



CONFERENCE PROCEEDINGS

# EDAMBA 2020

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FOR DOCTORAL STUDENTS  
AND POST-DOCTORAL SCHOLARS

FROM BETTER ECONOMICS TO BETTER  
ECONOMY

UNIVERSITY OF ECONOMICS IN BRATISLAVA,  
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# **EDAMBA 2020**

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for  
Doctoral Students and Post-Doctoral Scholars**

**From better economics to better economy**

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**University of Economics in Bratislava, Slovak Republic**

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## Foreword

The year 2020 turned out to be completely different than any of us imagined back when it started. Economic life has witnessed the fall of production, seizure of travel, our Earth got silenced. The COVID 19 pandemic has run our lives, our pockets, and often our moods. When choosing the title for EDAMBA 2020 we thought these proceedings would make valuable contribution to our view of economics, to our approach how to translate economic theory and empirical evidence into positive dynamics of real-data economic activities. However, amidst the COVID 19 pandemic we see that laws of economics may succumb to our fragility as human beings.

The University of Economics in Bratislava as the leading Slovak university in economics attempted to respond to the call to find new pathways between economics and economy amidst the COVID 19 pandemic by organizing the 23rd International Scientific Conference for Doctoral Students and Post-Doctoral Scholars on 27th October 2020 via online streaming. It was our great honor to host Andres Rodriguez-Pose from London School of Economics as the keynote speaker at the event with his address titled *Golfing with Trump*.

The papers collected in the proceedings were presented in six rather diverse parallel sessions of the conference, namely:

- 1) From Better Economics to Better Economy
- 2) Sustainable Growth in Changing Conditions of a Global World
- 3) Globalization as a Phenomenon in Trade and Marketing
- 4) Application of Knowledge Gained During the Study into Economic Practice
- 5) The Future in Economics Management Business and Related Areas,
- 6) Environmental Investments and Their Economic Significance, and
- 7) Migrations and the European Union & Nations and Cultures at Crossroad.

Proudly we present herewith the proceedings of the conference and hope that diverse as they are, they still are going to find the way to your hearts and make enjoyable and inspiring reading.

**Paula Puškárová**

*Conference Chair*

*Vice-Rector for Research and Doctoral Studies*

*University of Economics in Bratislava*

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# Methodology for analyzing consequences of the transition from US GAAP to IFRS

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**Abstract.** The article presents the results of partial research on the issue of the consequences of the transition of financial reporting from US GAAP to IFRS. The results presented in this article aim to be input data for further research, the implementation of which is the subject of the author's dissertation thesis. Based on qualitative research of a large number of sources and local research in the conditions of a multinational company that underwent the process of transition from US GAAP to IFRS, key hypotheses of the main research of the consequences of the transition from US GAAP to IFRS were formulated. Following these hypotheses, the main goal and partial goals were stated. The goals are concentrated in two fields - data analysis and process analysis. The last conclusion of the article is setting up the methodology of further research separately for both fields and the method of evaluating the results.

**Keywords:** financial reporting, global accounting standards, IFRS and US GAAP harmonization

**JEL classification:** F21, M41, M48

## 1 Introduction

The globalization of the world economy and the increase in the volume of international economic transactions already in the second half of the 20th century necessitated the existence of global accounting standards [9]. Differences in the accounting systems of individual states are based on different links between accounting and the legal system, different business practices, cultural and social characteristics, differences in the system of financing the business sector, and history. Following the differences, individual accounting systems can be classified according to different approaches and criteria, but we most often encounter the classification according to Beke [1], which distinguishes four models of accounting systems:

1. the continental model with a strong link to the legal system of states, typical of the states of the current European Union (EU), Japan and states with

historical or cultural-social connections to continental Europe, especially from Africa,

2. the Anglo-Saxon model based on the priority to satisfy the information needs of investors as the most important users of accounting information,
3. the South American model based on the conditions of the inflation economy with an emphasis on the information needs of the state, which is the most important user of accounting information in this model,
4. the mixed model combining elements of the first two above mentioned models, that applied mainly in the 90s of the 20th century in the countries of Central Europe, which were transforming a centrally controlled economy to a market economy.

The Czech authors Mládek [8] and Krupová [4] also identify themselves with the above division. Slovak author Manová [5]. describes this approach to the categorization of accounting systems as inductive, from a specific country to the general classification [5]. further complements the division of accounting systems with a deductive approach, which according to her "means the application of the general model to specific countries, [...] it is a confrontation of national policy with the sphere of individual enterprises [accounting units]." Based on the above, we distinguish between accounting systems based on a microeconomic model and a macroeconomic model. While the most important interests of society as the basic unit of the economy are crucial for the microeconomic model, the macroeconomic model is based on the subordination of society's interests to the state interest. The results of the business sector are closely linked to the state economy and society prospers only through intensive cooperation with the state.

The third approach to the categorization of accounting systems can be described as cultural-social. The difference in accounting systems is based on the historical development of the state and society, from which its social and cultural characteristics derive. From the sociological point of view, the determinants of the division in this approach are individualism and collectivism, the degree of conservatism, the extent of information openness of society, the flexibility of the legal and economic system, or regional disparities [5].

The origins of the global accounting system can be traced back to 1973 when the accounting organizations of Australia, Canada, France, Germany, Japan, Mexico, the Netherlands, the United Kingdom, Ireland, and the United States of America set up the International Accounting Standards Board (IASC) and have agreed to develop and adopt International Accounting Standards (IAS).

In 2000, the IASC was transformed into the International Accounting Standards Board (IASB) to consolidate international support for accounting harmonization in practice. Two years later, two important steps were taken in this direction.

1. On 19 July 2002, the European Union adopted Regulation (EC) No 1/2003 of the European Parliament and the Council. 1606/2002 on the application of international accounting standards, which aimed to "approve and use international accounting standards in the Community to harmonize the financial information provided by companies referred to in Article 4," that meant consolidated financial statements of publicly traded companies. The

standards in question were the accounting standards issued by the IASB, in particular the IAS, and subsequently issued by the International Financial Reporting Standards (IFRS) as well as the related SIC and IFRIC interpretations. A common IFRS designation has been adopted for all these international accounting standards.

2. The second major milestone in the harmonization process for enforcing IFRS in the world was 2002. A Memorandum of Understanding, also known as the Norwalk Agreement, was signed by which the IASB began working with the US Financial Reporting Standards Board (FASB), which publishes the US Generally Accepted Accounting Principles (US GAAP).

The long tradition of US GAAP, combined with US power at the turn of the 20th and 21st centuries, predestined US GAAP to gain a dominant position in the upcoming process of harmonization. It has been assumed that the principles and principles of US GAAP, verified by many years of practice, will be a building block of new, global accounting standards [5]. In the following years, however, this proved to be an incorrect assumption. The financial and economic crisis of 2007-2009 meant that the US had to take immediate steps to revive the financial market. One of them was an increased effort to converge to IFRS, to open the market to European investors.

A breakthrough in the convergence of US GAAP and IFRS was the decision of the Security and Exchange Commission (SEC), which ensures the functioning of regulated markets in the US: In December 2007, it issued a decision foreign companies registered on a US regulated market to accept financial statements prepared under IFRS without the need to transform them [10].

The reasons for the adoption of IFRS in the USA were mainly the need to support activity in the financial markets. The SEC stated in the explanatory memorandum that up to two-thirds of U.S. investors at the time owned securities of foreign companies that had to apply accounting information in two regimes to access the U.S. stock exchange. Differences arising from the transformation of IFRS statements to US GAAP have reduced the usefulness of accounting information for users and increased the costs of investors' decision-making due to the need to identify the results and assets of the transformation [5]. IFRS has become an integral part of the US accounting system, and indirectly the SEC has declared recognition of the supremacy of these standards over national accounting principles, thereby significantly strengthening their global position.

Given the above facts, to assess the relationship between IFRS and US GAAP, we identify with the attitude of the author Cvik and MacGregor Pelikánová [2], according to which "US GAAP is currently overshadowed by IFRS, but only the future and further development give us the answer to the question of whether the economic philosophy and the concept on which IFRS is based will be maintained worldwide and whether it will bring the expected result in terms of stability, transparency, and reduction of economic crime."

In practice, the dominance of IFRS is reflected in the increasing number of multinational US-based companies that are fully transitioning to IFRS reporting, despite the geopolitical characteristics of the parent company [7].

Historically, the application of IFRS to the detriment of US GAAP in multinational companies has developed in the same way as at the state level. At the beginning of the

21st century, it was the primary set of US GAAP standards, not only in US-based companies but in most companies whose shares were traded on the US stock exchange. An example is the Credit Suisse Group, which in 2001 faced a decision on how to set up processes in its financial centers and opted for US GAAP, as IFRS was in the process of being created and the company's shares were traded on the US stock exchange [3].

Other examples are the American companies IBM and Intel, which had a significant part of their business in the EU at the beginning of the 21st century, but primarily kept US GAAP accounting. They have dealt with the transformation to IFRS or national accounting standards only to comply with the regulatory requirements of individual Member States [3].

Only since 2010 have we seen the first significant transformations from US GAAP to IFRS in the conditions of multinational companies. In terms of the flow of accounting information in a multinational company, we distinguish between multinational companies [1]:

1. with a homogeneous accounting system - the whole structure of a multinational company is governed by a single set of accounting standards, usually IFRS. Both subsidiaries and the parent prepare their financial statements under the same accounting standards, regardless of their country of residence. These are usually multinational companies operating in the EU, whose subsidiaries meet the conditions for the preparation of financial statements under IFRS in their home countries,
2. with a heterogeneous accounting system - within the structure of a multinational company, there are accounting entities with the obligation to prepare financial statements according to different accounting standards. It is usually a combination of national accounting standards and transnational accounting standards IFRS. In the case of more complex structures across the European continent, both IFRS and US GAAP can be applied at the supranational level.

However, in the case of multinational companies whose shares are traded on the US stock exchange, we must also operate with other alternatives, in particular with the possibility that the financial statements prepared under IFRS are subsequently transformed into the "Form 8-K" statement. SEC. In this statement, accounting information is again reported under US GAAP. Companies domiciled in the USA have a reporting obligation; foreign companies, as mentioned above, have been able to present accounting information under IFRS since 2007.

A large number of scientific and commercial publications deal with the comparison of US GAAP and IFRS accounting standards. Therefore, our objective is not to compare individual standards and identify differences, but to build on the current level of knowledge and evaluate which differences between US GAAP and IFRS have a material effect on the facts reported in the financial statements and the nature of that effect.

## 2 Research Methodology

The presented article is a presentation of the results of partial research forming a theoretical basis for the analysis of the consequences of the transition of reporting from US GAAP to IFRS (hereinafter referred to as "main research"), to which the methodology of its processing is subordinated.

The aim is to establish a new set of knowledge based on the interrelation between economic practice and theory. Furthermore, there are goals to be stated on how the main research should be conducted and what are the most significant parts to be focused on, when analyzing the process of transition from US GAAP to IFRS in a certain company.

The need and benefits of the partial research presented in this article arise from the extent of the issue of the transition from reporting according to US GAAP to IFRS, resp. from the extent of the effects of the change in accounting standards on the facts reported in the financial statements. We have divided the goal of this partial research into three sub-goals realized in a logical sequence. They are:

1. establishment of a knowledge base for the issue of US GAAP to IFRS transition,
2. creation of a structure of key areas that need to be taken into account when deciding whether the transition from one set of accounting standards to another, is effective for a given company
3. determination of a set of methods and environmental factors that are suitable for analyzing the problem of transition from US GAAP to IFRS.

The first phase of the presented partial research was a thorough literature search of a wide range of sources to varying degrees linked to the issue of differences between IFRS and US GAAP accounting standards. The dynamics of the development of harmonization of IFRS and US GAAP accounting standards are taking place mainly in the forum of professional institutions associating accounting experts and the standard academic literature is not able to reflect these changes quickly enough, which was reflected in the source structure of the presented partial research.

We used methodological tools - induction, deduction, and abstraction - to connect the acquired knowledge and create logical connections. Equally important is the causal analysis process to reveal the links between seemingly unrelated findings. As ancillary thought operations, we applied synthesis, to summarize partial knowledge, and to compare.

The second phase took place as a local survey in a selected multinational company, which at the time was undergoing a process of transformation from US GAAP to IFRS. The local survey took place in the form of a critical interview with selected employees of the statutory accounting department, which dealt with setting up the process of transformation of individual items of the financial statements and subsequently creating a plan for the transformation process.

### 3 Results

#### 3.1 Knowledge base statement based on local company research

The analysis of the consequences of the transition from US GAAP to IFRS reporting resulted in two crucial statements marked as R1 and R2. Their formulations are as follows:

***R1: In the medium term, the change in reporting from US GAAP to IFRS harms the quality of the accounting information presented in the financial statements.***

The starting point of this conclusion is the existence of three significant risks that affect the degree of usefulness of accounting information in a given context:

1. Insufficient adaptation of users - internal and external users need sufficient time to acquire the necessary knowledge and understanding of the content of the new accounting standards and to be able to apply them in practice. If sufficient time is not created, a paradox may arise to increase the quality of accounting information while reducing its usefulness to the user. The discrepancy is that although new accounting standards make accounting information more accurate and reinforce the principle of providing a true and fair view, users are not yet adapted to change and are unable to accept or interpret this information correctly in their decision-making process.
2. Temporary disruption of continuity and conformity - differences of new methods and procedures compared to the original, used methods and procedures may cause a temporary decrease in the comparability of accounting information in time and space, which may lead to incorrect decisions of users and ultimately to capital instability.
3. Temporary non-compliance with the principle of the reasonableness of costs of obtaining accounting information - when moving to a new set of accounting standards, the costs of transforming accounting systems and working procedures may be disproportionately high, temporarily violating one of the obstacles to quality assurance in accounting information.

The determination of the medium-term time horizon is based on a thorough analysis of the harmonization of US GAAP and IFRS and means a period of one to five years from the introduction of the new set of accounting standards. In the long run, the convergence process of US GAAP and IFRS leads to an increase in the usefulness of accounting information for users, especially in terms of comparability and the ability to express a true and fair view of the entity's financial position. This objective was declared by the IASB and the FASB in 2002 in the Norwalk Memorandum of Understanding. From a short-term point of view, it is not possible to evaluate the impact within one year, given the standard length of the accounting period - 12 consecutive months.

***R2: The quality of the accounting information reported in the financial statements following the transition from US GAAP to IFRS is directly proportional to the quality of the transition process in the entity.***

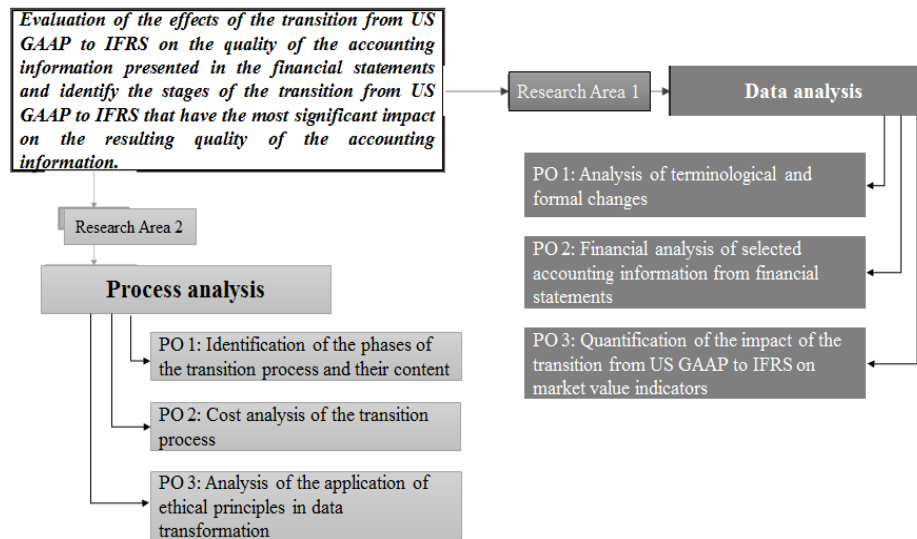
We evaluated the process of transition from US GAAP to IFRS reporting as a key factor in the quality of the transformation of accounting information. We assume that the change in IFRS reporting will be transferred to all accounting processes, from the initial processing of accounting documents to the presentation of accounting information in the financial statements at all levels. The quality of this process has three determinants:

1. professional competence and time capacity of human resources,
2. information flows and the processing cycle of accounting documents in the accounting unit,
3. the implementation readiness of the entity, i. the quality of the transition process plan.

### 3.2 Key determinants of the efficiency of the US GAAP to IFRS transition

There are two most crucial determinants of the efficiency of the US GAAP to IFRS transition. The first one is the effect on the quality of accounting information presented in the financial statements. The second is based on the need to identify the stages of the transition from US GAAP to IFRS that have the most significant impact on the resulting quality of accounting information.

We have divided this issue into two parts, which we called Research Areas (RA). Within each Research Area, we subsequently set three partial objectives (PO), which not only determine the focus of the partial work, but also the logical and temporal sequence of the research steps (Fig.1).



**Fig. 1** Structure of the key efficiency determinants and their analysis

### 3.3 Determining the research environment and methodology

We have been analyzing the formulated key efficiency determinants through a combination of various scientific methods of quantitative and qualitative research, the choice of which depended on the research environment and available data.

The environment of the US GAAP to IFRS transition was a multinational company, which in the years 2015 to 2020 underwent the process of transition from US GAAP to IFRS and is currently evaluating its implications for internal and external users of accounting information and the market value of the company. The selection of the key determinants of efficiency was preceded by an analysis of financial statements, annual reports, and information from the websites of the most important multinational companies, which have their shared service centers (hereinafter referred to as SSC) in Bratislava. We have identified some criteria to be met to reliably assess the effectiveness of the transition.

1. SSC with its registered office in Bratislava has in its portfolio the processing of accounting documents and the reporting of the group's accounting information,
1. the multinational company is in the process of transitioning from US GAAP to IFRS or has already completed this process at the time of the main research,
2. the multinational company issues shares traded on a public market in the United States.

We determined the key efficiency determinants used in the main research according to the partial RAs presented in the previous subchapter. Separately for individual **Research Areas** (hereinafter RA), as follows:

**RA 1** - the focus was on quantitative research with the dominance of financial analysis tools. The result of the ex-post analysis of selected items of the financial statements and the construction of various financial indicators were a comparison of selected indicators of activity, profitability, and indebtedness calculated separately from the financial statements according to US GAAP and IFRS prepared for the same accounting period.

The basic starting point was the fact that in the transition process the analyzed multinational company reported accounting information in two consecutive accounting periods, according to both sets of accounting standards, US GAAP, and IFRS. Subsequently, by constructing a pyramid indicator of profitability, we identify the impact of the development of individual variables on profitability.

We applied the same procedure for market value indicators, among which we will work mainly with three of them, which we consider the most relevant for external users of accounting information, especially investors [6].

#### a) **EPS - Earnings Per Share**

$$\frac{\text{Net Income} - \text{Preferred Dividend}}{\text{Weighted Average No. of Common Shares Outstanding}}$$



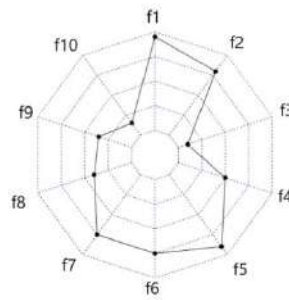
**b) P/E ratio (Price/Earnings ratio )**

$$\frac{(\text{Market Price of Share})}{(\text{Earnings per Share})}$$

**c) P/BV ratio (Price/Book-value ratio )**

$$\frac{\text{Price Per Share}}{\text{Book Value Per Share}}$$

**RA 2** - a central scientific method we proposed for analyzing the second efficiency determinant is an extended form of SWOT analysis presented in the form of a radio diagram. Individual factors are assigned weights based on their significance. We encounter a similar method when determining the company's strategy [11], but for the needs of our research, we will use it to determine the optimal process of transition from US GAAP to IFRS. For each of the partial goals of OV 2, we will create a diagram, the area of which will express the quality of the transition process. The peaks of the diagram will be individual determinants of quality in the researched areas in terms of PC 1 to PC 3. Individual peaks for each of the partial goals are determined based on scientific methods of qualitative research - local observation, standardized questionnaire, critical interview, and analysis of process documentation. An example of a graphical representation of the outputs from RA2 is shown in Fig. 2, where instead of f1, f2, etc. will be the individual factors of the quality of the transition process.



**Fig. 2** Graphical method of SWOT analysis

presentation of the Space

## 4 Discussion and conclusions

We consider the results achieved in the presented article to be the starting point for the following main research of the consequences of the transition of financial reporting from US GAAP to IFRS in the specific conditions of a multinational company. We focused on the synthesis of various financial and non-financial areas to create a comprehensive view of the issue. In the non-financial area, the main issues are ethical approach in the process of change in financial reporting standards and the dimension of human resources qualification and management. In the financial area, the main focus is placed on changes in the market value of the company due to changes in applied accounting standards.

The scope of the prepared main research is unprecedented in the conditions and content in the Czech and Slovak Republic, therefore it has required separate preparatory research. We set the knowledge base of the process of transition from the US GAAP to the IFRS so that it allowed the confirmation of the formulated key efficiency determinants and at the same time it established space for subsequent research in the given issue.

The conclusions of the presented article can be generalized as follows:

1. In the process of harmonization of accounting standards, IFRSs assume a dominant position that presupposes the transformation of the accounting processes and financial reporting of multinational corporations into the requirements of those accounting standards.
2. The transition from one set of accounting standards has a multidisciplinary character and the analysis of its consequences requires analysis at least two levels - data and process.
3. The personnel and ethical dimensions of the transition process are aspects from which the issue of transition from US GAAP to IFRS is completely abstracted in the professional literature, while their qualitative characteristics largely determine the quality of accounting information and results of the transition.

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# Industry and its impact on the environment of the Republic of Kazakhstan. Waste management system

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**Abstract:** The role of industry in the economy of the Republic of Kazakhstan is quite large and represents about 38% of the country's GDP. Waste generated as a result of industrial activities and solid household waste constitute a big problem for the ecology of the country. In this article, we analyzed the waste management system in Kazakhstan and came to the conclusion that it is ineffective, and it requires improvement under the strict control and coordination of the state.

**Keywords:** industry, Republic of Kazakhstan, industrial waste, solid waste.

**JEL classification:** *F 64, Q 53*

## 1 Introduction

Economic growth, prosperity and well-being of the population is one of the main tasks and responsibilities of every state. The current task and duty of the state is to ensure economic growth without devastation of the environment. Nevertheless, today we can observe global ecological unsustainable growth with its tragic consequences for the ecology [7].

The Republic of Kazakhstan, as the economic leader of the Central Asia region, is a country with significant reserves of energy raw materials (oil, hard coal, natural gas, uranium) and a large amount of various minerals such as tungsten, chromium, iron ore, manganese, silver, lead, zinc, titanium, copper, gold, and others. These natural resources enable Kazakhstan to successfully develop industry (mining, metallurgical, chemical, petrochemical, engineering) and subsequently ensure the economic prosperity of the state. On the other hand, these energy sources and mineral resources are non-renewable and require rational, pragmatic, and careful treatment. Reducing of the high consumption of raw materials, which entails the emission of exhaust fumes into the air, water pollution and the accumulation of large amounts of industrial waste as by-products, is a part of the strategic economic development plan of every developed country, including Kazakhstan [7].

The Government of the Republic of Kazakhstan places great emphasis on strategic infrastructure planning, and it has prepared number of documents in which it

defines its main tasks in the field of economy and state development in the context of sustainable economic growth. These initiatives are summarized in the main government infrastructure program „Nurly Žol“ (Light Road), which is focused on the usage of regional projects One Belt, One Road and CAREC (Central Asia Regional Economic Cooperation Program) and ultimately to achievement of the main goal – to become one of the first thirty most advanced economies in the world by 2050. The principles of sustainable economic growth are also included in the Kazakhstan Development Strategy until 2030, the Strategic Development Plan of the Republic of Kazakhstan until 2020, the Ecological Code of the Republic of Kazakhstan, the Concept of the Transition of the Republic of Kazakhstan to the „green economy“, etc. The Government Council for Sustainable Development of the Republic of Kazakhstan has been established since 2005 to achieve the set goals more effectively and coordinate them, too. [16].

Kazakhstan is also an active member and supporter of international climate conferences and agreements. Back in 1992, President of Kazakhstan Nursultan Nazarbayev signed the United Nations Framework Convention on Climate Change (UNFCCC) during the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro [4]. The Kyoto Protocol entered into force in 2005 and it has been ratified by the Law of the Republic of Kazakhstan in 2009 [3]. *„At the 21st Conference of the Parties in Paris in 2015, the parties to the UNFCCC reached a major agreement to combat climate change and accelerate and intensify the activities and investments needed for a sustainable future with lower carbon emissions“* [17]. On Earth Day, April 22, 2016, Kazakhstan signed the Paris Convention at the UN headquarters in New York City [18].

As the issue of sustainable economic growth is very comprehensive and topical for the Republic of Kazakhstan, for the analysis in this paper we concentrate on the role of industry in the economy of the Republic of Kazakhstan in the context of its impact on the state environment. We will focus on the share of industry in the overall structure of Kazakhstan's GDP, its main sectors, and its development trend. The aim of our contribution will be to determine how dangerous is the mentioned sector of the economy for the ecology of Kazakhstan in terms of the amount of waste produced due to its development. We will focus on the trend of production of industrial waste and municipal solid waste (hereinafter MSW) as well as their management system in the Republic of Kazakhstan.

## 2 Industry and its role in the structure of the economy of the Republic of Kazakhstan

The economy of the Republic of Kazakhstan during the period from 2013 to the present, as the official statistical data of the Ministry of National Economy of the Republic of Kazakhstan allow us to claim, has had a constantly growing tendency. As shown in Table 1, Kazakhstan's GDP, denominated in the national currency – tenge, has indeed been on an upward trend since 2013, and by 2019 the indicator had doubled. Kazakhstan's GDP in 2019 is 68,956 billion tenge. According to the World Bank, which provides information in dollars, the trend in Kazakhstan's GDP is less linear. From 2013 to 2016, we can observe a large decline in the indicator, which in the following period began to stabilize and then grew. In 2019, Kazakhstan's GDP in dollars reached 180 billion. The current growth rate of the Kazakh economy maintains relatively high numbers. In 2019, GDP growth reached 4.5%. The favorable dynamics have been maintained since 2017 due to high investment and consumer demand [9]. GDP per capita in 2019 (according to a preliminary estimate) was 3,725,582 tenge or 9,731 dollars [10].

**Table 1.** The trend of GDP development of Kazakhstan in 2013 – 2019.

	2013	2014	2015	2016	2017	2018	2019
<b>GDP (bil. KZT)</b>	35 999	39 676	40 884	46 971	54 379	61 820	68 956
<b>GDP (bil. USD)</b>	237	221	184	137	167	179	180
<b>Annual growth in %</b>	6	4,2	1,2	1,1	4,1	4,1	4,5

*Source: Ministry of National Economy of Kazakhstan, 2020*

*The World Bank, 2020*

The main component in the GDP structure of the Republic of Kazakhstan is the services sector. Its share during the entire monitored period exceeded 50% and in 2019 it represented 56%. Nevertheless, the value does not reach the level of developed economies.<sup>1</sup> The greatest importance for the economy of Kazakhstan in the field of services is wholesale and retail, transport and storage, and real estate services. Sixty six percent of Kazakhstan's population work in services [9].

Industry is the second most important sector of the economy of the Republic of Kazakhstan. The share of industry in GDP in 2019 was 27.5%. The tendency of the development of the given indicator during the whole monitored period has a permanently stable high level – above 25%. The volume of production of industrial production (goods and services) in 2019 reached more than 29 billion tenge. The index

<sup>1</sup> The share of services in GDP in economically developed countries reaches (and in some exceeds) 70%. The largest producers and exporters of services are currently the USA (79% of GDP).

of the volume of industrial production in 2019 compared to the previous year represented 104%. The most important sectors of Kazakhstan's industry are the mining and quarrying industry (14.5%) and industrial production (11.4%). Thirteen percent of the state's population is employed in this sector.

Agriculture is not very important for the economy of Kazakhstan and accounts for 4.5% of its production. The given development trend is observed during the whole monitored period. Nevertheless, it creates up to 15% of the total number of jobs, which is of great importance in the field of employment. Cereals, sunflowers, rape, flax, cotton, rice, and others are mainly grown in Kazakhstan.

**Table 2.** Structure of Kazakhstan's GDP in 2013 – 2019 in %.

	2013	2014	2015	2016	2017	2018	2019
<b>Total GDP</b>	100	100	100	100	100	100	100
<b>Industries producing goods</b>	<b>38,3</b>	<b>37,6</b>	<b>35,5</b>	<b>36,6</b>	<b>36,5</b>	<b>38,3</b>	<b>37,5</b>
Agriculture, forestry, fishing	4,5	4,4	4,8	4,6	4,4	4,2	4,5
Industry	27,8	27,3	24,7	26,1	26,5	28,7	27,5
Mining industry	15,2	15,2	12,7	12,9	13,3	15,2	14,5
Manufacturing	10,7	10,2	10,1	11,3	11,2	11,6	11,4
Electricity, gas, steam	1,6	1,6	1,7	1,7	1,7	1,6	1,4
Construction	6	5,9	6	5,9	5,6	5,4	5,5
<b>Sectors producing services</b>	<b>53,1</b>	<b>54,8</b>	<b>59,4</b>	<b>57,8</b>	<b>57</b>	<b>54,4</b>	<b>55,5</b>
<b>Gross value added</b>	91,4	92,4	94,9	94,4	93,5	92,7	93
Net taxes on products	8,6	7,6	5,1	5,6	6,5	7,3	7

*Source: Ministry of National Economy of Kazakhstan, 2020*

The mining and quarrying industry accounts for more than half of the production volume in industry. According to the latest published data, in 2019, its value reached about 16 billion tenge, which is 54.4% of the total volume. The key is oil extraction, which accounts for 42%. Industrial production in that year accounted for 11.5 billion tenge or 39.4% of Kazakhstan's total industry. The main component of industrial production is the metallurgical industry (17%). Smaller shares are provided by food production (6%), repair of machinery and equipment (5%) and production of coke and refined petroleum products (3%).

„Kazakhstan has proven oil reserves of 30 billion barrels (3.9 billion tonnes), with Tengiz, Karachaganak and Kashagan as the main production areas“ [9]. In 2018, according to British Petroleum, the volume of oil extracted in Kazakhstan reached 91.2 million tonnes [1]. This indicator is the largest for the whole period of independence of the republic after the collapse of the USSR. Kazakhstan is also rich in minerals such as

copper, lead, zinc, titanium, magnesium and precious metals (gold and silver). According to iron ore reserves, Kazakhstan is ranked 8th in the world. The value of iron ore reserves is 8.7 billion tonnes, which represents about 6% of world reserves [9].

**Table 3.** Volumes and indices of industrial production by type of activity in 2019.

	<b>2019 (mill. KZT)</b>	<b>Index 2019/2018</b>	<b>Rate of 2019 in %</b>
<b>Total industry</b>	<b>29 380</b>	<b>104,1</b>	<b>100</b>
<b>Mining and quarrying industry</b>	<b>15 978</b>	<b>103,1</b>	<b>54,4</b>
• Oil extraction	12 257	100,2	41,7
• Mining of non-ferrous metals	1 492	113,1	5
• Iron ore mining	416	109,3	1,4
• Extraction of natural gas	397	101,7	1,4
<b>Industrial production</b>	<b>11 573</b>	<b>105,8</b>	<b>39,4</b>
• Metallurgical industry	4 965	105,5	16,9
• Food production	1 708	103	5,8
• Manufacture of coke and refined petroleum products	840	105,7	2,9
• Repair of machinery and equipment	1 472	124,1	5
• Products of the chemical industry	475	102	1,6
• Other non - metallic mineral products	632	102,3	2,2
<b>Electricity, gas and steam</b>	<b>1 561</b>	<b>100,6</b>	<b>5,3</b>
• Electricity generation/ distribution	1 121	104,5	3,8

*Source: Ministry of National Economy of Kazakhstan, 2020*

Despite the current economic situation, which is largely affected by the COVID-19 pandemic, according to the 4th months of this year, the volume of industrial production in Kazakhstan increased by 5.9%. According to the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan, the increase was recorded in the automotive, textile, pharmaceutical and metallurgical industries. At the same time, there are 13 special economic zones and 23 industrial zones in Kazakhstan [11].



### 3 Impact of industry on the environment of Kazakhstan. Waste management system

The important role of industry for the economy of Kazakhstan and the growing tendency of its development brings to the state not only economic growth and prosperity, but also a number of environmental threats. Due to industrial growth, millions of tonnes of sulfur dioxide, hydrogen sulfide, nitrogen dioxide, hydrocarbons, ozone, ammonia, carbon monoxide, and dust fall into the air every year. Extraction and processing industry in addition to large amounts of water consumption, also entails the formation of waste water, hazardous to the environment. As a result of industrial production, surface water is contaminated by oil products, compounds of copper, iron, zinc, surfactants, phosphorus, phenol, ammonium and nitrite nitrogen, which often end up in the composition of groundwater. Mining also leads to destruction of natural landscapes, destruction of soil cover and disruption in the hydrological balance of groundwater.

In the second chapter of the paper, we will focus on the impact of industry on ecology and especially on the issue of industrial and municipal waste in the Republic of Kazakhstan and measures taken to improve the current situation.

Although the topic is very current and actively addressed at the highest level of the state, it dates back to the past. *„There is historical industrial waste in Kazakhstan, including man-made mineral formations. During the period of the Soviet industrial five-year plans, significant volumes of waste from heavy industry, the agrarian complex and the development of mineral resources have been accumulated. At the same time, a significant part of this waste is very toxic and has a high level of radioactive contamination“* [12]. Minister of Ecology, Geology and Natural Resources Magzum Mirzagaliyev said that as of 2018, the country has accumulated a colossal volume of POP-containing waste since Soviet times, 40.3 thousand pieces of PCB-containing oil transformers and capacitors, 82.6 tonnes and 4 100 liters obsolete banned, unusable pesticides, 3.7 thousand tonnes of buried pesticides, and 13.5 thousand pesticide containers, despite the fact that there is no production of POPs in Kazakhstan [6].

After the collapse of the Soviet Union, former President of the Republic of Kazakhstan, Nursultan Nazarbayev, in 1992 in his book *„The strategy of resource conservation and transition to the market“* emphasized the importance of creating a system for waste disposal and recycling: *“full and effective use of secondary raw materials in the form of waste and their transformation into a new consumer value is an important direction for improving the environment”* [15].

The volume of industrial waste generated in Kazakhstan even after the collapse of the Soviet Union has a growing tendency, which only aggravated the situation. More than 900 million tonnes of industrial waste are generated every year.<sup>2</sup> During the period under review, in 2014, more than 980 million tonnes of waste were generated as a result of industrial production in the state. Only 23% or 226 million tonnes of the waste was disposed of. The volume of industrial waste generated in 2015 was slightly higher and reached 982 million tonnes. Only 23% were also utilized. A comparatively small proportion of waste in Kazakhstan is MSW. In 2014 and 2015, more than 5 million

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<sup>2</sup> In 2010 – 786 mill. tonnes, in 2011 – 1 101 mill. tonnes, in 2012 – 961 mill. tonnes, in 2013 – 978 mill. tonnes.

tonnes were produced. Disposal of the waste is also very small and represents only 2%. The share of utilized waste products is slightly higher and represents about 30% of the total volume.

**Table 4.** Volumes of planned waste for 2014 and 2015, million tonnes.

Type of waste	2014	2015
Generated industrial waste	979,6	982,2
Disposal of industrial waste	225,5	227
The share of production waste utilization to their formation	23	23,12
Generated municipal solid waste	5,3	5,5
Disposal of municipal solid waste	0,1	0,09
The share of utilization of municipal solid waste to their generation	2,21	1,8
Generated hazardous waste	337,4	251,6
Disposal of hazardous waste	110	74
Share of hazardous waste disposal	32,6	29,5

*Source: Ministry of Ecology, Geology and Natural Resources, 2020*

Since 2016, the statistical information provided by Ministry of Ecology, Geology and Natural has changed. The waste was categorized into four groups: hazardous, non-hazardous, radioactive and municipal solid waste. From Table 5 we can see that the volume of waste discharges and MSW has a slightly decreasing tendency and the volume of non-waste discharges is gradually increasing. Also, the statistics give us the opportunity to see that there is produced about 0.13 million tonnes of radioactive waste in Kazakhstan every year.

**Table 5.** Waste generated in 2016 – 2018, million tonnes.

Type of waste	2016	2017	2018
Generated hazardous waste	151,4	126,9	149,96
Generated non-hazardous waste	169,6	278,2	295,5
Generated radioactive waste	0,13	0,16	0,13
Generated municipal solid waste	5,4	4,8	4,3

*Source: Ministry of Ecology, Geology and Natural Resources, 2020*

The main types of industry producing industrial waste are mining, metallurgical, oil and gas production, and heat and power industries. *„About 99% of hazardous waste from the manufacturing industry and more than 90% of all waste from the mining industry is generated precisely in the metallurgical industry and the production of finished metal products. This fact characterizes this industry as the most environmentally unsafe among other industries“* [16].

According to the latest published statistics, in 2019, the country accumulated about 31.1 billion tonnes of industrial waste. These are mainly man-made mineral formations (MMF), including overburden and ash (70% of the total), waste from the manufacturing industry (10% of the total) and other activities (20%) [13]. As the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan informs us, the level of industrial waste processing is also growing. In 2019, 34% of production waste was recycled, which is 10.9% more than in 2015. The remaining volume of industrial waste, which is about 680 million tonnes annually, is sent to tailings and landfills throughout the country. As of today, 1.5 thousand of such objects are registered in the State Cadastre of MMF [13].

The authorities' particular concern and the danger to the country's ecology and the health of the population of Kazakhstan are 170 million m<sup>3</sup> of radioactive waste. Minister Mazgum Mirzagaliyev also said that the Koshkar-Ata uranium-containing waste storage facility is a serious environmental problem in the Caspian region. The total area of the disposed waste is 66 km<sup>2</sup>. A total of 105 million tonnes of toxic and radioactive waste have been disposed there [6].

About 4.5 – 5 million tonnes of municipal solid waste is generated in the Republic of Kazakhstan annually. In 2019, the volume of solid waste amounted to 4.7 million tonnes.<sup>3</sup> The share of recycled and disposed MSW is also growing annually, and in 2019 this indicator reached 15%.<sup>4</sup> Sorting and processing of solid waste is carried out in factories in the cities of Nur-Sultan, Shymkent and Zhanaozen, as well as at enterprises, mainly small and medium-sized businesses. By today, 3,292 facilities for the disposal of solid waste have been created in Kazakhstan, of which only 601 (18%) comply with environmental and sanitary standards. Also, the government is fighting unauthorized landfills. By the end of 2019, 2,590 (28%) were disposed of from 9,229 illegal dumps [13].

Certainly, the ecological situation with both industrial and municipal waste in Kazakhstan is poor. The concept of the Republic of Kazakhstan's transition to a „green economy“, adopted by Presidential Decree in 2013, also regulates the state policy concerning the problem of waste in the state. Targets are set for 2030 to create the infrastructure for recycling/disposal of hazardous and toxic waste for 100% waste and also to process 50% MSW by 2050 [5]. These plans are very ambitious, which will not be so easy to achieve, and the achievement of the set goals will require rather large financial resources.<sup>5</sup>

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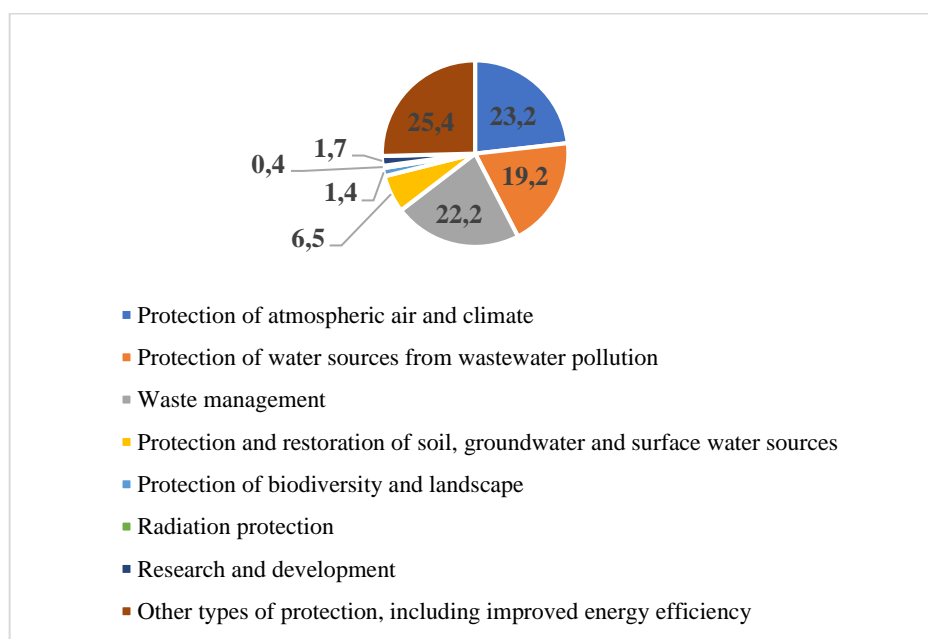
<sup>3</sup> In 2017, the volume of SHW amounted to 4.9 million tonnes, in 2018 – 4.3 million tonnes.

<sup>4</sup> In 2017, the share of recycled and disposed solid waste was 9%, and in 2018 – 11.5%.

<sup>5</sup> The total investment requirement by 2050 for the Waste Management Program is 4 billion dollars.

As of 2018, the level of government spending on environmental protection amounted to 302.2 billion tenge. This is slightly higher than the level of the previous year [8]. Below, we provide the structure of environmental protection costs in the Republic of Kazakhstan by types of environmental activities in 2018.

**Fig. 1.** The structure of costs for environmental protection in the Republic of Kazakhstan by types of environmental activities in 2018.



Source: Ministry of National Economy of Kazakhstan, 2020

As we can see from this diagram, the share of waste management costs in 2018 was about 22% of the total.

To achieve the set goals and move the economy of Kazakhstan towards „green economy“, the government has developed the project Waste of Energy. The main idea of the project is to incinerate waste to generate electricity by analogy with renewable energy sources. Also, this project will give an impetus for the introduction of technologies and attracting investments in the field of recycling and disposal of waste. According to the Minister of Ecology, Geology and Natural Resources of the Republic of Kazakhstan: „in general, the introduction of this mechanism will allow attracting at least 500 million dollars to the incineration industry in the next few years. It is planned to increase the share of thermal utilization from the total volume to 30% by 2025“ [2]

Today we can see that the government and those who are directly responsible for this area of environmental protection as ministries and their subordinate bodies, industrial companies, and the people of Kazakhstan itself have to build a comprehensive and effective waste management system.

## 4 Conclusion

The industry of the Republic of Kazakhstan plays an important role in the economy of the state. Despite efforts of the state officials to diversify the economy, the mining and metallurgical industries have historically been one of the main drivers of Kazakhstan's economic growth. At the same time, industry, and especially the mining and metallurgical industries, produce the largest amount of hazardous industrial waste.

As part of the strategy and concept, the state leadership set goals for the storage and treatment of industrial waste and MSW by 2050, however, we can see that the current situation of waste management systems is insufficient and inefficient.

The main problems and shortcomings of the waste management system in Kazakhstan are:

- 1) the legacy of historical industrial waste from the times of the Soviet Union;
- 2) an annual increase in the volume of new industrial waste by at least 900 million tonnes and their accumulation (currently more than 31 billion tonnes of industrial waste);
- 3) an annual increase in the volume of household waste by 4.5 – 5 million tonnes;
- 4) „the organization of public services does not meet the standards. Outside large cities, on average, only a quarter of the population has access to services for the removal of solid waste. There are also significant regional differences in service coverage“ [5];
- 5) the volume of processing of industrial waste in 2019 is 34%, and municipal solid waste is about 15%;
- 6) undeveloped infrastructure of the collection, processing and disposal of industrial waste and municipal solid waste;
- 7) a lack of economic incentives and a low level of control of the adopted norms by the state;
- 8) a large number of illegal dumps and landfills;
- 9) a lack of a clear mechanism of interaction between various ministries, departments for policy development and supervision over industrial waste and municipal solid waste;
- 10) insufficient regulatory framework and statistical data in the waste management system.

These and many other obstacles will have to be addressed by the government of Kazakhstan on the way to achieving the goals of the Concept of Transition to a „green economy“. However, we can see a positive trend in the development of utilization and processing of industrial waste and solid waste, specific projects, and plans for the formation of an integrated waste management system.

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## Hidden reserves in financial management

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**Abstract.** The purpose of this paper is to analyze the issue of hidden reserves, which are an instrument of financial management of an entity. Compliance with the entity's accounting policies also means that, at the end of each reporting period, when preparing the financial statements, the entity recognizes provisions and adjusts its assets to fair value. An entity may adjust the value of an asset only if the actual valuation of the asset is lower than its valuation in the accounts. This will respect the principle of truthful and faithful representation of the facts that are subject to accounting. If the actual value of an asset is greater than its carrying amount, it cannot reevaluate the asset upwards and therefore creates a hidden reserves for the entity. We also explained the emergence of hidden reserves in an illustrative example in the automotive industry, where we compared the cost of land with the real fair value of land determined by an expert.

**Keywords:** hidden reserves, the precautionary principle, the valuation

**JEL classification:** M40, M41

### 1 Introduction

It is the duty of financial management in the conditions of globalization of the economy to provide the entity with growth in performance and success through constant search for solutions and decision-making. An important instrument of financial management is also the hidden reserve, which is an active management tool through which financial management can influence the economic result and distort the real picture of the economic situation of the entity for both internal and external users.

The purpose of this paper is to clarify the motives for when hidden reserves are created and used and how hidden reserves affect the financial statements.

## 2 The impact of financial management on the enterprise

Each entity seeks to achieve strategic and operational objectives that represent effective financial management. The main objective of financial management is to ensure sufficient financial resources and to place them so that they are used efficiently while ensuring a balance between profitability, indebtedness and liquidity. The whole process of financing an entity should be managed in such a way that sufficient financial resources are secured at minimum cost to avoid increasing the financial risk of the business. (Fireš a Zelenka, 1997)

Hidden reserves are an important instrument in the financial management of an entity. Hidden provisions can be characterized as a portion of equity that is not recognized in the financial statements. Hidden provisions are not recognized in the balance sheet or income statement and even in the entity's notes and are created prior to the preparation of the financial statements. If an entity applies the precautionary principle in accounting and in preparing its financial statements, this often results in the creation of hidden reserves. Hidden reserves are used as an instrument to ensure the long-term existence of an entity, since their creation and dissolution may affect the entity's profit or loss. (Pakšiová, 2012)

They are also a cheap source of financing for business activities. Hidden reserves are an instrument of balance sheet policy. Distortion of financial statements through tacit reserves may result in a failure to observe the principle of fair and fair presentation. (Šlosárová a Blahušiaková, 2017). If financial management chooses to handle tacit reserves, an entity may use this to its advantage although the entity's actual picture is different. Hidden reserves cannot be identified directly from the balance sheet and are therefore latent on the outside. Thus, the information contained in the financial statements cannot provide sufficiently truthful and relevant data for the users of the financial statements.

Hidden reserves cause distortions in equity as well as some assets or liabilities. Thus, in the accounting period when the hidden reserves are created, the entity reduces its profit or loss and conversely in the period when the entity achieves a low profit or loss, it may adjust the profit or loss by reversing those provisions. By manipulating hidden reserves, the entity achieves the required optimum operating result.

## 3 Hidden reserves

The creation of hidden reserves allows an enterprise not to make unrealized gains and thus prevents the payment of dividends and taxes.

### 3.1 Creation of the hidden reserves

Hidden reserves are therefore distinguished in a broader and narrower sense: (Šlosárová, 2006)

1. In a broad sense hidden reserves represent the difference between a lower carrying amount and a higher fair value of an asset or a difference between a higher carrying amount and a lower fair value of liabilities. An example of a hidden reserve that represents the difference between a lower carrying amount



and a higher actual value of assets is the creation of excessively high provisions that do not reflect a temporary projected impairment of assets or the existence of fixed assets and inventories with a carrying value greater than carrying amount and caution in this case does not allow an increase in the valuation of assets in the accounting entity. For example, the hidden reserves that result from the difference between the higher carrying amount and the lower fair value of liabilities are the recognition of liabilities in the balance sheet that are likely to arise.

2. In the strict sense the hidden reserves represent realized profit. For example, if such costs or revenues are charged that are included in the period in question, even though the expenditure or income has not yet been incurred. Another example is the posting of a large amount of depreciation that does not really reflect the wear and tear of the asset.

Hidden reserves arise either when the assets are underestimated in accordance with the precautionary principle or when the liabilities are overstated. They are closely linked to their bearer, which is the difference between the carrying amount and the fair value of the asset or liability. A specific feature of the hidden reserves is that they reduce profit or loss and increase profit or loss in the period of extinction. (Soukupová a kolektiv, 2008) This implies that hidden reserves are part of equity and are hidden in profit or loss.

The examples of created hidden reserves:

- a) Underestimation of assets (choice of depreciation method, shortening of depreciation period, clearing of higher provisions for receivables and others) - Underestimation of assets arises when the fair value of assets is higher than the book value of assets. If the prudence principle does not allow an entity to recognize an asset at fair value, the result is an unrecoverable hidden reserve.
- b) Non-capitalization of assets (non-capitalization of assets) - Non-capitalization of assets may result in a hidden provision if an entity does not attribute all ancillary acquisition costs to the cost of an asset when it acquires or owns an asset. In this case, there is a resultant and deliberate hidden reserve, which may be considered inadmissible in case of breach of accounting or legal regulations.
- c) Overstatement of liabilities - An overstatement of liabilities occurs when an entity intentionally or unintentionally creates excess reserves based on an incorrect estimate of the amount of the provision. It is the creation of the resultable adjustable reserve.
- d) Recognition of non-existent liabilities - Recognition of non-existent liabilities occurs when an entity recognizes provisions that are unfounded. At that time, the tacit reserve has up to three adjectives, namely the resultant, deliberate, inadmissible tacit reserve, and then it is a deliberate violation of the laws and accounting practices.

### **3.2 The hidden reserves in accounting of business entities**

The hidden reserves can be divided into these parts:

- a) Essentials for capital hidden reserves relating to capital where they arise as a result of an underestimation of material costs or of capital increases in kind.

The second breakdown in terms of substance is the resultant hidden reserves that arise as a result of an accounting understatement of assets or, conversely, an accounting overstatement of costs. An example of the result hidden reserves is a lower asset valuation than fair value or non-capitalization of costs that should have been included in the asset valuation.

- b) Balance sheets for hidden reserves related to asset items that reduce the total amount of assets or hidden reserves related to liability items when the ratio between equity and liabilities changes
- c) Time for long-term hidden reserves that are linked to non-current assets or long-term liabilities and short-term hidden reserves that are linked to short-term assets and short-term liabilities
- d) Eligibility for appreciable hidden reserves that may arise entirely accidentally or by intentional creation. Accidental provisioning of hidden reserves is due, for example, to an incorrect estimate of the provision or to an incorrect estimate of the use of assets. By contrast, intentional hidden reserves are the result of deliberate underestimation of assets or overestimation of liabilities. The reason for the emergence of secret reserves is that financial management does not want to disclose vulnerable reserves, which in many cases are offenses. Non-controllable hidden reserves are also called forced hidden reserves that arise without the entity's involvement. They are related to legal compliance. Information about uncontrollable hidden reserves could improve the quality of the information presented in the financial statements when making external user decisions.
- e) Confidentiality of hidden reserves for secret hidden reserves, of which unauthorized persons may not be informed, or secret hidden reserves, which are disclosed in the notes to the financial statements. Information on secret reserves is usually only accessible to a very small group of people, namely top management. This information is strictly protected from disclosure to external users or other internal users of the financial statements.
- f) Allowances for allowable hidden reserves that are intentional hidden reserves. They also arise when valuing inventories of own production if not all ancillary costs are included in the valuation. Ineligible hidden reserves are also intentional hidden reserves. They are also referred to as offenses because these hidden reserves arise from violations of accounting regulations and laws.

The hidden reserves that relate to asset items lead to a decrease in the total balance sheet and the hidden reserves that relate to liability items do not change the total balance sheet amount, but in this case only the ratio between equity and liabilities on the liability side changes. (Blahušíakova, 2017). Entities are legally required to acquire, measure, depreciate as well as throughout the life of an entity, but in many cases, regulations allow entities to choose between different alternatives where financial management often exploits this discretion in the regulations to their advantage.

For example, in the case of an acquisition of fixed assets, if an entity acquires an asset with a useful life longer than one year and does not have a statutory purchase price to capitalize the asset, legislation permits entities to decide whether the asset will be classified as a fixed asset or expensed. The accounting treatment in such cases must be enshrined in each entity's internal policy. If an entity decides to put such assets directly

into expenses and does not capitalize it as a non-current asset, then there is a resultant, allowable, intentional hidden reserve. (Soukupová a kolektiv, 2008)

Depreciation is another example of a choice between a number of alternatives in legislation and accounting practices. Entities may choose depreciation at their discretion. Depreciation thus does not often correspond to the useful life of fixed assets and in such cases there is excessive depreciation. In the case of fixed assets that are undisclosed, the incentive to create a hidden reserve is to increase the fair value of the market. Typical examples of non-depreciated fixed assets are land. When they are purchased, they are valued at cost, but as a rule, the price of land is rising. However, this change is not taken into account in lawful accounting because the asset is not revalued upwards and thus creates a tacit provision in the entity because the measurement in the financial statements is lower than fair value.

Very often, hidden provisions are created for receivables. There is a high risk of default, loss or doubtful receivables in the event of non-payment and at that time their valuation is reduced based on provisions. Thus, in many cases, entities create excessive provisions for receivables and at that time deliberate, amenable, hidden reserves arise. (Pakšiová, 2017)

For inventories, hidden provisions are created, for example, by comparing when the fair value is greater than the carrying amount or if all ancillary costs are not included in the cost of inventories, or in the case of self-produced inventories, indirect costs have been incorrectly included in the cost of inventories. The creation of hidden reserves may also be caused by the choice of first-in-first-out (FIFO) or weighted arithmetic mean (VAP).

For example, in the case of securities or other short-term financial assets, the creation of hidden reserves may result in a higher fair value of the asset than its carrying amount.

Hidden reserves are also created in case of over-provisioning or inaccurate or unjustified provisioning. Unreasonable provisioning results in an appreciable, resultant, inadmissible provision and an incorrectly estimated provisioning results in an appreciable, resultant, and random hidden provision.

Also, accruals and deferred provisions are recognized in respect of undervalued assets or overstated liabilities. On the asset side, a hidden provision may arise due to accruals of accrued expenses, which will be accrued expenses or if accrued income, which represents the revenue of the current accounting period, is not capitalized. On the other hand, on the liabilities side, there are hidden provisions that are tied to liabilities. However, this situation does not reduce the value of the assets but transfers values from own funds to external sources, thereby overestimating liabilities. (Ondrušová, Máziková, 2016)

In particular, tacit reserves may arise for the following reasons:

- a) Excessive provisioning, that is, liabilities are overvalued in the books and an appreciable hidden provision is created.
- b) Provisioning for expenses that will never be incurred, that is, the liabilities are overstated in the books and this creates an appreciable hidden reserve.
- c) Termination due to the existence of a provision, which means that if the reasons behind the provision cease to exist, the provision should be reversed or, if appropriate, canceled. Otherwise, a hidden reserve is created.

In addition to the creation of hidden reserves, it is necessary to pay attention to their holding and dissolution. If an entity wishes to knowingly benefit from the existence of tacit reserves, it will continue to hold them. The holding of hidden reserves occurs when a given hidden reserve is linked to a fixed asset or a long-term liability. Keeping hidden reserves at a certain height is possible by regulating the volume of hidden reserve holders.

There are several reasons for an entity to decline and cancel its hidden reserve. The loss of hidden reserves in the entity is caused by external factors that cannot be influenced by financial management, but also by internal factors in the form of decisions that the management of the entity is in charge of. Thus, the hidden reserves may be extinguished voluntarily or notwithstanding any measure taken by the undertaking. (Melúchová, Mateášová, 2015)

Therefore, we distinguish two types of hidden reserves in terms of influence:

- a) hidden reserves necessarily disappearing;
- b) hidden reserves with voluntary extinction.

**Table 1:** Reasons or decrease and cancellation of hidden reserves for individual types of assets and liabilities

Type of asset or liability Reasons for decrease and cancellation of hidden reserves	Type of asset or liability Reasons for decrease and cancellation of hidden reserves
Non-depreciated tangible fixed assets Disposal of assets	Non-depreciated tangible fixed assets Disposal of assets
Depreciation of tangible fixed assets and intangible fixed assets Depreciation or disposal of assets	Depreciation of tangible fixed assets and intangible fixed assets Depreciation or disposal of assets
Intangible assets	Intangible assets
Tangible fixed assets not depreciated	Tangible fixed assets not depreciated
Other assets that are valued at cost	Other assets that are valued at cost
Decrease in the market price of assets to the purchase price level	Decrease in the market price of assets to the purchase price level
Securities at fair value Revaluation of assets to fair value	Securities at fair value Revaluation of assets to fair value
Inventory Consumption, sale or discontinuation of production	Inventory Consumption, sale or discontinuation of production
Accruals and deferrals Expiration of the period for which accruals were deferred	Accruals and deferrals Expiration of the period for which accruals were deferred

Source: Own processing

For example, a loss occurs when the hidden reserve is transferred to equity items and does not affect the profit or loss. If the hidden reserve ceases to be transferred to profit or loss, this results in a decrease in costs or an increase in revenues. A further disappearance of the hidden reserve may occur if the hidden reserve is transferred to

another hidden reserve. Equally, the hidden reserves are extinguished due to the liquidation or sale of the asset for which the hidden reserve is created. A typical example of unintentionally disappearing hidden reserves is the gradual drawing of assets or a decline in the fair value of assets on the market. The write-off of the hidden reserve is also the write-off of a non-existing liability or the release of the unjustified reserve. The reversal of excess reserves may also be an instrument to cover the entity's poor financial position. (Kovanicová, 2005).

Land is generally very difficult to value. Its value depends on several factors such as location of the land, the equipment of the land with utilities, the value of surrounding land and so on. The initial valuation of the land needs to be considered very well. However, over time its value may change. For example, when there will be built a motorway right next to land which was supposed to be for sale to build new houses for families than it is guaranteed that the new motorway will decrease the price of the land. This is due to the fact that the locality will increase noise and dust. In such case the land is overstated in accounting. However this kind of situation is very difficult to predict. There may also be a situation where the value of the land will increase, for example if over the years a large residential area has been built near the land and area where the land is located has become a sought-after location for young families. In this case there is a difference between current price and the price in accounting and that is why the hidden reserve needs to be created. (Cunningham, Fiume, 2020)

## **4 Methodology**

We will present the existence of hidden reserves in entities that carry out their business in the automotive industry as the dominant business in the Slovak Republic. In the case of tangible fixed assets that are not depreciated hidden reserves are most often created when valuating land. When it is acquired by purchase it is valued at cost in accounting, but its value usually increases over the years. This change is not taken into account in accounting under Slovak law because the asset is not revaluated upwards and thus the entity creates a hidden reserves because its valuation in the financial statements is lower than the fair value.

We will present hidden reserves on one of the assets items, namely land. We chose this component of assets mainly because the value of land is increasing over time and we will show by way of example selected entities how it has changed since it was acquired in view of the time it was presented in the financial statements.

We drew the basis for the analysis from the register of financial statements, to which entities are obliged to enter their financial statements. At the same time we used information published in the Cadastral Portal (<https://www.katasterportal.sk/kapor/>), from where we drew information related to land ownership.

## **5 Hidden reserves in practice**

Land is regulated in the Slovak Republic by the Cadastral Act, the Forest Act, the Construction Act, the Land Companies Act and the Accounting Act. It is important to recognize for what purpose the land was procured. It can be land as fixed assets or land

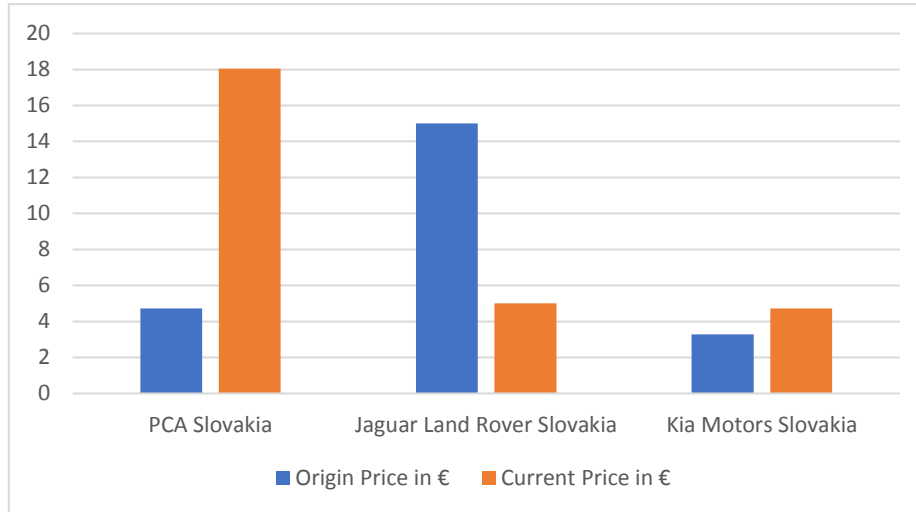
as goods. The land may be depreciated for permanent crops. If the land is land, the land is not depreciated. We took three car companies as an example of companies that own land and do business there. In the past, prior to the construction of automobile plants, land was used to grow crops and the price of land was significantly lower than it is nowadays when there is a great interest in land near car plants, especially for the perfect infrastructure built by the aforementioned automobile company. Therefore, the interest in land close to car companies is increasing, especially from large, multinational companies.

As an example of property associated with the existence of a hidden reserve, we would mention land as an example of the difference between the cost of land and its current market value. We chose three companies, PCA Slovakia, s.r.o. Jaguar Land Rover Slovakia and KIA Motors Slovakia, s.r.o. All three companies operate within the automotive industry.

Company PCA Slovakia, s.r.o. based in Trnava, has an area of 183 hectares, selling price in 2019 according to real estate agent is 18.04 euros per square meter. This price is set by an expert in May 2019. The original price in 2003, when the construction of PCA Slovakia started, was EUR 4.73 per square meter. For the period of 16 years, there has been increase of the price for square meter by 289%.

Another company is Jaguar Land Rover Slovakia Ltd. whose land area is 300,000 square meters. The current price for one square meter of land near Nitra is worth approximately 5 Euros. However, the purchase price of the land of Jaguar Land Rover was up to EUR 15 per square meter, as there was a speculative purchase of land just before construction from its owners for EUR 0.3 - 5 per square meter and the land was resold for the above EUR 15. To date, the company has been judging these speculators. (dennikn.sk) In this case, therefore, it is appropriate to create a reserve for litigation. Despite the interval price determination, it can be stated that the value of the land increased by 200% from the moment of acquisition to the present.

The last company is Kia Motors Slovakia, s.r.o, which owns 166 hectares of land. The cost of land was € 3.28 per square meter and is currently € 4.72 per square meter. The difference between the purchase price of land and its present value may be in the case of PCA Slovakia s.r.o. and Kia Motors Slovakia s.r.o. the reason for creating a hidden reserve. However, we do not take into account the structure or the moment of procurement. For this company, the price of land per square meter has risen by almost 44% since the acquisition of the land.

**Fig.1:** Different between origin price and current price of land

**Source:** Own procesing

In the chart we see that the origin prices of PCA Slovakia and Kia Motors Slovakia were lower than the current price. Price of the land of Jaguar Land Rover Slovakia is today much cheaper than before but this is happening only because of the speculation of the previous owner like we wrote before.

As we mentioned before, hidden reserves may also arise from changes in the value of assets owned by the entity. Since the value of a land depends directly on its location, we may believe that the value of the land may change over the years. The value of land is rising every year, but of course the price of land can also move downwards.

## 6 Conclusion

An entity may use hidden reserves as an optimization tool to ensure the entity's long-term existence. If an entity achieves high profits, it may reduce it by creating hidden reserves, or conversely, if an entity achieves a loss or low profit or loss for the reporting period, it may increase it by reversing the hidden reserves.

However, reserves as well as hidden reserves serve primarily as a tool to make the economic result more realistic in relation to accounting principles. However, hidden reserves, unlike reserves, represent the entity's own source of financing. They are hidden in profit or loss and external users may not be aware of them if the entity decides that it does not define the creation, holding and release of hidden reserves in the notes to the financial statements. Hidden reserves are typically tied to their bearer, which is the difference between the carrying amount of an asset and a liability and its fair value on the market.

After comparing the financial statements, specifically the value of the land, with the data obtained by evaluating the land by an expert, we found that there is a large difference between the cost and the current fair value of the land. The cost of the land

is much lower than its fair value and it is therefore apparent that there have been hidden reserves in the entities for the existence of the land. The amount of hidden reserves in this case depends not only on the type of property to which it is linked, but also on its location. In Slovakia, the purchasing power of money is higher towards the capital, which was also reflected in the increase in the price per square meter. The highest increase was recorded in Trnava, then in the vicinity of Nitra and around Žilina was the lowest price of land.

Provisions and hidden reserves are a powerful accounting tool for optimizing economic results. The creation of reserves and hidden reserves also contributes significantly to the achievement of the financial statement objective. Entities should comply with the prescriptions in the preparation of the financial statements and should respect the principle of prudence as well as the principle of a true and fair view of the financial position of the entity. However, financial management in an entity often considers reserves as a tool to reduce the tax burden and gain advantages over other entities. Hidden reserves are mainly used because external users do not see the creation of hidden reserves in the financial statements, which creates an imperfect picture of the entity.

The concepts of reserve and hidden reserve differ in several ways. Unlike some reserves, there is no obligation to create hidden reserves in the Slovak Republic. The entity decides whether or not to create them. Hidden provisions are not shown in the financial statements and are not freely available to external users unless the entity mentions them in the notes.

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## ENVIRONMENTAL BURDEN AS A BUSINESS CHALLENGE

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**Abstract.** The Slovak economy has experienced extremely dynamic growth in the last two decades. Increased waste production is a side effect of economic growth. Between 2004 and 2018, the total production of waste in the Slovak Republic increased by 26.3%, while the largest waste producer is the construction industry with approximately a third share. Despite the improvement in the rate of waste recovery in recent years, the Slovak Republic is still significantly behind the EU average in this matter. An important means to achieve a higher rate of waste recovery in the Slovak Republic is a suitable mix of financial instruments and incentives to achieve this goal. The main goal of this paper is to provide a clear summary of existing and potential financial instruments to support the development of waste recovery, with special regard to those programs that are directly applicable in Slovakia.

**Keywords:** waste, recycling, environmental burden, separation, renewables, green bonds, green financing, capital structure, waste recovery

**JEL classification:** O44

### INTRODUCTION

This paper discusses the importance of nature protection, waste management, waste recovery respectively its energy use, as well as new opportunities in the field of technology and especially the financing of the so-called green economy.

The aim of this article is to look at the issue of waste management not only from a statistical point of view in terms of waste production, the percentage of recycling or waste recovery, but especially from an economic point of view. In particular, we will be interested in the possibilities of raising various forms of capital to support/finance

environmental projects, also to point out how new technologies in this area may have a positive impact on different areas of the economy.

## **1 STATISTICS ON WASTE PRODUCTION AND THE SHARE OF RENEWABLE ENERGY SOURCES IN THE EU AND THE SLOVAK REPUBLIC**

In 2016, the total volume of waste generated by all economic activities and in households in the EU reached 2,261 million tons., and from that year to the present, waste production has increased even more. In general, the total amount of waste produced can be expected to be to some extent related to the population and economic strength of the country. The smallest EU Member States generally had the lowest levels of waste production and the larger states the highest. Nevertheless, we find some relative deviations from the average. A relatively large amount of waste was produced in Bulgaria and Romania and a relatively small amount of waste was produced e.g. in Italia.

From the point of view of economic activities that participated in waste generation, the biggest burden was represented by construction, in total value (34.8%). In second place were mining and surface mining (27.6%), industrial production (11.1%), waste services and water treatment (9.5%), households (8.3%). The remaining 8.7% was waste produced from other economic activities, mainly from services (3.9%) and energy production (3.4%).

The data in the following table no. 1 present the production of waste in the European Union and Slovakia according to the economic activity of waste producers for the period of 2004-2016, while 2016 is the last year for which data are published in the Eurostat database.

**Table 1: Waste generation in EU and SR by NACE Rev. 2 for the period of 2004-2016**

NACE		2004	2006	2008	2010	2012	2014	2016
<b>A</b> (AGRICULTURE, FORESTRY AND FISHERIES)	EU	64 070	57 700	46 530	21 000	21 380	18 710	20 910
	SK	606	742	789	526	549	574	789
<b>B</b> (MINING AND QUARRYING)	EU	752 770	606 420	554 720	665 460	726 930	696 600	642 140
	SK	211	332	151	166	311	289	317
<b>C</b> (MANUFACTURING)	EU	368 980	344 810	337 980	260 370	254 110	256 970	262 440
	SK	3 878	5 527	4 469	2 669	2 516	2 613	3 446
<b>D</b> (ENERGY)	EU	95 130	196 060	91 070	84 010	96 170	92 620	78 220
	SK	1 733	1 577	1 151	878	1 046	544	958
<b>E</b> (WATER/WASTE)	EU	122 570	133 380	159 530	163 230	193 890	230 890	253 620
	SK	427	353	793	735	671	988	958
<b>F</b> (CONSTRUCTION)	EU	766 250	836 290	864 450	875 980	843 940	870 250	923 670
	SK	1 404	916	1 302	1 786	806	1 387	967
<b>G-U</b> (HOUSEHOLDS/OTHERS)	EU	165 350	176 720	153 910	165 260	135 430	133 480	142 060
	SK	935	3 430	1 046	906	870	734	1 284
<b>Total</b>	EU	2 335 120	2 351 380	2 208 190	2 235 310	2 271 850	2 299 520	2 323 060
	SK	9 193	12 878	9 700	7 665	6 769	7 130	8 717

Source: Own treatment according to Eurostat, 2020, Waste generation by waste category

Within the amount of waste produced in EU countries per capita, it is possible to observe relatively large differences between countries. On average, Finland produced the most waste per capita, with an average of 22.4 tons of waste. This is more than four times the average value of 5.1 tons per EU inhabitant.

The average Slovak generated less than **2 tons of waste**.

The recycling rate of municipal waste, as well as packaging waste, is increasing significantly from year to year. The countries that recycled and composted municipal waste the most in the EU in 2017 were Germany (68%), Austria (58%), Slovenia (58%). On the contrary, Serbia (0.3%), Bosnia and Herzegovina (0.4%), Malta (6%) were in the opposite position.

In the field of municipal waste recycling, Slovakia is among the countries that are improving from year to year, but it still has to catch up with developed EU countries. At the same time, here, it is good to ask the question whether the process that takes place in our country can really be called recycling in the true sense of the word. The aim of this article is not to contradict official terminology, but if we are to be consistent,

I think it is important to point out that in our environment it is more of a downcycling process.

Indeed, real recycling can only be considered to be a process in which the material is converted into something of roughly the same value as it was originally.

In the past, the Institute for Environmental Policies also drew attention to the fact that recycling statistics were probably mainly improved by better reporting of metals. In the case of the other components of sorted waste, it is not clear whether their recycling has really improved or only the reporting.

Absolute figures also reveal that the amount of landfilled waste has increased slightly. Thus, a higher recycling rate does not automatically mean a lower landfill rate. This phenomenon can be explained either by a higher level of waste production, but the possibility of better reporting is also an option.

As for global statistics on municipal waste, it must be said that the average Slovak generates relatively small amount of municipal waste. In 2017, the average Slovak produced 378 kg of municipal waste, which is the fourth lowest value in the EU. On the other hand, the largest amount produced was in Denmark (781 kilograms). The EU average in 2017 was 486 kilograms per capita.

The Slovak Republic has committed itself to increasing the share of recycling to 65% by 2035 and to reducing the amount of waste sent to landfills to only one tenth of municipal waste (Slovak Spectator 2019).

Another key topic in this area is renewable energy sources. The share of renewable energy in energy consumption has been steadily increasing throughout the European Union between 2009 and until now. The Europe 2020 strategy target is 20% by 2020 and the Europe 2030 strategy target is 32% by 2030 (European Commission, 2020).

Despite the positive trend, the situation in Slovakia is significantly worse than the above-mentioned limit values. While in 2009 the share of energy from renewable sources was only at the level of 9%, in 2018 the share already represented an increase of 12%. However, this is still far from the targets set in the Europe 2020 strategy.

**Table 2: Share of energy from renewable sources in the EU and SR for the period of 2009-2018 (in %)**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU	13	13	13	15	15	16	17	17	17	18
SK	9	9	10	10	10	12	13	12	11	12

*Source: Own processing according to Eurostat, 2020. Share of energy from renewable sources*

## 2 MOBILIZATION OF INTERNATIONAL CAPITAL TO FINANCE GREEN ECONOMY PROJECTS

Investing in the environment in the European Union over the next decade will require hundreds of billions of euro a year. The European Union predicts that by 2030, it will have to provide 180 billion euro a year for activities to meet its Paris commitments. The transition to a circular economy in the European Union will require more than 320 billion euro by 2025. The problem is that the total budget of the European Union is only about 145 billion euro a year.

Additional funding must come from private sources. Although member states will also contribute to the achievement of environmental goals from their own budgets, it is clear that public sector resources will not be enough. The EU's future long-term strategy for 2050 speaks of the need **to involve private investors** in sustainable finance.

In the world, both public and private sectors already make extensive use of green funding instruments.

The trend in recent years in many countries is to raise funds for environmental goals through so-called **green bonds**.

The issuance of green bonds began with volumes issued by the World Bank and other international financial institutions in 2012. Over time, private investors also became involved. In recent years, green bonds have also been issued by states. Investors invest money in projects that correspond to their green values and at the same time, they can also benefit from green investments financially.

In accordance with the principles of green bonds, the funds collected are directed mainly to the following areas:

1. renewable energy,
2. energy efficiency (including efficient buildings),
3. sustainable waste management,
4. sustainable land use (including sustainable forestry; and agriculture),
5. protection of biodiversity,
6. clean transport,
7. sustainable water management (including clean and drinking water)
8. adapting to climate change (Vella, 2018)

In addition, green bonds are a relatively new financial instrument used to protect against climate change, their market has seen remarkable growth since 2012 (Chiesa, 2017).

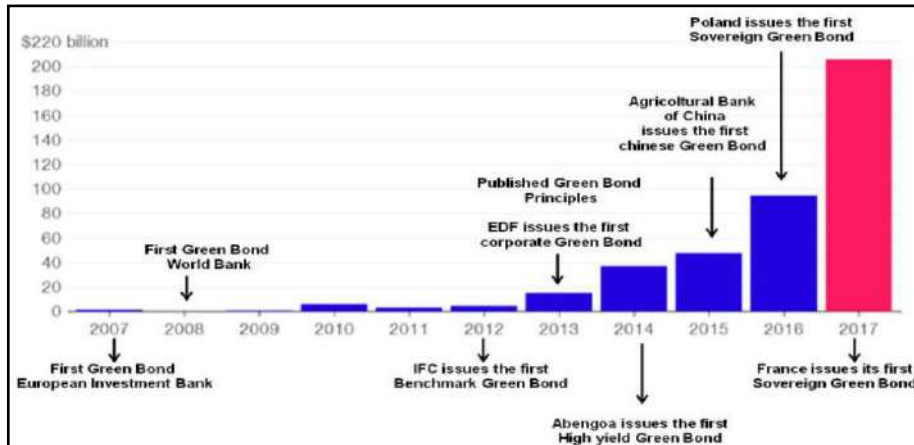


Figure 1: Growth of the green bond market

Source: Chiesa, 2017.

Unlike ordinary bonds, green bonds are used to finance specific "green" investments. Compared to bank deposits, bonds generally tend to provide higher profitability, liquidity and stability to suit a variety of investors. The funds raised must be spent on renewable energy and sustainable green projects. Green bonds can be seen as an experiment that has shown that capital markets can be a source of financial initiatives to tackle climate change. The key objective is to offer investors, together with bonds, a product that meets their risk-based return on investment objectives, as well as to support the financing of projects that reduce greenhouse gas emissions, on the one hand, and to help countries adapt to the effects of climate change on the other.

Just for an example, last week, the German government issued its first issue of this type of bond. These will be used to finance environmental protection, in line with their primary objective. Ten-year bonds have aroused huge interest among investors. The six banks commissioned by the government finance agency received 6.5 billion euro. However, demand exceeded 33 billion euro.

Slovakia is currently declaring stricter debt brake rules and has not yet used the option of issuing green government bonds.

In addition to the aforementioned possibility of green bonds, banks abroad provide their clients with **green loans** on more favorable terms for the implementation of green projects. Barclays Bank, the Dutch Renewable Energy Group Triodos or ING Bank already provide such loans for investment projects in various environmental areas through its corporate banking, which helps its corporate clients incorporate ESG criteria into their processes and decisions.

Cooperation with the European Investment Bank, the European Investment Fund and other international financial institutions, such as British Barclays Bank, also offers various forms of guarantees to finance green innovation.

The European Union is working intensively on legislation that should encourage private investment in environmental projects for green projects. The current rating system is inconsistent and is mainly addressed by private companies. However, the assessments are not comparable between the companies and their objectivity is suspected. The European Commission's key recommendations are to create a single classification system for sustainable activities, to include sustainability in published investment information, to set environmental standards and to create a European eco-label for investment products.

This is the next step in Europe's effort to promote sustainable investment.

### 3 NEW TECHNOLOGIES AND FINANCING OF GREEN ECONOMY PROJECTS IN THE SLOVAK REPUBLIC

In the last two decades, in order to reduce landfilling and use the energy potential of waste materials, in the Slovak Republic several projects have been launched to focus on their recovery. Besides a few others, it was mainly the implementation of alternative sources focusing on electricity production.

In the recent past, the implementation of these projects in the environment of the Slovak Republic has significantly stagnated due to unsatisfactory economic indicators and low state support.

In order to meet the common goals of the EU, it was necessary to urgently introduce effective incentive mechanisms in the Slovak Republic to support the development of renewable energy sources and other forms of elimination or recovery of waste. These were mainly incentive purchase prices of electricity, green certificates and green tariffs, low interest rates, tax relief and direct financial subsidies.

The situation in the Slovak Republic, for example in the field of renewable energy sources, it gradually began to change for the better, especially in 2008, when ÚRSO approved by legal decree no. 2/2008 guaranteed prices for electricity produced in renewable energy sources. However, the state's support for the construction of such resources has major shortcomings.

However, the possibilities for financing such, say alternative, projects have in the past been largely limited to a combination of facility operators' own **equity** and **commercial loan**. With regard to the price of equity, such a capital structure, despite supporting subsidies, e.g. on the purchase price side, proved to be unfavorable.

Slovenská sporiteľňa currently finances several dozen renewable energy projects. However, these are mainly photovoltaic power plant projects, small hydropower plants, biomass electricity production and biogas plants.

Another Slovak bank, VUB bank, also participates in financing energy production from renewable energy sources. The main share is represented by photovoltaic power plants,



but the bank's portfolio also includes hydroelectric power plants. To a small extent, projects of biogas plants and other alternative sources of electricity production are also represented.

Tatrabanka has been active in the area of financing projects based on renewable energy sources since 2010, when it launched more significant support in this area.

OTP Banka has been involved in the areas of photovoltaics, biogas and small hydropower plants.

However, for the purposes of this article, I call the aforementioned types of projects with the term alternative, without the label ecological.

Many years of practical experience, societal demand for truly ecological solutions, as well as new legislative requirements for the elimination of waste produced, logically point to new solutions for this area and creates pressure for additional or **new forms of raising capital** to support truly environmental solutions.

I agree with the opinion of many experts that the alpha and omega of the future is a strict and perfect separation. It is necessary to focus the highest attention on this topic - corporate as well as civic.

The aim of the separation process is to use waste for a profitable production of output products with standard quality, and at the same time to minimize waste that remains unused, or to use the reduced amount for energy.

The situation in Sweden could be an excellent example for the Slovak Republic. Sweden is a world leader in waste recycling due to its strict laws that require proper waste sorting.

Therefore, I consider investments in effective education of the population, legislative setting of obligations and fees for producers, support of investments in innovative technologies for the area of recycling or waste separation, as well as for the area of further energy use of waste, to be the key factors in the future.

One of the current options for financing waste management projects is from **private funds**.

A good example is the investment company IPM Group, which specializes in investments in energy, mobility and artificial intelligence and launched the Avanea Eco Fund. The Avanea Eco Fund (AEF), which they founded in March last year, is primarily intended to invest in the latest technological innovations, create new capacities in recycling, sorting and recovery of waste, or the overall transformation of waste management. AEF plans to co-finance projects in the amount of 73 million euro, of which 22 million were obtained by the fund in a public tender by Slovak Investment Holding and 51 million by co-investors from the private sector.

Among the cross-sectional financial instruments for the purpose of raising capital to support projects of the so-called green economy, we can also include **several programs** managed directly by **the European Commission**.

A good example of raising capital in the form of a **subsidy** for the area of separation support is the **Operational Program** of Environmental Quality, which in the past was used mainly by municipalities to invest in technologies to increase the quantitative and qualitative level of waste separation in the municipality. The co-financing of the submitter represents approximately five percent of the mentioned subsidy. Of course, the global objective of this operational program is to support many other projects aimed at the sustainable and efficient use of natural resources, including the promotion of an energy-efficient, low-carbon economy.

Very current EU programs in the field of support for environmental projects include also e.g. program Horizon 2020 or program Life.

**Horizon 2020** is the EU's framework program to support research and innovation. In Slovakia, the national coordinator for Horizon 2020 is the Ministry of Education, Science, Research and Sport. Under this program, the EU provides specific support to small and medium-sized enterprises (in short as SMEs). The tool for the SME is aimed at highly innovative SMEs that have the ambition to develop their own growth potential.

Horizon 2020 for SMEs provides project financing in two phases.

The first, with financial support of 50 thousand euro is aimed at creating a feasibility study of the technological/practical, as well as the economic viability of the innovative idea.

The second phase, with a pre-financing rate of 70%, is designed to create an innovative project that shows great potential in terms of the company's competitiveness and growth, supported by a strategic business plan. (SAŽP, 2020).

As we have stated in the text above, it is generally the case that borrowing funds for one's business purposes is often not that simple. On the one hand, these are relatively expensive resources, and as well as project risk assessment, the need for guarantees, or even the initial declaration of solvency, can also become a problem for green economy projects. This is one of the reasons why commercial banks in the Slovak Republic currently offer financing for innovative projects in the field of the environment in cooperation with European funds and European programs.

In Slovakia, the European funds are mainly known and are provided mostly in the form of grants (non-repayable financial contribution), but there is also another way to obtain financial funds for business.

Within the mentioned Horizon 2020 framework program, for example, **the InnovFin Program**. It aims to contribute to overcoming the shortcomings of the European **venture capital** market and to provide capital and quasi-capital to cover the development and financial needs of innovative enterprises from start-up to growth and expansion (InnoNews.blog)

Another of these is the **LIFE program**, which is a program of the European Commission and EU member states in the field of environment and climate protection. LIFE PROGRAM aims to help transition to a low-carbon economy, to protect and improve the quality of the environment and to halt and reverse the loss of biodiversity and the dissemination of solutions and best practices to achieve environmental and climate goals, as well as to support innovative environmental and climate change technologies.

However, these programs are far from the only way to obtain EU funding to finance the so-called green projects. With regard to environmental policy objectives at national as well as international level, new forms of raising capital are constantly being sought to support their fulfillment.

In July this year, for example, **The European Innovation Fund** has launched a 1 billion euro call to fund major low-carbon technology projects

The funding of 1 billion euro will be available to support breakthrough innovative green technologies that will help achieve the goals of the EU Green Deal and prepare the way for climate neutrality. The fund will provide grants for large-scale pioneering green technology projects that develop solutions for clean hydrogen, renewable energy, energy-intensive industries, energy storage and carbon capture, use and storage. The aim of the fund is to help clean energy projects to enter the market and overcome the risks of commercialization (source: SLORD). Of course, this support also applies to Slovak entities.

Within the Slovak Republic, the **Environmental Fund** also offers other possibilities of obtaining advantageous capital in the form of loans or subsidies.

The main goal of the fund is the purpose of implementing state support for environmental care and to support the creation of an environment that will be sustainable. The Fund provides funding to applicants in the form of grants or loans to support those projects that have environmental objectives at national, regional or local level. Funds from the fund can be provided for a number of projects

One of the interests of my further research in the field of capital structures of business entities is also the focus on companies operating in the field of electricity production from renewable sources, respectively, green economy projects. The primary interest in terms of capital formation in relation to the value of the company is the evaluation of the benefits of using European funding/subsidies vs. commercial resources in combination with a possible subsidy of output purchase prices.

Currently, I do not recognize a relevant study that would provide such answers in a comprehensive and unambiguous manner.

## CONCLUSION

Within the EU, the topic of financing the so-called green economy is very urgent. This is evidenced by a number of programs, documents, but also laws, which serve as a guide in dealing thoroughly with nature protection, as well as waste management and real meaningful recycling.

Slovakia has made some progress in this direction over the last decade, but our market still has large reserves in this area, both in the field of energy recovery of waste as well as in efficient recycling.

The offer of the Slovak market also has its limits in the area of obtaining support or financing of environmental projects.

Creating the conditions for financing sustainable green development, applying the instruments of green financing, as well as expanding private capital flows to this area, remains a significant challenge and we therefore consider this area to be one of the key priorities for the upcoming periods.

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# Labour Migration in the Slovak Republic and its Main Consequences<sup>1</sup>

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**Abstract.** Migration is an integral part of our lives and one of the most visible signs of globalization. Never in the history of humankind have so many people migrated as nowadays. The migration trend also affects the Slovak Republic. Although historically the Slovak Republic has faced mostly waves of emigration, trends in recent years clearly indicate an increase in the number of immigrants to Slovakia. The vast majority of them are migrant workers, for whom the greatest motivation for coming to Slovakia is the prospect of better wage conditions compared to their country of origin. Migrant workers in Slovakia constantly face a number of stereotypes, which, however, do not have a logical ratio. The following article deals with impact of foreigners on the Slovak labour market.

**Keywords:** International Migration, the Slovak Republic, Labour Migration, Wage, Unemployment

**JEL classification:** F22, J15, O15

## 1 Introduction

Euro-Atlantic integration of the Slovak Republic and positive values of main macroeconomics variables, which can be observed mainly since 2004 have caused that migration trends in this country have changed significantly. The Slovak Republic has become more popular for immigrants coming from third countries or less developed countries of the European Union. The fact that immigrants from mentioned countries are interested in immigration to the Slovak Republic in combination with negative demographic trends and unstable situation on the local labour market are main reasons, why the total number of immigrants from third countries in the Slovak Republic is increasing. Labour migration also brings several negative phenomena, such as the negative attitude of the domestic population towards the foreign minority. In general,

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there is a strong belief that foreigners have a visible negative effect on the wage rate in the country and steal vacancies for the domestic population. The following study focuses on the detailed characteristics of migrant workers in the Slovak Republic and evaluates their impact on economy. The following study is divided into four chapters, including introduction (1) and conclusion (4). Because theoretical background to the selected topic plays a key role in our study, the second chapter is dealing with some theoretical perspectives on labour migration in general. The third chapter (3) is focusing solely on labour migration in the Slovak Republic and its main consequences.

## **2 Theoretical Perspectives on Labour Migration**

Migration in any of its form belongs to the one of the most visible effects of globalization. Due to this fact, there are many theories, which try to explain main factors, which at the end of the day cause migration and force people to migrate. The following article is primarily dealing with labour migration to the Slovak Republic from the third countries. This kind of migration can be considered as a consequence of economic growth and successful Euro-Atlantic integration. The United Nations considers economic and labour migration almost synonymous, but for the purpose of this article, we would not use the same approach. Economic and labour migration can not to be considered as synonymous, because the main motive, which has caused them can be different. Dirgová points out the crucial difference in labour and economic migration (2009). According to her opinion, the main difference between the before mentioned kinds of migration is the fact that the main motive for labour migration is opportunity of better employment conditions in the chosen destination, while, economic migration may have speculative nature (2009). This can be encountered especially in cases where migrants arrive to economically developed countries in order to abuse the benefits of a social system and at the same time, they are not motivated to find a job. At time the culmination of the migration crisis some authors have pointed to the possible speculative nature of migration, as persons who would be recognized as refugees could remain in any member state of the European Union, not necessarily in economically advanced countries with generous social system. Although speculative nature of migration was not proven, it was spread as a tool in antimigration campaign mainly by extremists and populists political parties. According to many opinions speculative background of immigration is not connected only with migration waves from the third countries, but can be characteristic also for new member states in the European Union. German political scientist Wolfgang Bock says that immigration from member states located mainly in the Eastern Europe has speculative nature (2018). The system of free movement of persons established by the European Union, considered one of the greatest achievements of integration, according to Bock, directly opens the door to immigrants who come to Germany to abuse local social system (2018). According to him these people do not create added value for the German economy.

Although migration carries certain risks, for example in the possible abuse of the benefits of the social system in economically developed countries, its importance is enormous for the same group of countries. We also rank the Slovak Republic among the economically developed countries that need migration in order to fill the deficit on

the labour market. The country has for a long time faced waves of emigration. Due to wide range of factors nowadays, Slovakia is an important destination for migrant workers from the third countries. The reason for the increased number of migrant workers on the Slovak labour market is partially explained by classical or neoclassical theories of migration. Classical economic theories are based on the assumption that wage differences in countries of origin and destination are the main reason why the population is migrating. Dougless argues that the cause of international migration can be seen primarily in the labour market. To sum up classical and neoclassical theories of migration are based solely on macroeconomic aspects and they are trying to explain migration on all-society level. (Štefančík, 2010)

### **3 Current State of Labour Migration in the Slovak Republic**

#### **3.1 Two Main Groups of Legal Foreign Workers in the Slovak Republic**

In the case of the Slovak Republic, as a member state of the European Union, it is essential to distinguish between two different groups of foreigners who can work legally on our territory. The first category includes a citizen of a Member State of the European Union and a state party to the Agreement on the European Economic Area, the Swiss Confederation and his or her family members and a third-country national who has been granted residence in the Slovak Republic. (Center for Labour, Social Affairs and Family 2020). These persons have the same legal status in legal relations arising under the Employment Services Act as citizens of the Slovak Republic, unless this Act provides otherwise. The second group consists of persons from third countries. Because there is different legislation that applies to the employment of third-country nationals it can be argued that the employment of third-country nationals is subject to stricter conditions. First of all, it is essential to define exactly which persons from the third countries can legally work in the territory of the Slovak Republic. A person from a third country can legally work in Slovakia if person (Ministry of Labour and Social Affairs of the Slovak Republic 2020):

- a. is European Union Blue Card holder,
- b. has been granted temporary residence for the purpose of employment on the basis of a certificate of the possibility of filling a vacancy,
- c. has been granted a work permit and a temporary residence permit for the purpose of employment,
- d. has been granted a work permit and a temporary residence permit for the purpose of family reunification,
- e. has been granted a work permit and a temporary residence permit of a third-country national who has been granted long-term resident status in a Member State of the European Union,



f. meets the conditions according to § 23a of Act no. 5/2004 Coll. on employment services - no confirmation of the possibility of filling a vacancy or a work permit is required.

The Slovak Republic is recording an increase in the number of working immigrants coming from third countries. Even the number of mentioned persons exceeds the number of working foreigners from the other member states of the European Union. The following table illustrates the number of persons employed in the Slovak Republic from the third countries and the country of origin for the past year. As it was already mentioned earlier, the Slovak Republic is becoming an increasingly sought-after destination for the third-country workers. The nature of the economy in combination with wage conditions are considered the two basic pull factors. However, the benefits that labour immigration brings are not just one-sided. In the pre-crisis period, the Slovak labour market faced a challenge due to an inability to fill vacancies. It is important to take into account, that the labour market deficit may play a key role in a company's future investment decision-making.

**Table. 1.** Total number of foreign workers from the third countries in the Slovak Republic and country of their origin

Country of Origin	Total Number of Foreign Workers
Ukraine	16 998
Serbia	5 837
Vietnam	1 128
Georgia	622
Bosnia and Hercegovina	618
Northern Macedonia	537
South Korea	346
Thailand	304

Source: Center for Labour, Social Affairs and Family 2019

The issue of labour immigration has not been justified in the region of Slovakia until 1989. This trend was influenced mainly by communist regime. During the past period, however, this trend has changed and the Government of the Slovak Republic itself is taking steps to facilitate the employment of foreigners. Such measures can clearly include legislative changes that have occurred since January 1, 2019. Based on these, there was an amendment to Act no. 5/2004 on employment services. As part of legislative changes, for example, an obligation was introduced to update and thus publish a list of vacancies on a quarterly, not semi-annual basis, and only in districts with an unemployment rate below 5 percent (Center for Labour, Social Affairs and Family, 2018). This particular step is intended to prevent foreigners from working in districts with higher unemployment rates, which can generally be assessed positively. Another legislative change is the abolition of the obligation to declare the notarized document about the highest level of education attained (Center for Labour, Social

Affairs and Family, 2018). The copy of the document about the highest level of education is fully sufficient for the employer. The only exception in this sphere is the performance of those types of professions that require a university degree. This step in terms of the speed of participation of foreigners in the labour market can be assessed positively, but they are contrary to the general interest of the Slovak Republic to build a knowledge economy. As mentioned above, foreigners in most cases occupy low-skilled jobs that do not require a university degree or a high school diploma. As part of the amendment to the law, changes have taken place, the clear aim of which is to remove administrative obstacles and speed up the involvement of foreigners in the work process. Such steps may clearly include, for example, the obligation of the Police of the Slovak Republic to decide whether or not to grant a residence permit for the purpose of employment no later than 30 days after receipt of confirmation of the possibility of filling a vacancy, in case the third-country national will be employed in a district where the average registered unemployment rate is less than 5% or the third-country national represents or works for a business service center or technology center. Also aliens residing in another Member State of the European Union are not required to present a medical certificate to certify that they do not suffer from a disease that endangers public health. The amendment to the Act also contains other legislative changes that are intended to simplify the process of employing foreigners in the Slovak Republic.

In addition to the fact that in Slovakia the number of workers from third countries is constantly growing, another feature of labour migration is the low qualification of foreign workers. They usually occupy low-skilled jobs that do not require higher education. Based on data from the Central Office of Labour, Social Affairs and the Family in 2019, up to 21,640 foreign workers worked in the positions of fitters and machine operators (Central Office of Labour, Social Affairs and the Family, 2020). Statistics show that even the second group of the most frequently filled positions does not require higher education or qualifications, as 7,416 workers work in positions marked as auxiliary and unskilled workers (Central Office of Labour, Social Affairs and the Family, 2020). The third most frequently mentioned category are skilled workers and craftsmen with a number of workers of 6,347 (Central Office of Labour, Social Affairs and the Family, 2020). The above statistics clearly show that the Slovak labour market is currently interesting for workers without higher education, who due to this fact occupy less qualified jobs. This fact has its advantages, but in the future it may also pose a serious risk for the Slovak economy. The advantage of labour immigration to Slovakia is mainly the possibility of filling vacancies, which we have not been able to fill in Slovakia for a long time from the domestic unemployed. These unemployed people usually have various barriers in the labour market and are at a disadvantage compared to jobseekers from abroad. The issue of the long-term unemployable is a long-occurring negative trend in the Slovak labour market. Its occurrence is one of the reasons why labour immigration brings benefits to the Slovak economy. The fact that vacancies are filled by foreigners means that the risk of multinational companies going abroad is lower. However, the belief that labour immigrants represent an advantage for the Slovak labour market is very low in Slovakia and in general there is a strong belief in their negative impact on the wage rate, labour demand and the Slovak society as a whole. Apart from the strong stereotypes in society, the positives of the activities of

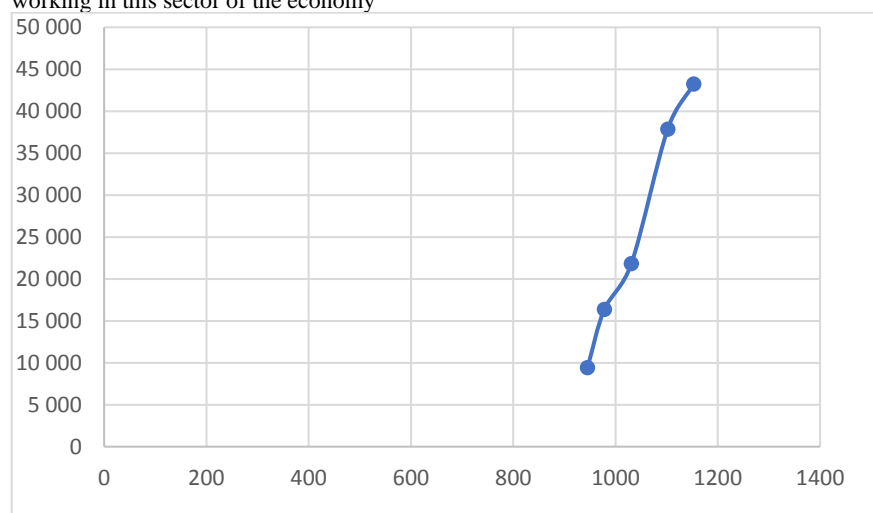
foreigners on the Slovak labour market are evident. Although the pre-crisis and post-crisis data on the number of unemployed differ significantly, 135,517 vacancies were registered before the outbreak of the economic crisis caused by COVID-19 (Ministry of Labour and Social Affairs of the Slovak Republic, 2019). As already mentioned several times in the text that jobs could not be filled by domestic workers, there would be a substantial risk in the form of companies leaving Slovakia. The number of unemployed in Slovakia before the outbreak of the crisis was 93,799 (Central Office of Labour, Social Affairs and the Family, 2020). Given the above, we perceive as the biggest advantage of foreigners on the Slovak labour market to fill the deficit that has arisen over the years. The disparities between supply and demand on labour market are large and pose a challenge to the country's economy. However, as mentioned above, the activity of migrants on the Slovak labour market is not only perceived positively. This phenomenon is largely the result of, among other things, a strong anti-immigration campaign, especially since 2015, during which selected countries of the European Union began to feel consequences of the migration crisis. Although the countries of the European Union have been affected by the migration crisis to varying degrees, the anti-migration campaign has become a successful tool used by populist parties across the countries of the European Union, including Slovakia. Before the parliamentary elections in 2016, the issue of migration became a central topic and voters considered it one of the biggest problems facing the Slovak society. In addition to the fact that the migration crisis has helped to increase the popularity of selected political entities on the Slovak political scene, it can be assumed that it has caused foreigners to be generally perceived negatively by Slovak society and Slovak citizens do not distinguish fundamental differences between migrant and refugee. The veracity of the above statement is also confirmed by many results of the public opinion poll. Now we would like present the results of several of them. Based on selected survey, 43% of respondents stated that they have a negative attitude towards foreigners from less developed countries; it means countries that are countries of origin for the most foreigners in Slovakia (TA3, 2017). As for the exclusively economic view of Slovaks on migration, the results of a survey by the Michal Šimečka Foundation show roughly the same views. Based on a public opinion poll conducted by the institution, 70,8% do not consider foreigners economically beneficial for the economy (The Integration Forum 2019 (10.10.2019).

Similar trends can be observed in other opinion polls. Again, it should be noted that in the case of the Slovak Republic, the negative impact of foreigners on individual aspects of the labour market has not been proven. Most often, it is possible to meet with the argument that foreigners have a negative effect on wage growth and fill vacancies intended for domestic unemployed people. However, both of these statements cannot be considered true.

### **3.2 Mutual Relation between Labour Immigration and Wage Rate in the Slovak Republic**

The following part of the study deals with two main stereotypes in our society and economy, which are connected with foreigners on the Slovak labour market. Firstly, we would like to start with their impact on wage rate. The graph below shows the development of the average wage in industrial production. If the general belief in the society was true in the period under review, which begins in 2014 and ends in 2019, there should be a slowdown, or even a decline in the average wage in industrial production. According to the Ministry of Labour and Social Affairs of the Slovak Republic, 7 221 foreigners worked in positions that can be included in industrial production in 2014 (Ministry of Labour and Social Affairs of the Slovak Republic 2015). In 2019, 43 223 foreigners worked in the same positions (Ministry of Labour and Social Affairs of the Slovak Republic 2020). Over a period of six years, we can clearly talk about a significant increase in number of working foreigners in Slovakia in this sphere. The graph below illustrates the relationship between the number of foreigners working in industrial production and the average wage in this sector. As we can clearly see in the graph below the presence of foreigners did not have a negative impact on the level of wages.

**Fig 2:** Mutual relation between wage in industrial sector and total number of foreigners working in this sector of the economy

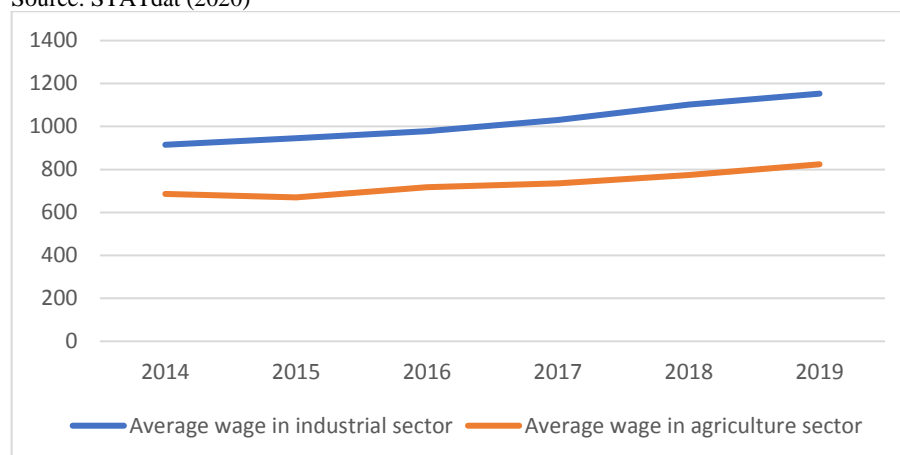


Source: STATdat (2020), Ministry of Labour and Social Affairs of the Slovak Republic (2020)

As already mentioned several times in the article, foreigners fill vacancies in the Slovak Republic, mainly in industrial production. If we deal with the general assumption that foreigners have a negative effect on wage rate and push wages downwards through their presence on the labour market, we should see a slowdown in wage growth at a time when the number of working foreigners in selected sectors has increased. We stated above that foreigners work primarily in industrial production, so in the graph below we compare the development of the average wage in this sphere with the development of the average wage in agriculture, forestry and fishing sector. The field of agriculture, forestry and fishing is not very attractive for foreign workers,

so it can be assumed that they will have no or minimal influence on wage rate. Before analysing the development of wages in industrial production and agriculture, we consider it necessary to add that the comparison does not deal with the level of wages in these sectors of the economy, as it is a natural phenomenon that wages in agriculture are lower in economically developed countries compared to the secondary sector. The development of wages in both sectors is essential for our analysis. It goes without saying that their development is not only influenced by the fact whether or not foreigners are employed in the mentioned sectors. Wage rates are largely influenced by the overall economic situation in the state, or by the activities of trade unions and many other internal and external factors. However, based on the general belief that can be observed in the Slovak Republic, one of the main concerns about the activities of foreigners in the labour market is the fear that they will cause a drop in wages or stop their growth. If this statement were true in the period under review, which begins in 2014 and ends in 2019, there should be a slowdown, or even a decline in the average wage in industrial production. If it was a true belief in society that foreigners have a negative impact on wage developments, there would clearly be a halt in wage growth in the period under review. However, according to the available data, such a phenomenon did not occur in the economy, and on the contrary average wages in sectors, where foreigners work have been risen. In addition to the fact that the link between these two variables is strong, it is important to compare wage developments with the sector where foreigners do not work often. As mentioned above, such a sector is clearly the primary sector. Apart from the fact that the average wage level lags behind the secondary and tertiary sectors in the long run, the primary sector is not one that would employ a large number of foreigners. The graph below shows that although we also recorded an increase in wages in the primary sector, their pace and, ultimately, the final level do not reach the level of average wages in industrial production. Based on our comparison, it can be clearly stated that foreigners working in Slovakia do not have a negative effect on the development of wages in Slovakia.

**Fig. 2.** Comparison of average wages in industrial sector and agriculture sector  
Source: STATdat (2020)

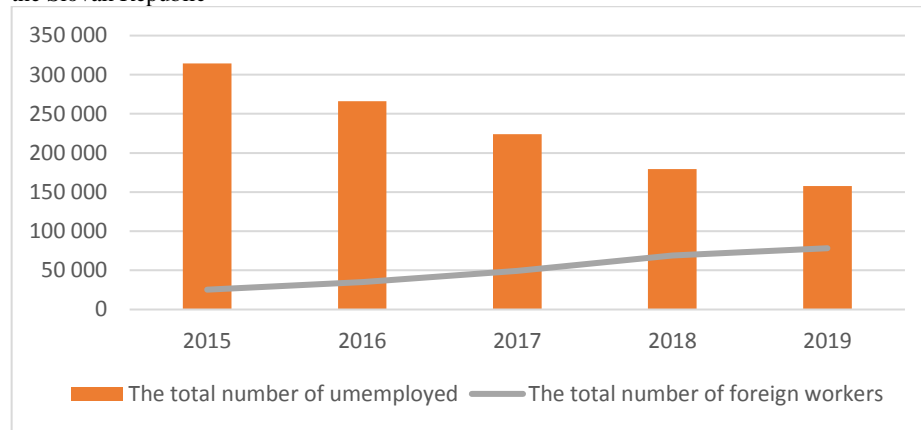


Source: STATdat (2020)

### 3.3 Mutual Relation between Labour Immigration and Unemployment Rate

The second most common argument that can be observed in society in relation to foreigners is that they occupy jobs that are intended for the domestic population. However, this argument, as well as the one that automatically links the arrival of foreigners with a slowdown in wage growth, cannot be described as correct and logical. First of all, it is important to state that the Slovak Republic has the lowest unemployment rate in its history. On the Slovak labour market, however, we still register vacancies that we are not able to be filled with domestic workers. In the short term, it is therefore more efficient to employ foreigners who, due to legislative changes in the Employment Services Act, have significantly simpler conditions for entering the labour market. However, the benefits of these legislative changes should be reciprocal, as employer demand in the labour market is acute and can be an obstacle to the production process. If employers are not able to fill vacancies in Slovakia, this can lead to the termination or relocation of production to other countries. Filling vacancies by foreign workers helps the economy significantly. If we look at the activities of foreigners on the labour market from the point of view of keeping companies on the Slovak market, their effect can be assessed highly positively. The negative mutual relationship between the number of working foreigners on the Slovak labour market and the increase in the unemployment rate has not been proven, which is also illustrated by the graph below.

**Fig. 3.** Mutual relation between total number of unemployed people and foreign immigrants in the Slovak Republic



Source: STATdat (2020), ÚPSVaR (2020)

### 3.4 Impact of COVID-19 on Labour Immigration in the Slovak Republic

The spreading coronavirus has paralyzed the economies of the all member states of the European Union, including Slovakia. The European Commission assumes that the economy will enter a recession and the crisis will have a negative effect on the level of unemployment. In the case of Slovakia, the European Commission estimates that the unemployment rate will increase to 8.8% from 5.8% in 2020 (European Commission 2020). The labour market will thus face different challenges compared to the situation at the beginning of 2020 or pre-crisis period in general. With the increase of the number of domestic unemployed, it can be assumed that the need to employ foreigners will decrease. However, based on the European Commission's forecasts, a decline in the unemployment rate can be seen as early as 2021, which will be a natural effect of the economic recovery. The need to employ foreigners has for a long time a logical ratio in economically developed countries. At a time of economic growth, we were able to observe an insufficient level of labour supply on the labour market, so one of the ad hoc solutions was to employ foreigners. Although, given the current situation, a short-term suspension of this trend can be expected, after overcoming the crisis, there is a reasonable assumption that the established trend of employing foreigners would continue.

## 4 Conclusion

Labour migration is part of economically developed as well as developing countries. Advanced democracies with positive macroeconomic variables are becoming more and more popular destination for immigrants from less developed countries. The Slovak Republic is also affected by this trend and is becoming a popular destination for

foreigners from third countries or less developed countries of the European Union. The character of the Slovak economy greatly helps the established trend. Now, we can observe an ever-increasing number of foreigners on the Slovak labour market, while the number of those who come from third countries exceeds the number of workers from European Union member states. This is mainly caused due to the fact that the acute shortage of workers on the Slovak labour market was behind the legislative steps that were to significantly simplify the employment of foreigners. If the government's goal was to increase the number of working foreigners in Slovakia, this effort can be assessed positively. A partial negative is the fact that the legislative changes only concern lower-skilled workers and abstract from the highly qualified workers. Legislative changes will be needed in the future to facilitate the employment of highly qualified workers who will play a crucial role in the transformation to knowledge economy. Due to the qualifications of workers, they find employment in industrial production, specifically in positions that do not require a university degree. To sum up main results of our study there is no clear evidence about negative impact of working foreigners on the labour market. Nor can it be argued that foreigners have a negative effect on the total number of unemployed, as this macroeconomic variable is declining in the long run, which can be assessed as highly positive.

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# Voluntary Health Insurance and the consumption of the Europeans aged 50+

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**Abstract.** With the rising life expectancy of the Europeans and the increasing costs of health care, medical expenses represent an important form of a financial risk. One way to decrease this risk on the micro level is to participate in the supplementary health insurance schemes. This paper focuses on the effect of the supplementary health insurance and the out-of-the-pocket medical expenditures and food consumption of the European households with participants aged 50+. Analysis is conducted for 17 European countries and Israel. All results are based on the Wave 6 of Survey of Health and Ageing and Retirement in Europe (SHARE) database. Ordinary least squares estimates do not allow to draw any conclusions about the effect of the supplementary health insurance participation on the out-of-the-pocket drug expenses of the households, however we found an evidence for the positive effect on the consumption. Supplementary insured individuals tend to spend more on the food consumption.

**Keywords:** Supplementary health insurance, consumption, out-of-the-pocket expenditures

**JEL classification:** D 10, D 12, I 11

## 1 Introduction

Thanks to the better life conditions and the invention of the ever more efficient and accessible healthcare, life expectancy of the Europeans continues to rise. Beside of the obvious positive effect on the quality of life, this has several negative implications for society. Combined with the decreasing natality within Europe, longer lifespan represents a significant challenge for the future sustainability of the social systems.

Based on the Biró (2014) in most of the European countries more than 50% of health expenditures are financed by the general government through the public health insurance. This leads to the need to identify certain medical procedures which should not be reimbursed by the NHS, thus reducing the social burden. Boone (2014) conducted an analysis in which he used a model encompassing moral hazard and adverse selection to identify which treatments would be effective to cover by public

insurance and which are more suitable for private supplementary insurance. He stresses that public insurance can tackle the adverse selection (by being universal) more effectively than private market. On the other hand, moral hazard endangers both, private and public insurance systems and therefore should be redundant while deciding about covering some treatment. In conclusion Boone suggests that public insurance should cover mainly chronic diseases.

In practice, dental care is often only partly or not at all included in NHS (like in Denmark). As a result of distinction between the treatments, patient is left with two possibilities – out-of-the pocket expenditures paid by patient himself or voluntary private healthcare insurance.

Unexpected health shocks, as a background risk which cannot be effectively eliminated by the subject's behaviour, affects the consumption of the elder populations. In the absence of voluntary health insurance schemes (VHI), citizens are always forced to build a buffer, which will be used once adverse health shock occurs. This is the case of Slovakia, where voluntary health insurance system is non existing. Paccagnella et al. (2007) states, that saving behaviour of the elderly households is largely determined by the health risks. Also, Palumbo (1999) concludes, that the part of the explanation of why elderly consumers do not turn their assets to the consumption after getting to the retirement has do with the revision in conditional probabilities of health-related outlays. When it comes to the empirical evidence Gourinchas and Parker (2002) estimated, that precautionary savings (savings for health shocks are part of it) can explain as much as 50% of US savings.

Introduction of a supplementary health insurance schemes should lead to the decrease in the precautionary savings for those individuals joining the scheme in comparison to the non-joining individuals. There are several studies focused on the effect of the health insurance coverage on the consumption of the household. Bai and Wu (2014) exploited the effect of the introduction of new public insurance scheme in China and their results indicate that consumption of the household, excluding health expenditures, increased by 5.9% after the scheme was introduced. Also, they concluded that the increase in consumption was much higher than the average premium of the insurance. In favour of the supplementary health insurance systems are also findings of Liu (2015). He stressed that adverse health shocks may have particularly severe impacts on the low-income households, because of the high treatment costs relative to income and potential persistent health complications. Therefore, lack of the reimbursement in case of the one-time negative health shock might affect the consumption patterns of the household for a longer period. Building the effective system of the healthcare insurance, brought partly by public and partly by private sector seems desirable.

Yet, it is important to mention, that the results are not unambiguous. Guariglia and Rossi (2004) found out, that in the UK - private health insurance is supplementary to the National Health Service – participation in the private health insurance scheme increases the probability of the household savings. As a possible explanation, one can mention endogeneity arising from the selectivity bias. That means that differences in unobserved characteristics might affect both – insurance take-up and saving propensity. Other possible explanation is, that those more cautious are more likely to save, but at

the same time also more likely to buy supplementary health insurance as a mean for the reduction of the risks.

Other interesting implication of the supplementary health insurance is the utilisation of the healthcare use. As Biró (2014) states, utility maximizing individuals should harvest non negligible advantage from the participation in the VHI. It makes dental care accessible and decreases the number of doctor visits necessary to get to the specialists, through the bypassing the general practitioner. More extensive VHI direct the demand towards more efficient treatment.

The aim of the paper is to analyse, to what degree are VHIs able to mitigate the out-of-the pocket healthcare expenditures and thus increase the consumption possibilities of the elderly. We will also assess if the insured are more likely to visit specialists. For this purpose, we will use data from several European countries (and Israel) participating in The Survey of Health, Ageing and Retirement in Europe (SHARE). Similar research was conducted with the SHARE database by Holly et al. (2005), providing some evidence that VHI coverage may have a positive effect on out-of-pocket medical expenditures or by Biró (2014) analysing the effect of VHI on the healthcare utilisation. In our analysis we will use more recent data, encompassing more countries and as mentioned above, we will also assess the side effect of the VHI on the consumption strategy.

## 2 Data

For the purpose of our analysis we are taking advantage of the extensive micro data database collected under SHARE initiative. SHARE collects data on the level of the household (only households with participants at the age of 50 or older) and is multidimensional. It has modules focused on demographic, health, economic and social variables. We use the data from Wave 6 which was collected in 2015. Although, since 2020 there are available data from the Wave 7, however, some variables are reporting considerably large amount of the missing values in this wave. Our key variable, participation in the supplementary health insurance scheme, is one of these, therefore we considered wave 6 to be more appropriate. Wave 6 encompasses 18 countries (17 European countries and Israel), unfortunately Slovak Republic is not one of them. Slovakia joined the survey for the 7<sup>th</sup> wave, but more values are missing than reported, so in its current state it does not allow the proper analysis.

In the first part of the practical section we will examine the relation between VHI and drug expenditures covered by households themselves. The sample size per country, share of the supplementary health insured households and average amounts paid yearly for medication by households themselves are shown in Table 1. Surprisingly, the simple mean comparison suggests, that the relation between VHI and amount paid is unambiguous. For example, in Austria, Spain or Croatia supplementary insured are on average paying much more for medication than those with mandatory insurance only.

**Table 1.** Sample size, share of supplementary insured households and average yearly amounts paid for medication out-of-the-pocket (standard deviations in brackets)

Country	Sample Size	(Insured/Sample Size) *100	Uninsured amount paid for medication by themselves (€)	– Insured – amount paid for medication by themselves (€)
Austria	3 402	21.74	242.56 (6.93)	331.96 (31.39)
Germany	4 412	28.96	140.11 (4.39)	147.31 (7.58)
Sweden	3 906	14.86	143.17 (2.43)	122.69 (5.32)
Spain	5 636	12.38	105.80 (5.91)	146.30 (14.69)
Italy	5 313	5.35	238.91 (6.20)	276.44 (25.34)
France	3 948	95.08	76.04 (9.14)	90.34 (4.23)
Denmark	3 721	48.29	268.96 (10.32)	182.74 (8.54)
Greece	4 937	4.39	225.15 (6.24)	234.99 (30.08)
Switzerland	2 806	79.41	353.47 (45.67)	267.86 (10.28)
Belgium	5 823	81.16	319.18 (19.93)	296.45 (9.03)
Israel	2 035	44.67	471.09 (23.72)	424.69 (33.45)
Czech Republic	4 858	6.10	92.43 (2.63)	76.20 (6.52)
Poland	1 826	7.27	289.23 (7.73)	243.96 (25.37)
Luxembourg	1 564	76.95	286.38 (74.22)	194.13 (14.28)
Portugal	1 676	23.31	438.30 (24.39)	364.61 (43.13)
Slovenia	4 224	82.77	86.12 (7.33)	90.10 (3.67)
Estonia	5 638	3.12	225.56 (4.04)	205.73 (19.04)
Croatia	2 494	90.07	65.62 (9.76)	105.58 (4.76)
Number of obs.	67 925		42 953	

Source: Based on data from SHARE database, Wave 6.

Suggested, unambiguity of the relation between VHI and expenditures for medication can be the result of the self-selection bias. Supplementary insured, might be different in several demographic, social and economic characteristics from those uninsured. Therefore, trying to establish clearer conclusions about the link between VHI and drug expenditures, we will estimate the Ordinary Least Squares (OLS) model separately for

each country (expenditures may vary across countries based on price levels), while controlling for several chosen characteristics.

OLS regression for out-of-the-pocket drug expenditures is specified as follows:

$$ODE_i = \alpha_1 + \beta_1 VHI_i + \theta X'_i + \partial_i \quad (1)$$

Where ODE stands for out-of-the-pocket drug expenditures,  $\alpha_1$  represents the intercept (to limit potential issues with the normality of the distribution, however we believe our samples are numerous enough to overcome any such problems), VHI is a dummy for supplementary health insurance and  $\partial$  stands for error term.  $X$  consists of the vector of control variables – Age, Age squared, Gender, Self-Reported Health, Marital status and Financial Wealth. Age is used as the drug expenditures tend to rise by age and age squared controls for the likely nonlinear relation. Also, we control for gender and marital status. We will include variable self-reported general health status. Originally, values are in the range from 1 to 5, with a lower value representing the better-perceived health. However, as this is a categorical variable, dummy variable will be created – we assign value 1 for those with good, very good and excellent perceived health and 0 for those with bad or fair health. Lastly, we control for the effect of financial wealth. This variable is constructed as:

$$\text{Gross financial wealth} = \text{bank accounts} + \text{stocks} + \text{bonds} + \text{mutual funds} + \text{individual retirement accounts} + \text{contractual savings for housing} + \text{life insurance policies} \quad (2)$$

In the second part of the practical section of this paper we estimate the effect of the VHI participation on the consumption. For this purpose, data on total monthly consumption or the expenditures on certain free time luxury activities would be preferred but only data on food expenses are available. However, we still believe that this is enough to brought us to the conclusions. VHI participants should have lower background risk and therefore spend more on the food (either quality or quantity).

We will regress OLS regression separately for each country (expenditures vary depending on price levels). To control for self-selection we use several demographic, social and economic characteristics as controls. Second model is specified as follows:

$$FOOD_i = \alpha_2 + \beta_2 VHI_i + \phi X'_i + \kappa_i \quad (3)$$

Where FOOD stands for the sum of expenditures on the food at home or outside from the consumption module. Intercept is represented by  $\alpha_2$ , VHI is a dummy for supplementary health insurance and  $\kappa_i$  is an error term.  $X$  stands for the vector of control variables. These are Age, Gender, Marital Status, Financial Literacy, Internet User, Social Activity, Risk Aversion, Wealth Quintiles. Financial literacy is based on the numeracy score, which is categorical variable, therefore dummy with value of 1 if respondent answered 5 or 4 out of 5 questions correctly and 0 otherwise. Internet user is a person that reported using the internet recently. Dummy is used to control for the socialising, which we consider as a factor increasing food consumption. Socially active are those attending at least one of these: 1) voluntary/charity work; 2) educational course; 3) sport, social or another kind of club; 4) political or community-related organization 5) playing cards or games such as chess. Financial risk aversion defined as a level of risk one is willing to take, might affect the consumption, as it stipulates the caution and propensity to save. Lastly, we control for financial wealth. To avoid disturbances from extremely high values, we encoded it into quintiles for each country.

Table 2 shows the average values and standard deviations of the control variables by VHI status, as well as the results of the t-tests. T-test was run as a non-paired test with the supposed unequal variance. As one can see, t-test showed significant differences between insured and uninsured in all reported variables, thus supporting our hypothesis about the self-selection bias.

**Table 2.** Control variables used in regressions and t-tests by the VHI status (standard deviations in brackets). \*\*\* means t-test is significant at 0,01 level of significance

Variable	VHI Uninsured	VHI Insured	t-test
Age	68.285 (0.050)	66.622 (0.064)	U>I ***
Males	0.433 (0.002)	0.440 (0.003)	U<I ***
Self-assessed health	0.556 (0.002)	0.684 (0.003)	U<I ***
Internet users	0.423 (0.002)	0.600 (0.003)	U<I ***
Risk averters	0.779 (0.002)	0.701 (0.003)	U>I ***
Married	0.700 (0.002)	0.732 (0.003)	U<I ***
Socially active	0.467 (0.002)	0.630 (0.003)	U<I ***
Financial literacy	0.456 (0.002)	0.543 (0.003)	U<I ***
Financial wealth (max. 1 mil.)	26 282.57 (383.559)	75 419.58 (905.809)	U<I ***

Source: Based on data from SHARE database, Wave 6.

The highest correlation found between the independent variables is -0.39 between the Age and Internet Usage, therefore we conclude we do not suffer from the multicollinearity issues. To overcome other potential issue, heteroscedasticity, we use heteroscedasticity adjusted errors in all regressions.

### 3 Results

Table 3 reports the results from the drug expenditures regressions, for the spatial requirements we do not report coefficients for the control variables. Even after controlling for several other characteristics, we might conclude that link between VHI and out-of-the-pocket medical expenditures is not unambiguous. Although all the regressions are statistically significant, in overall our model is able to explain only small fraction of the variance in the drug expenditures. At maximum, we did explain 17% of the variance for Poland. VHI estimate is statistically significant at alpha 1% or 5% only for Austria, Germany, Spain, Denmark, and Croatia. Only in case of Denmark the

coefficient is negative, thus supporting that out-of-the-pocket medical expenditures are lower for supplementary insured. Other 4 significant countries are contra intuitive.

**Table 3.** Regressions estimated for the out-of-pocket expenditures for medication (standard deviations in brackets), Control variables: Constant, Age, Age squared, Male, Health, Married, Wealth. \*\*\* significant at 0.01 level, \*\* significant at 0.05 level, \* significant at 0.1 level of significance. N. stands for number of observations.

	Austria	Germany	Sweden	Spain	Italy	France
VHI	98.54*** (31.97)	16.77** (8.34)	-11.06* (5.86)	45.07*** (16.39)	153.54 (97.28)	15.40 (10.02)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.06	0.04	0.05	0.01	0.04	0.02
F-test	27.41***	22.29***	20.53***	6.98***	23.09***	4.25***
N.	2315	3253	3072	2534	3149	1737
	Denmark	Greece	Switzerland	Belgium	Israel	Czech Republic
VHI	-66.35*** (12.65)	21.34 (29.63)	-57.46 (47.60)	27.05 (22.01)	18.49 (50.48)	-1.98 (6.86)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.09	0.08	0.03	0.09	0.05	(0.03)
F-test	21.02***	27.83***	5***	40.55***	9.42***	26.81***
N.	2774	3129	1231	3480	897	4082
	Poland	Luxembourg	Portugal	Slovenia	Estonia	Croatia
VHI	1.69 (24.76)	-35.16 (85.63)	-21.30 (51.62)	7.51 (8.42)	-6.39 (18.22)	29.46*** (10.42)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.17	0.05	0.03	0.03	0.09	0.05
F-test	39.88***	5.28***	14.92***	8.96***	88.48***	11.56***
N.	1409	784	1197	2254	4416	1227

Source: Based on data from SHARE database, Wave 6.



**Table 4.** Regressions estimated for the monthly food expenditures (standard deviations in brackets), Control variables: Constant, Age, Male, Married, Financial Literacy, Internet User, Social Activity, Risk Aversion, Wealth Quintiles. \*\*\* significant at 0.01 level, \*\* significant at 0.05 level, \* significant at 0.1 level of significance. N. stands for number of observations.

	Austria	Germany	Sweden	Spain	Italy	France
VHI	45.33*** (10.85)	37.36*** (8.23)	19.65* (11.76)	61.51*** (13.96)	24.07 (15.92)	6.42 (26.2)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.20	0.15	0.21	0.15	0.18	0.16
F-test	76.26***	87.22***	92.61***	65.98***	117.01***	78.30***
N.	2869	4050	3103	3309	4400	3007
	Denmark	Greece	Switzerland	Belgium	Israel	Czech Republic
VHI	7.14 (9.39)	75.85*** (23.78)	53.22*** (19.40)	39.15*** (12.13)	116.87*** (19.39)	-5.03 (8.23)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.21	0.12	0.18	0.19	0.27	0.11
F-test	113.16***	34.39***	58.11***	114.95***	46.82***	61.03***
N.	3177	2254	2201	4230	1077	4007
	Poland	Luxembourg	Portugal	Slovenia	Estonia	Croatia
VHI	14.54 (17.52)	105.31*** (28.26)	45.59*** (14.00)	51.01*** (6.65)	44.24*** (14.16)	-9.40 (16.59)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Robust Errors	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.13	0.10	0.13	0.16	0.18	0.13
F-test	9.79***	14.69***	18.31***	85.13***	103.22***	42.08***
N.	364	1249	1196	3461	4627	2222

Source: Based on data from SHARE database, Wave 6.

Results for the second regression, aimed to estimate the effect of the VHI participation on the consumption expenditures of the households are reported in Table 4. Here the coefficients are a bit clearer. After controlling for the explanatory variables mentioned in the section above, for 11 out of 18 countries coefficients suggest that VHI participation has statistically and also economically significant positive effect.

Supplementary health insured in Israel and Luxembourg spent on food more than 100 euros more per month in comparison to their uninsured counterparts. From significant results the lowest reported is 37.36 euros per month in case of Germany. All models are statistically significant at the level of alpha 1% and the explained variance is on average between 15 to 20 percent. Heteroscedasticity adjusted errors were used.

## 4 Discussion

While controlling for several other characteristics, we have estimated OLS regression with the aim to test the effect of VHI participation on the out-of-pocket drug expenditures. Based on our results we did not find enough evidence to conclude that such a link exists. Only for 5 out of 18 analysed countries the coefficient was significant. In 4 of them VHI coefficient had positive sign. This would be in line with Biró (2014) and Holly (2005), who also suggested that there is a positive link. Biró (2014) suggests, that VHI participants tend to visit specialists more often. That would lead to the higher amount of drug prescription relative to supplementary not insured. Other explanation could be that those supplementary insured are different in some unobserved characteristics such as approach to the risks or behavioural risks.

However, based on the insignificance of the most of the VHI coefficients, it is possible that there are omitted important control variables in our regression such as abovementioned behavioural risks. One possible drawback of our setup might be the construction of the health index. While easy to interpret, it is self-reported and thus subjective. In the future, it might be useful to employ the broader spectrum of health condition dummies instead of one composite variable.

For the part concerning the effect of VHI participation on the consumption, results suggest positive effect on the food expenditures. VHI insured are spending more on food than VHI uninsured. This is in line with the expectations, because decreased background risk of the unexpected medical out-of-the-pocket expenditures allows households to spend more on consumption. Statistically significant coefficients varied from 37 to 117 euros per month. These results are supported by Bai and Wu (2014) who also found that the introduction of more extensive insurance coverage leads to the increase in non-medical spending. Results are also supported by the findings of Palumbo (1999) and Paccagnella et al. (2007), who linked the saving and spending behaviour of the elderly with the medical risks.

Positive effect of the VHI participation on the food expenses has interesting implications for the policy makers. It suggests, that by decreasing the risk of out-of-the-pocket medical expenditures authorities might positively affect the market demand and thus boost the economy. Higher consumption also leads to the higher life standards. Thus policies that broaden insurance coverage, or bring new private insurers to the market are desirable.

This paper is subject of several limitations that should be eliminated in further research. First of all, lack of data on consumption makes it impossible in current state to estimate anything else besides the effect of the VHI on the food expenses. Secondly, scarcity of the outcome for the variable VHI varies a lot between countries. OLS might

not be the most appropriate method of the estimation in countries such as France or Italy, where almost no one and almost everyone has VHI, respectively. Some other estimation method or sample creation will be considered for further development of the topic. Thirdly, the extensive scope of the SHARE database offers possibilities for the identification of further control variables. As we already mentioned, one such expansion could be to substitute self-reported health index for health condition dummies.

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# Impact of new European tax on Slovak economy

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**Abstract.** The euro area is the first case in the history of monetary unions, where monetary policy making is centralized under a single central bank, while fiscal policymaking is decentralized by the national governments of the Member States. How should a deeper fiscal integration or even a fiscal union look like? One of proposed solution among economists is the introduction of European tax. The aim of this paper is to review literature on fiscal integration and to assess the impact of this new European tax on Slovak economy using CGE model. We explore the impact of increased transfer payments from Member state to the central budget as well as creation of new European tax. We estimate that the negative impact of higher transfer payments or increased taxes is negligible, but this larger central budget would provide a tool to help Member states that were exposed to asymmetric shock in the future.

**Keywords:** fiscal union, optimal currency area, euro area, federalism, European tax, CGE model

**JEL classification:** E44, E61, E62

## 1 Introduction

The European Union is facing problems stemming from systemic errors in the European integration project itself. The euro area is a case of a monetary union with centralized monetary policy and, at the same time, decentralized fiscal policies. The position of "unfinished" European integration is a significant negative factor. There is a consensus that a viable process for fiscal and political union is necessary for a viable euro area. The fiscal union project requires concrete steps to deepen fiscal integration and move towards a political union. The basic argument for introducing fiscal surveillance and a common fiscal framework is that unsustainable fiscal policy in one member state can destabilize the entire euro area. There is a wide scope for different approaches to deepening fiscal integration (on the one hand, the SGP, the six pack, Treaty on Stability, Coordination and Governance in the Economic and Monetary Union, ESM and EFSF rescue mechanisms) or to propose new elements (fiscal transfers between countries, larger central budget, etc.).

The euro area is the first case in monetary union history where monetary policy-making is centralized within a single central bank, while fiscal policy-making is decentralized in the hands of the national governments of the Member States. This institutional framework is new to economists and policy makers. Such a case of monetary union with centralized monetary policy-making but decentralized fiscal policy is a historically unexplored and unverified area, so we can find in the literature a broad spectrum of views on the future development of the EMU and on the need to deepen fiscal integration.

The future of European Union and more specifically euro area institutions was at the center of a heated policy debate during 2011–2012, when the euro-area faced its deepest crisis since its birth. One key event during that period was the publication, on December 5, 2012, of the report “Towards a Genuine Economic and Monetary Union” authored by the so-called “four presidents” (Van Rompuy, Barroso, Juncker and Draghi) which identified four pillars on which a “stable and prosperous” monetary union could be built (see European Commission 2012).

One of these pillars together with the banking union (or, more precisely an “integrated financial framework”), the integrated economic policy framework, and the strengthening of democratic legitimacy was the “fiscal union” at least this is the term used by many to refer to it, although more precisely the report referred to the achievement of an “integrated budgetary framework ensuring both sound national budgetary policies and greater resilience to economic shocks of the euro area as a whole”. Since then, progress has been made in all these areas, although to different extents, with more progress being made in achieving an integrated financial framework. The update of the four presidents’ report issued in June 2015 (actually now the five presidents’ report, following the inclusion of the president of the EU Parliament; see European Commission 2015) makes new proposals on how to advance in integrating the institutions of the euro-area but is relatively less ambitious than the previous report, at least in terms of short-term objectives. The debate on the medium- and long-term future of European institutions is, however, still very much alive (see, for example, Sapir 2015).

The question remains to what extent governments can create a budget deficit to absorb negative shocks without leading to unsustainability of these deficits. The use of fiscal policy in offsetting negative shocks cannot be sustainable in the long term. Experience from history points to the fact that large budget deficits quickly lead to unsustainable debt dynamics, which are very difficult for countries to stop and stabilize. (Muchova, 2010)

The fiscal union project requires taking concrete steps to deepen the fiscal integration and move towards political union. The basic argument for introducing a fiscal surveillance and a common fiscal framework is the fact that unsustainable fiscal policy in one Member State can destabilize the euro area as a whole. (Bénassy-Quéré et al., 2016.)

The aim of the paper is to present possible elements of the fiscal integration and evaluate their impact on the Slovak economy through the CGE model. Namely we investigate the possibility of creating larger European budget. This can be achieved by transfer payments of existing tax revenues of each Member state or by creating new

European tax. Using GTAP CGE model we can assess the impact of these 2 scenarios on Slovak economy and its implications on the possible formation of fiscal union in the future.

## 2 Literature review

Fuest-Peichl (2012) identifies five potential pillars of fiscal union, but the fiscal union that will emerge may or may not include all of them: (1) common rules, policy coordination and surveillance; (2) a debt resolution mechanism; (3) a mechanism for providing a common debt guarantee; (4) fiscal transfers between countries; and (5) a larger EU budget and the introduction of a European tax.

The current elements of the fiscal union under discussion include elements of transfers only in a scenario where individual member states do not fulfill their obligations and do not repay their debt. Therefore, another possible element of a fiscal union would be the transfer mechanism between countries, to a significant extent. The current EU budget includes transfers under the Structural and Regional Funds as well as agricultural policy. However, these transmission mechanisms are essentially unrelated to the functioning of the monetary union. Moreover, with around 1% of GDP, the size of the EU budget is relatively small, so the scope of transfers is limited. The standard argument in favor of a fiscal union is that a monetary union should be complemented by a fiscal smoothing scheme that will help absorb asymmetric macroeconomic shocks. The basic idea is as follows. In a monetary union, member countries do not have access to monetary policy to respond to the recession. They can only use fiscal policy, but their room for maneuver can be limited if the capital markets are skeptical of the country's solvency. The view is widespread that pressure from the capital markets can force countries to adopt counterproductive, pro-cyclical fiscal policies. In this case, the fiscal smoothing scheme can provide a guarantee through financial transfers to countries affected by asymmetric negative macroeconomic shocks. Usually fiscal equalization exists in a monetary union only along with a high degree of political integration, typically a federation with a strong central government. Of course, this does not necessarily mean that a fiscal adjustment scheme could not be implemented in the euro area or in the EU. However, there is one problem of separating the fiscal equalizer "guarantee" effect, which is crucial for macroeconomic stabilization, from the redistribution effect of wealth. A pure guarantee mechanism could find sufficient political support but introducing an important wealth redistribution mechanism would probably face resistance. Another question is that, depending on the type of shock, stabilization through fiscal balancing may delay / slow down the necessary measures in the country affected by the shock.

### 3 Methodology

In empirical research, we carry out a simulation using the computable general equilibrium model. CGE models are numerical simulations based on general equilibrium principles and are designed to turn general equilibrium theory into a practical tool for policy analysis. The CGE model itself is a computer program. (Gilbert et al., 2016) A suitable introduction to the structure of typical CGE models are, for example, Hosoe et al. (2010) or Gilbert and Tower (2013). Dixon and Jorgenson (2013) provide an excellent overview of the latest developments in this field.

The basis of the CGE model is the so-called social accounting matrix (SAM), which captures in detail the flows of money, goods, and services in the economy. These matrices are very detailed, and we can change the degree of data aggregation according to research needs. For the needs of our model, we aggregate the world into 4 regions: Slovakia, the euro area (excluding Slovakia), the rest of the EU and the rest of the world. The reason for this aggregation is the interconnectedness of economies within the EU, and therefore the need to look at the impact of new policies and asymmetric shocks. In our model, we aggregated production in the regions into 3 sectors: agriculture, industry, and services.

The advantage of CGE models is their ease of data. For a simple CGE model, data from one time period from national accounts are sufficient. However, this advantage is also a disadvantage, CGE models are static, and therefore incorrect data selection can lead to skewed results. We will use the GTAP model (Global Trade Analysis Project) as a basis for our research. The standard GTAP model is a multiregional, multisectoral, compatible general equilibrium model with perfect competition and constant economies of scale. The GTAP database is a consistent representation of the world economy for a predetermined reference year. The database is based on several data sources, for example: national input-output tables (I-O), international trade data, macroeconomic data, energy and security data. The underlying input-output tables are heterogeneous in terms of resources, methodology, base years and sectoral details, so considerable efforts are made to ensure consistency between different sources. (GTAP, 2019.)

### 4 Results

As we have mentioned above, the transfer payments in the euro area only work under the Structural and Regional Funds, which, however, are not linked to the stages of the economic cycle and cannot fully function as a tool to offset asymmetric shocks across the Member States. Marzinotto, Sapir and Wolff (2011) argue that if the European Ministry of Finance took the wrong steps or if there was a need to recapitalize large banks, it would need a stable and strong inflow of funds. These funds could be obtained, for example, from a Europe-wide tax proposed by the authors at 2% of GDP.

In our model, we will simulate an increase in the fiscal resources available to the euro area by 1% of euro area GDP. This increase in the euro area budget represents an additional amount to the already mentioned EU budget of 1%, and the EU is



redistributing these funds through its own funds. In this way, the euro area will have a total budget of 2% (of which 1% can be sent through transfers to Member States). The question remains how these funds will be collected. Consider two scenarios. The first is the possibility for countries to reduce their government spending and thus send part of their tax revenue to the common budget of the euro area. Tax revenues in the euro area account for 46.5% of GDP (40.8% of GDP in Slovakia). The second option is a new European tax that would flow directly into the eurozone budget only.

In the first step, we simulate the current period and the situation in which reduced government spending or increased taxes would affect Slovakia and the euro area. We simulate two situations where government spending in Slovakia is reduced by 1% of its GDP and these funds are transferred to the euro area, which will increase government spending in this region. Subsequently, we simulate the situation that these funds are financed by the government by increasing tax revenues by 1% throughout the euro area. Table 1 shows the impact of the newly formed fiscal union on the monitored regions in the current period. According to our calculations, in good times it would be "less costly" to finance the euro area budget with existing tax revenues than to create a new European tax.

**Table 1.** Change in GDP due to introduction of fiscal union (in %)

	Transfer of existing tax revenue	New increased tax	Total effects
Slovakia	-0.0444	-0.0609	-0.1053
Euro area (excl. Slovakia)	0.0001	-0.0484	-0.0483
Rest of EU	0.0008	0.0178	0.0186
Rest of the world	0.0001	0.027	0.0272

*Source: own calculations.*

Table 2 shows that reducing government spending and raising the tax rate would lead to deflationary pressures. In this case, the effect of government expenditures is stronger for Slovakia than increased tax revenues (increased tax rate). The increased tax rate reduces household disposable income accordingly limiting their consumption, which affects aggregate demand and causes slight deflationary pressures (0.05%). At the same time, the depletion of government spending has a similar (but larger) effect. The sum of these effects is the situation when a "European tax" would be introduced in the country and these funds would be transferred from Slovakia towards the euro area budget.

**Table 2.** Change in the inflation rate due to introduction of the fiscal union (in %)

	Transfer of existing tax revenue	New increased tax	Total effects
Slovakia	-0.0971	-0.0538	-0.151
Euro area (excl. Slovakia)	0.0001	-0.0455	-0.0453
Rest of EU	0.0007	0.0168	0.0175
Rest of the world	0.0001	0.0263	0.0264

*Source: own calculations.*

Household incomes would also be affected by the creation of a fiscal union as can be seen in table 3. However, the effects of the introduction of the fiscal union in the current period are relatively low, indicating that the current fiscal union in the euro area may not be worried about economic consequences (some moderation of economic growth was expected) but rather the political willingness to adopt these solutions.

**Table 3.** Change in household income due to introduction of fiscal union (in %)

	Transfer of existing tax revenue	New increased tax	Total effects
Slovakia	-0.043	-0.0626	-0.1056
Euro area (excl. Slovakia)	0.0002	-0.0498	-0.0496
Rest of EU	0.0009	0.0182	0.0191
Rest of the world	0.0001	0.0273	0.0275

*Source: own calculations.*

Tables 1-3 describe how the economic situation in Slovakia will change due to the creation of a larger euro area budget in the current period. We can see a slight decrease in the country's economic indicators.

## 5 Conclusion

The emergence of the euro area has pushed the issue of fiscal union aside, but the current crisis has relaunched this debate. Of the three classic functions of fiscal policy - the provision of public goods, redistribution, and stabilization - only the latter provides a clear justification for fiscal policy at the euro area level. An unsustainable fiscal policy in one Member State may destabilize the whole euro area and national policies may

have a direct and indirect effect on demand inflation at the transnational level. The "everyone for themselves" policy is ineffective in this case. However, coordination is challenging as it involves 19 national budgetary processes and a common central bank (Bénassy-Quéré, Ragot and Wolff, 2016). The fiscal union poses several risks. One of the least solvable problems of the fiscal union is moral hazard.

In this paper we analysed the possible impact of creating new larger European budget. We reviewed 2 possible scenarios when the income to the budget is a) transferred from existing tax revenues of Member State or b) the impact of newly created/increased tax in Member State.

Based on the analysis using the GTAP CGE model, we can assess that deeper fiscal integration in the form of transfers, or a common European tax would not have huge negative impact (under 1 %). On the other hand, this deeper fiscal integration could provide a tool for countries in euro area to defend against asymmetric shocks. We can recommend that Slovakia and the euro area focus on deepening fiscal integration. The creation of a common budget, linked to the economic cycle and of adequate size, is desirable for the sustainability of the euro area and the European Union. Our proposal is therefore to create a larger euro area budget of at least 1% of Member States' GDP. Marzinotto, Sapir and Wolff (2011) have already justified this increase in their work. In the future research this method can be improved in several ways and, we can analyse the scope of help that this new European budget can provide to a country that is hit by an asymmetric shock. In our analysis the new European budget is always balanced, in the following research it is possible to explore the possibility that the budget might be in surplus in good times and in deficit during the crisis. The GTAP model can be altered by using different level of aggregation, meaning that in following research it is possible to investigate the impact of creating fiscal union on households aggregated by level of income, or investigate the impact on specific industry in the national (or local) economy.

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## Human resources in the conditions of the creative economy in Slovakia

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**Abstract.** At present, it is necessary to realize the need to move economically towards innovation, development and creativity. The creative industry is by its nature a suitable type of industry for the development of the country, due to the relatively low inputs to the process and other possibilities of using human potential and outputs, which significantly affect further development. Therefore, it is very important for human resources to be prepared for entry and employment in this industry. In this report, we will deal with the position of human resources in the creative industry in Slovakia. At first, we will segment the current state of the creative industry in Slovakia. It will be based on these findings in the following defined competencies, which should be developed and better applied in the labour market in the creative industry. A huge influence on the work performance also has the style of management of employees. We will determine the specifics in the approach of management of employees in the creative industry as well as the requirements on these employees.

**Keywords:** creative industry, human resources, creativity

**JEL classification:** O18 R10, Z10

### 1 Introduction

The creative economy is currently considered to be the most dynamically growing economic segment. It is considered to be the key to innovative and interdisciplinary sectors, whether of an economic or social nature. From an economic point of view are creativity, innovation, inventiveness, and entrepreneurship regarded as the most important sources of a nation's wealth and economic growth. The economic growth of a company is based on the number of talented people [1]. Creative human resources are an inevitable prerequisite for the competitiveness of the organization on the market. For a company of any focus, creative employees mean having a great competitive

advantage, as this company has the potential for developing new creative and innovative ideas and solutions. Creative employees are considered to be a rare commodity in the labour market more and more [2]. The creative industry has unlimited growth potential, making it a path to sustainable development [3].

## **2 The current state of the creative industry in Slovakia**

In 2011, the Ministry of Culture has begun to deal with the creative industry and prepared a government material entitled: "Bases of the concept for the support of the cultural and creative industry in the Slovak Republic". This material characterizes the creative industry. The characteristic states that the creative industry must be perceived as an exploitative chain, which is created by the formation of conditions for the creative activity, then includes creative activity, production, reproduction, representation including export, storage, archiving and restoration. This document was also approved by the government [4]. The creative industry in Slovakia has a relatively short span. It belongs to the competencies of the Ministry of Culture of the Slovak Republic and the Ministry of Economy of the Slovak Republic, at the same time it closely cooperates with the department of finance, education, labour, and regional development. The starting material "Bases of the concept for the support of cultural and creative industries in the Slovak Republic" from 2011 was followed by the "The strategy for the development of the creative industry in the Slovak Republic". This document was prepared in 2014. According to this document, the creative industry is a part of the economy that creates its economic value based on artistic talent or creative contribution. This sector is based on the evaluation of the intellectual property. The essential part is made up by entrepreneurial activity, based on individual creativity, skill, and talent. These activities have the potential to create capital and new workplaces using intellectual property. It is important to perceive the entire exploitation chain completely, from the creation of the conditions for the creative activity, through the production, to the restoration of its results. The cultural industry is also part of the creative industry. The cultural industry is based on the knowledge and further use of cultural heritage. Cultural heritage combines cultural aspects from a historical, anthropological, ethnic, aesthetic, and social point of view. It also adds economic value to the result of an intellectual creative activity. Among the cultural heritage we can include cultural monuments, archaeological sites, museums, archives, but also the living forms such as festivals and celebrations, exhibitions, etc. Under the term creative industry, we understand the whole structure of the cultural and creative segments. Within the further understanding of the scope of the creative industry are production, exploitation and distribution considered to be the application of the results of creation and creativity, not as a direct part of the creative industry [5]. In the document „The strategy for the development of the creative industry in the Slovak Republic" a framework structure and market application is adopted, which is identified in more detail in table no. 1. At the same time, the strategy also defines cross-cutting areas and

activities that may not directly be the result of their own creative activity, but further use and exploit such results. These are shown in table no. 2

**Table 1.** Framework structure of creative industries and their market application

<b>AREA (SECTOR)</b>	<b>CREATIVE ACTIVITY / PROFESSION (areas of creation) <i>includes in particular</i></b>	<b>APPLICATION OF THE RESULTS OF THE CREATION AND THE CREATIVE ACTIVITIES</b>	
		Manufacture (production) <i>includes in particular</i>	Exploitation and distribution (trade) <i>includes in particular</i>
<b>Literature</b>	writers, editors,	publishers of the non-periodic including on-line publications Including audiobooks	book market
	translators, redactor		platforms
<b>Theatre</b>	playwrights, choreographers and other authors of dramatic and musical-dramatic works as well as non- musical interpretive art (actors, puppeteers, dancers, mimes, circus performers, etc.)	theatre operators	ticket sales
<b>Music</b>	music composers	producers of music including on-line	music market
	and music performers (singers, musicians), as well as lyricists	records of musical works and musical publishers part	services, public cultural events (concerts)
<b>Audio vision</b>	directors, screenwriters, dramaturgs, cameramen, editors,	original manufacturers of the audio-visual works (producers), television broadcasters	TV broadcast, retransmission, distribution, cinemas, audio-visual
	costume designers, architects, music composers and others film professions		media services on demand
<b>Visual Art</b>	all forms of art,	individual creation	fine arts and antiques market, auction companies
	artistic photography and light design as well as		

	new forms of multimedia installations etc., as well as related professions (e.g. restorers)		
<b>Architecture</b>	architects including interior design and garden architecture, as well as related activities (e.g. restorers with certificate of performance for restoration activities, natural persons with special professional competence at performing monument research, legal persons authorized to implement archaeological research)	individual (mostly order) creation / activity (individual activity performed through natural persons with special professional competence for this kind of monument research) “	execution of constructions and other architectural objects, execution of restoration research and restoration, execution of monument research and its use in restoration of objects and real estate
<b>Design</b>	industrial design and artistic design, as well as commercial art	industrial production (e.g. automobile industry, furniture industry etc.)	retail
<b>Fashion industry</b>	fashion design, haute couture a fragrance industry, as well as design in related areas (e.g. nail design), and related professions	clothing industry, individual / order creation	retail



	(stylists, arrangers, florists and etc.)		
<b>Crafts</b>	creation of craftsmen (crafts of traditional folk and urban culture, production of toys)	individual creation, ÚEUV, production of objects following the pattern of the traditional folk culture, as well as objects inspired by traditional folk an urban culture	retail
<b>New Media</b>	creators of multimedia works, computer a console game, mobile applications	gaming industry, publishers of multimedia works and computer and console games	retail including on- line sale and service
<b>Software</b>	programmers – development of software (does not involve development and production of computer games and console games)	software production (companies operating in the field of information and communication technologies (further on just „ICT“)	retail including on- line sale a service

**Table 2.** Cross - cutting areas and activities

<b>Advertising industry</b> marketing	advertising agencies and
<b>Information and communication technologies</b> communications and the provision of services for information	electronic company, as well as for specific content services (retransmission, direct to home (DTH), multiplex on- demand audio-visual media services, etc.)
<b>Communication media</b>	radio and television broadcasting (including via the Internet), press agencies, publishing of periodicals and provision of e-news, as well as related professions and activities (journalists, reporters, documentary, and reportage photographers, etc.)
<b>Support services</b>	art agencies, event agencies, collective management of rights organizations, etc.

Subsequently, the "Action Plan for 2015-2017 concerning the Strategy for the Development of the Creative Industry in the Slovak Republic for 2014-2020" was prepared. Both materials were prepared under the auspices of the Ministry of Culture and the Ministry of Economy. According to the strategy of the creative industry, it includes the creation, production and distribution of products and services using inventiveness, creativity, and intellectual capital as primary inputs. Also, a set of activities based on knowledge, aimed at, but not limited to the arts, potentially generating revenue from trade and intellectual property, and tangible and intangible intellectual or artistic services with creative content, economic value, and market

objectives [5]. Based on these documents we can state that the Slovak Republic leans towards the theoretical concept of the creative industry in accordance with the vision and documents of the European institutions.

### **3 The human intellectual as a potential source of value creation**

The formation of new innovations, growing competitiveness or value creation require certain skills and competencies. It is essential to define career practices and focus on flexible and multidisciplinary structures that will support, in particular, people's creative thinking and skills. The environment for creatives is changing greatly due to the constant digital development. In the past, the creative product was ready for launch after many stages of testing, today it is launched at an early stage, then it is constantly monitored and modified. Here there is a fundamental reversal, when the process is no longer standard, from research to development, but the process is exactly the opposite, from development to research [6]. Development comes first, research is secondary. In addition to the digitalization of design and process, i.e. the digital transition, this reversal also requires another form of cooperation and new forms of business models. It is essential that creatives and creative professionals build lasting and strong relationships with partners from the business sector, the non-profit sector, and the government. These collaborations require a new creative infrastructure in which all parties will work closely together to acquire the meaning and competencies for this new comprehensive approach.

#### **3.1 Creative skills**

We have a lot of views on creativity. If we see creativity as the ability to solve problems, create different innovations, then everyone can be considered creative. In the context of the cultural and creative industry, this area consists of a large group of companies and professions with different skills, methods, strengths, customer relations, technologies, ways of communication. The following list outlines the areas involved in the cultural and creative industry; however, it is not exhaustive as it is very extensive.

- Artists, the first group that unconditionally forms a substantial part of the creative industry are artists. Painters, craftsmen, sculptors, actors, musicians, etc., they all produce art. In addition to their creative and artistic skills, we also consider creativity a strength, in relation to the processes that leads to a creative product and that allows us to see meaning in a visual way. The skills of actors and stage artists consist of the ability to work with body language, communication, and so-called "Storytelling". Musicians have the ability to create an unforgettable sound atmosphere, they also use their talent in creating a sound logo and its use in management.
- Designers, their strength lies mainly in terms of development and communication. Designers should not be understood only as those who design e.g. sofa or kitchen tools. They can often be involved in creating new key business strategies. They can also contribute to service design and market access, understanding and engaging new customers. The group of designers

includes many subgroups that have a certain set of strengths. These include fashion designers, graphic designers, set designers, sound designers, architects. Fashion designers understand trends and can react to them promptly. Graphic designers, sound designers and architects excel at working with space. Whether it is large construction projects, customer space or spaces where their own workshops are located.

- Content producers are people who can combine creative content with one or more media with their work. These include filmmakers, computer game makers and authors. Through their work, they can contribute to strengthening of the use of media for business purposes and create valuable content for companies in terms of personnel development, development of new products, or as an element of marketing.
- Event producers, these are experts in the field of advertising, scenography, and people, professionally interested in the entertainment, communication, and creative industry. During their work, various collaborations with other creative companies are made, based on which they create an overall experience. This group also includes business experiences such as festivals, cultural events, attractions.

### **3.2 Development of competencies**

In a hypermodern society, management processes are constantly changing, whether it is a business area or a domain of a personal development. They are based on the spread of knowledge. Workers are required to constantly learn and acquire new knowledge and skills. However, education alone is no longer enough. Creative professionals must be part of a group of innovators, in order to stay competitive market [7].

It is in knowledge management that the terms creativity and innovation are often inflected with and when used, often confused. In the economic literature, however, these two terms are defined differently. There are several technologies used to define the innovation process or the value creation process. In general, however, these processes contain five levels of competencies. We categorize them into the creativity phase and the innovation phase. According to the individual phases of the value chain, we can divide these competencies into:

#### **The phase of creativity**

- the identification of the problem, it requires sufficient and detailed expertise. It is very important to realize that the view of what we see as a problem is not static for all people. Their views of the issue are changing based on the information they currently have. It is the collection of information that is considered to be the first step in the process of identifying problems and also in the decision-making process. When identifying the problem, it is appropriate to involve as many people from different professional sectors as possible, thus ensuring the greatest possible diversity of opinions.
- generating ideas, after defining the problem that needs to be solved, we must generate as many ideas and new ideas as possible. Competences in thought-making techniques are essential. Creative versus critical thinking is used

where ideas are generated without evaluation and then they are critically evaluated later, preferably with a polarity approach.

#### **The innovation phases**

- idea selection phase, the same number of participants participate in the idea selection as in the previous phase. Each participant must present arguments in order to choose the best decision together. Then a shortlist of problem-solving ideas that advance to the next phase follows.
- development / prototyping and production phase, development is the stage of prototype and experiment creation and the progress to the phase of processing all inputs and their selection. The best idea is used to verify their longevity through a process of stages. There is a thin line between the stages.
- commercialization / dissemination phase, this is the final testing phase. In the case of a business failure, this is not however a legal disaster. The whole process enables the acquisition of strategic, technical, and other competencies and can help to achieve success in future efforts and projects [8].

## **4 Management of the employees in the creative industry**

The creative industry employs creative employees. Managing creative workers requires determination and creativity. The creative industry is undergoing constant changes. Success depends to a large extent mainly on the work of the people who work in this industry. The creative industry differs from other industries mainly in that they produce products of a special kind. These are products of creative work and products that are different every day. According to A. Arisova (2012), employees, who are working in the cultural industry, are divided into two groups: content creators and content transformers. Not all employees in the cultural industry can be considered to be creative workers. Only a small percentage of these employees are involved in content creation. The largest group of workers in this sector are people who can be classified as "content transformers". There is no sharp line between these two groups of workers, but it is important from a management point of view to distinguish between them. When managing transformers, the leadership style is not extremely different from other employee leadership styles in other industries. However, the management of creators needs to be approached separately [9].

Creativity is considered to be a modern tool for responding to local and global challenges, whether from a social or an economic point of view. Supporting employee creativity leads to innovative forms of human resources management. It brings new opportunities for the company to develop, increases its competitiveness and brings new value for customers. In companies, in addition to the issue focused on the creativity of the individual, we must also deal with creativity in the company as a whole. The area of research is focused mainly on managers and executives and their ways to support creativity in the company. There is no precise guide on how to support a creative business climate. Every company tries to support creativity in a different way [8]. One of the main factors can be considered the setting of the position of the top manager towards creativity. He decides whether creativity will be supported in the company or

not. Business management must really want to achieve a creative climate with the goal to innovate, and they must also be really committed to this role.

A number of new methods and fashionable terms are currently emerging in the approach of leadership. A common feature is the strengthening of the elements of democracy, the pursuit of greater autonomy and the increase of the involvement of subordinates in decision-making processes. The position of the manager is also changing accordingly. In this context, we may encounter a number of new terms, for example: managers are required not only to be good managers but also to be leaders, leadership is not strictly carried out through orders and control, but the leadership is strengthened through joint vision, coaching, teamwork, etc. Current trends in people management, which are also used in the creative industry, point to the transactional approach of management, the transformational approach of management and the team approach of people management.

#### **4.1 Transactional approach**

This approach is based on the concept of transaction. It is a relationship something for something. The higher the performance, the higher the reward. With this approach of people management, motivation is evoked in the form of reward or possibly punishment. Taking this approach into account, the manager delegates the work to his subordinates and they automatically become responsible for the assigned tasks. However, the assignment of work to workers takes place regardless of whether or not they have the necessary means and skills to perform it. This style is based on an agreement that aims to bring about change. Since the transaction is between a manager and a subordinate, a change in the subordinate's behaviour is to be achieved. Motivation and punishment are used in the "something for something" mutual transaction between the manager and the employee.

#### **4.2 Transformational approach**

In today's turbulent times, there is a growing need to have dedicated and properly motivated employees in the company. On the other hand, it is also important for employees to feel that they trust their superiors and have no problem relying on them. The best way to achieve this is with the transformational approach to the leadership of people, first mentioned by Burns in 1978. Transformational leadership is built on the satisfaction of the higher needs of workers. The leader develops self-regulation and self-control in the members of his team, awakens needs in his subordinates that they did not even know about yet. There are the following ways to achieve transformation, namely: by affecting the employees to transfer their interests to the interests of the organization, by changing the needs and expanding their range, and promoting a level of awareness of the value of the resulting work [10].

#### **4.3 Team leadership**

Today, leadership is getting increasingly into the context of teamwork. Teams and teamwork predominate in the process of managed organization. In the case of task

orientation, the leader pays attention, for example, to the coordination of the activities of the group members and the setting of clear goals for the individuals and the group in order to help fulfil the assigned task. In contrast, the focus on relationships is not only associated with the different interests of individual members of the group, but also the human relationships within the group are important. With this in mind, the leader should pay attention to the prevention of conflict situations in the group, in the event of a problem that has already arisen, to manage it properly as well as to build and support team spirit [11].

## **5 Requirements for employees in the creative industry in Slovakia**

The creative industries face a constantly changing environment characterized by new digital technologies and globalization. It brings new challenges and opportunities. As it is a less predictable environment, it tends to adapt to change and learn new knowledge throughout life. It is necessary to have a considerable dose of own initiative and creativity. New jobs are being created that require new skills. These must be supported by job mobility so that employees can work where they are needed, and their skills are used. The share of work in the creative industries is expected to rise steadily. Education is considered to be a major area in the development of the creative industries. The reason is that these are relatively new areas with certain specifics. If people want to work in this industry, they must be properly prepared, which will be reflected in their education. The challenges and requirements that this industry brings are not specific and education must be adaptable to this. Regions and educational institutions have the task of assessing their current situation in this area and, if necessary, proposing solutions to support it. That is why it is very important to focus on training from an early age and to prepare future employees for this industry. There are two perspectives for employee training. On the one hand, it is necessary to focus on the education of young students, on the other hand, it is equally important to focus on retraining and capacity building for the existing workforce. It is necessary to look not only at secondary schools and universities as institutions for the preparation of future creative workers, but also at the possibilities of retraining the population after school, for example through general education institutions. It is important to prepare them for the conditions of an ever-changing environment through the penetration of digital technologies into human lives. We must realize that quality workers are not only an essential part of the company where they work, but they also play a part in the development of the entire region. Therefore, quality education in all forms of learning must be promoted. Education is generally very important and, as in other industries, the creative industry should be accessible to the widest possible range of the population.

We have identified the requirements for job seekers in the creative industries into three basic criteria:

- Education
- personal prerequisites and skills
- obtaining an academic degree at a prestigious school

### **5.1 Education of the applicant**

Education is one of the essential factors in choosing a suitable candidate, so it is very important to choose the field that the student decides to study. Based on the chart compiled by the company Profesia, we can see a ranking of study fields according to the interest of companies in Slovakia in 2018. This ranking is based on the perspective of employers in finding new employees. Only Slovak universities were included in this ranking. It follows that graduates of computer science, engineering, technology and economics have the highest chances among employers. In 2018, an average of 7 employers viewed the CV of a computer science graduate. It is almost 4 times more than graduates of theology or sports. Graduates of the Department of Arts, Sports and Theology are in the last places. The fields of informatics and art educate graduates from the creative industries.

### **5.2 Personality prerequisites and skills**

Creativity is considered a key aspect of the concept of the creative industry, and it is also one of the basic features of the nature of human capital. Based on this, we know that people who have creativity, a sense of detail, artistic feeling, computer skills, etc. have a job in the creative industry. Personality traits that creatives must have are precision, perseverance, passion for work, high intensity of work. The personal skills of these people consist of talent for one of the areas of the creative industry and the acquisition of skills acquired through education, whether through self-study, completion of various courses or in educational institutions, and so they are constantly improving in the activity and working to be better.

### **5.3 Obtaining an academic degree at a prestigious school**

Last but not least, when choosing an employee from the employer's point of view, it is also important at which school the applicant obtained his degree. The applicant's chance increases if he obtained his academic degree at a quality school. To assess the quality of a given school, several rankings are compiled, which are compiled by independent organizations and they evaluate schools according to certain evaluation indicators, which may differ in individual evaluations.

## **6 Factors influencing the development of the creative industry**

In the development of the creative economy, we have certain prerequisites that must be met for successful development. We are primarily talking about achieving a certain degree of technological, cultural, economic and social development, which creates the conditions for the growth of the creative industry. In 2007, The Work Foundation



defined 8 factors, the achievement of which is a condition for the development of the creative economy:

- demand, the growth and productivity of the creative economy are closely related to the growth of demand. The more demanding educational requirements are required, the more local creative and cultural activities will be supported. This will increase the number of artists and entrepreneurs.
- The greater the diversity, the more openness and diversity are encouraged, thus increasing the likelihood that creativity will also be encouraged and increasing productivity.
- The same conditions, creativity encourages innovation and experimentation. Some creative and cultural industries are characterized by a relatively small number of large distributors. In these cases, it is necessary not to limit the diversity of creative products and not to oppose the growth of small and medium-sized enterprises.
- education and skills, education is an essential part of the development of any industry, not excluding the creative industries. There is a lack of professional skills in key creative industries, so a better understanding of this sector is needed as part of the study process.
- building contacts, in case of not having enough own skills and knowledge about the market, it is necessary to connect with others, acquire this knowledge and skills through building contacts and relationships with external forces.
- The public sector, most members of the creative and cultural sectors, work through interaction and assistance from public support and investment, and this knowledge needs to be further developed.
- intellectual property, the business model of the creative industry largely depends on the expression of copyright.
- building more business capacity, many small and medium-sized creative enterprises with growth potential face difficulties in achieving this. Their weaknesses are the most common shortcomings in management and business discipline [6].

When developing a creative economy, certain preconditions must be met. It is about gaining a certain economic, technological, social and cultural degree of maturity, which creates the conditions for the growth of the creative sector. The development of the creative economy in Slovakia is still lagging behind in many ways compared to developed economies, and we still have a long way to go. We can state that although Slovakia lags behind in many areas compared to other economies, we have great potential for the successful development of the creative economy in the conditions of the Slovak Republic. The basic thing is that the local government, local governments and the state are open to new possibilities to support the building of a creative economy. The creative industries and creative cities are considered to be one of the driving forces

of the future economic development of countries in the field of services and employment.

We can monitor the development of the company with the help of creative activities in two main directions, namely:

- focus on customers,
- focus on the organization.

#### **Customer focus**

The main goal is to create a better experience from the perspective of customers, visitors or spectators. Achievement can be achieved through the creation of new marketing, product and service development, improved communication and additional services. In the field of marketing and communication, new media are used, the organization of various events or the application of aesthetic quality. The development of products and services is focused on aesthetics, atmosphere, expanding the business to new platforms. Additional services include adding, supplementing and retaining customers, customer events.

#### **Focus on organization**

The main goal is to strengthen the company's own experience through initiatives in the field of management, teamwork and the ability to work together. This focus is suitable for organizations where innovative processes and creative environment are used. The creative environment includes creative processes, innovation, experience with innovation and management professionals, teamwork, conflict resolution training, collaboration skills, et...

## **7 Conclusion**

Creative people with creative potential are the basic pillars of the creative economy. At present, the creative industries are considered a fast-growing sector with great potential. In the creative industry, the main essence is the use of human creativity and talent. It supports the creation of new jobs. A very important part of the creative economy are small and medium-sized enterprises, but also individuals whose ideas stimulate innovation in the development of social, cultural and economic life. Support for the creative industries is based on cooperation and the quality of education. An integral part of supporting the creative industry is also the progress and development of education. As the Slovak Republic has only limited resources of mineral resources, the creative industry is an area to which it should pay attention, as it is an economy that is not dependent on exhaustible resources. It is necessary to realize that currently the creative industry is a rapidly growing industry and this potential needs to be used properly.

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## DEVELOPMENT OF COMPETITIVENESS IN THE SOUTHEASTASIAN REGION: CASE OF SINGAPORE

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**Abstract.** The paper deals with the analysis of the competitiveness of the Southeastasian region with a focus on the economy of Singapore. The aim of the paper is to clarify what is behind the economic success of this region and especially Singapore, which is one of the most competitive economies in the world. In the article, we primarily deal with the characteristics of competitiveness from the perspective of various authors and its importance from a micro and macroeconomic perspective. Next, we look at the region of Southeast Asia in terms of historical development and geopolitical significance for Asia and the rest of the world. In the following section, we will follow up with an analysis of the Singapore economic miracle. Lastly, we analyze the current position of the region based on the competitiveness index.

**Keywords:** Southeast Asia, competitiveness, economy, Singapore, regional development

**JEL classification:** *O11, O53, P17, R10*

### Introduction

The world in the 21. century is marked by the processes of globalization, internationalization and interdependence. These processes currently significantly affect the development of the global economy. In the case of globalization, it is about speeding up the processes associated with overcoming the boundaries and barriers of space and time that relate to everyday life. It is not just about the economy and the way transactions are carried out. Globalization affects many spheres of our lives. Such as the way and form of communication, information retrieval, travel, culture and much more. Internationalization opens up new opportunities for companies that can expand their presence into foreign markets. Interdependence deals with greater or lesser

economic dependence between national economies or markets. Because of these processes, competitiveness is an increasingly important aspect that tells us how successful a company or state is compared to others. Competitiveness in the global economy represents the ability to assert itself not only at the domestic level, but also internationally. The greater the competitive pressure on firms and states, the greater the effort they have to make to gain a comparative advantage over their competitors. Globalization can be considered as a driver of innovation, which leads to gaining a good starting position in the competition. The Southeast Asian region can serve as a good example to illustrate the implementation of significant changes that have been able to kick-start the economic activity of the states grouped in this part of Asia. Right now, many experts are turning to the region of Southeast Asia for valuable lessons from its transformation. Singapore in particular and its incredible transformation are attracting the attention of many economists. Singapore and its economic transformation provide us with some valuable lessons. The questions arise, how did this city-state do it? Is it possible for any country to go through a similar change? We will try to answer some of these questions in the following paper.

The paper deals with the economic transformation of the region of Southeast Asia, especially Singapore. Based on the concept of competitiveness, the different views of the authors are discussed. In the context of the Competitiveness Index published annually by the World Economic Forum, we analyze the current position of the region of Southeast Asia and Singapore. Specific attention is paid to Singapore and its economic miracle.

## 1 Concept of Competitiveness

Competitiveness as a driving force of innovation and development is not a new concept. However, individual authors and theorists have different views on competitiveness and its role. The importance of this economic category affects how successfully resp. unsuccessfully, states involved in the international division of labor are able to take advantage of their specific advantage and position, which may stem either from owning a certain technology, know-how or one of the inputs (labor, land, capital) in which we have an advantage over other states. Such advantage creates a beneficial position for the state in the competitive struggle. Let's discuss the concept of competitiveness and the various theoretical approaches of the authors.

The classical economy represented by Adam Smith speaks of the four factors behind competitiveness. In particular, labor, land, capital and natural resources. In his work "A Study of the Causes and Nature of Country Wealth" (1776), which is considered to be the basis of classical economics, Smith deals with the motives behind the economic success of states. In short, the ownership of any of the aforementioned inputs speaks to a large extent about the wealth of the state, i.e. its ability to succeed in competition with other states. (Smith, 1776)

Following Smith, David Ricardo comes up with a theory of comparative advantage. The theory points out how competition can be created between states. If a country can make effective use of a particular production factor, it can create a

comparative advantage in the production of a given commodity that sells more cheaply than other countries. (Ricardo, 1817)

Karl Marx on the other hand emphasizes that the social and political environment has an important impact on economic well-being of society. (Marx, 1867)

Robert Solov, who analyzed the factors of US economic growth from 1948 to 1982, points to the importance of education, technological innovation, and the growth of know-how. (Solov, 1957)

Michael Porter contributed with the Theory of National Competitive Advantage of Industries to the discussion on competitiveness. The theory focuses on explaining what is behind competitiveness of certain industries. In the diamond-shape model, Porter examines the interaction of four factors: structure and firm rivalry, conditions of input factors, demand conditions and related and supporting industries. The stronger the relationship between these factors, the higher the productivity and innovation, which leads to the sector's export growth. In this case, it is a regional aspect of competitiveness focusing on clusters. Porter (1998) defines clusters as geographically concentrated and interconnected companies with specialized suppliers, service providers that operate in similar industry and that co-operate with the institutions, such as: universities, various agencies and trade associations; in certain areas where they compete, but also co-operate. (Porter, 1998) But when can the state gain a competitive advantage over others? According to Porter, if a state creates such business environment where there are favourable conditions for business with maximum state support. (Porter, 1990) These conditions, therefore, present competitive advantage of the nation. However, Porter's view on competitiveness also has its critics.

Krugman (1994) believes that defining competitiveness of a nation or region is more complex than competitiveness of company. In this respect, Krugman considers the definition of competitiveness to be unnecessary. (Krugman, 1994)

Cooke (2004) also speaks of regional competitiveness, which he defines as the ability of the economy at the sub-national level to attract and maintain firms with stable or rising market activities, while maintaining or improving living standards of all those living in the region. (Cooke, 2004)

Department of Trade and Industry of the UK also offers insight on regional competitiveness which it describes as the ability of a region to generate income and sustain the employment level with the aim of domestic and international competition. (DTI, 2002, p. 3)

In addition to the aforementioned authors, many institutions have expressed their views on competitiveness. If we talk about national competitiveness, the Institute for Management Development characterizes it as "how nations create and maintain an environment which sustains the competitiveness of its enterprises." (IMD, 2003) The World Economic Forum defines it as the set of institutions and economic policies supportive of high rates of economic growth in the medium term." (WEF, 2003) The OECD's definition seems more complex and advanced in this context: "the degree to which a country can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real income of its people over the longer term." (OECD, 1996) Each of the definitions is different, but their common feature is the creation of a favorable environment that underpins the country's competitiveness in order to improve its prosperity. To put it simply, the degree of government involvement in improving the

business environment, whether through tax breaks, government subsidies and other instruments, is important for national competitiveness. Such an environment can create stable and long-term jobs and allow companies to grow. For companies, this growth will be reflected in growing sales, which means for the state to improve its prosperity in terms of increasing GDP. We can look at competitiveness from a macro and microeconomic point of view. From a macroeconomic point of view, this is the already mentioned regional and national competitiveness. It cannot be linked to company-level competitiveness, even though they are largely interconnected. The way companies measure performance is easier to grasp. For companies, we have indicators such as turnover, sales and profit or loss, which allow us to measure the economic performance of companies on an annual or quarterly basis. Based on these results, they are able to assess their market position and strategy for the future. From a macroeconomic perspective, this is a more complex essence of competitiveness. National competitiveness can be reflected in increased economic performance, both as economic growth (in percent) and GDP, where we can view and compare year-on-year and quarterly results. However, despite the fact that the competitiveness of companies and nations is to some extent similar and there is a certain interdependence, it is not possible to deduce the national one on the basis of the competitiveness of companies. Firms within a particular industry sector were able to achieve positive results, but there was no increase in the performance of the economy as a whole. Conversely, economic growth does not necessarily mean growth at the corporate level. The economy of a country whose GDP predominantly consist of the tertiary sector (services) may increase the performance of the economy, even though the primary sector (agriculture) has declined over the period. For these reasons, competitiveness at the country level cannot be measured the same way as that at the company level. (Kao, 2008)

How is the national competitiveness measured? In addition to Porter, who researched competitiveness by comparing 10 economies, there are two renowned institutions that deal with this topic and publish annual reports evaluating the competitive performance of countries. The IMD World Competitiveness Yearbook (WCY) examines the performance of 63 economies based on more than 330 criteria. WCY consists of 3 main sections:

1. Competitiveness rankings
2. Competitiveness country profiles
3. Statistical tables (IMD website)

The second institution is the World Economic Forum, which has been publishing the Global Competitiveness Report since 1979. It is thus a more established institution measuring countries' competitiveness. WEF divides countries' competitiveness into 12 pillars, which are then grouped into three sub-indexes. (WEF website) You can see more information about WEF competitiveness index in the picture 1. IMD and WEF have their own methodology for measuring countries' competitiveness. However, both indices are based on heavy data (statistics) and soft data (surveys, questionnaires, etc.) However, the difference between IMD and WEF lies in the reliance on a given type of data.

Despite the complexity of indices measuring the competitiveness of countries, there is an area that they cannot take into account in the evaluation. This concerns the

implementation of environmental measures and policies that will enable countries to tackle climate change and prepare them for a sustainable future.



**Figure 1:** Pillar structure of the WEF countries' competitiveness.

Source: WEF

## 2 Region of Southeast Asia and Singapore Economic Miracle

Southeast Asia is a region located south of China and east of India. It consists of 11 countries: Brunei, Cambodia, East Timor, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam, which have a total population of more than 650 million and cover an area of more than 4.5 million square kilometers. This makes it the 3 largest sub-region after South and East Asia. (World Population Prospects, 2019) Ten of the region's eleven countries, with the exception of East Timor, are part of ASEAN. ASEAN is an intergovernmental organization that was founded in 1967 in Bangkok. It aims to accelerate the economic growth, social progress and cultural development in the region and promote regional peace and stability. (ASEAN website) The region is very diverse and includes poorer countries as well as richer ones, which are the engine of economic growth for the whole region. If we look at GDP per capita, it ranges from \$ 1,294 (East Timor) to \$ 65,233 (Singapore), which indicates the abysmal differences between national economies. (World Bank, 2019)



Within the region, Singapore is rightly called the most important and successful example of a country's transformation. Along with Honk Kong, South Korea and Taiwan, they are referred to as Asian tigers. This similarity is linked to the transformation of these countries, accompanied by rapid economic growth, which has brought them to the forefront of the world's most prominent economies. So what is behind Singapore's success? The history of Singapore is associated with British colonization in the first half of the 19th century. Singapore officially came under British rule in 1824. For the United Kingdom, Singapore was of great importance as a trading post and port for the revitalization and protection of their merchant fleets. During the 1970s, Singapore became the world's largest rubber export center, allowing the country to expand its trade eightfold between 1873 and 1913, attracting many immigrants, especially of Chinese origin. (Ministry of Information, Communications and the Arts of the Republic of Singapore, 2009) After nearly 140 years of British rule and a failed union with Malaysia, Singapore gained independence in 1965. After becoming an independent state, Singapore was in a difficult situation - without the army and support, between conflicting Indonesia and Malaysia, with social and economic problems. (Kuznetsova, 2018) With no natural resource, Singapore had to look for other ways to modernize the country. Lee Kuan Yew, the founding father of modern Singapore and the first prime minister from 1959 to 1990, is the one behind Singapore's economic miracle. His policy was moderate and a combination of liberalism and authoritarianism. The aim of his policy was to attract foreign direct investment, which started the country's economic revitalization and progress. From a domestic policy perspective, Singapore's success was driven by an effective anti-corruption policy and the de-bureaucratization of public administration. GDP growth in the late 1960s and early 1970s reached double digits. In the 1970s, the manufacturing sector was the engine of Singapore's growth. In the 1980s, it was accompanied by financial services. The share of exports of the manufacturing sector to GDP increased from 9.4% in the early 1960s to 66.5% in the late 1970s. (World Trade Organization, 1996, Vol. 1, p. 5) Huff (1999) identified six characteristics of Singapore's long-term economic performance: sustained rapid growth, strong export orientation, high savings and investment, low inflation, small government consumption and fundamental structural transformation (Huff, 1999). Quah (2018) analyzes what was behind Singapore's economic success. He made the following findings:

1. **Lee Kuan Yew's leadership** - Thanks to Lee Kuan Yew's pragmatic and purposeful leadership, Singapore has become a country as we know it today. He was able to balance the needs of the state even in difficult times of separation from Malaysia. Lee Kuan Yew was known for his consistency and unwavering commitment to improving life in Singapore.
2. **effective public bureaucracy** - The state works properly only if the state administration works efficiently. The World Bank defines government efficiency as "the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies" (Kaufmann *et al.*,

2004, p. 3). Singapore has been showing very favorable results in terms of government efficiency for a long time, which indicates an excellent state of public administration.

3. **anti-corruption policies** - During the British colonial government, corruption was a serious problem, which deepened significantly during the Japanese occupation. Acceptance of corruption in the post-war period by civilian employees due to low wages, lack of control by their superiors, high inflation rates helped to significantly spread corruption (Quah, 1982, pp. 161-162). After the leaders of the People's Action Party assume the office, they expressed enough political will to adopt the Prevention of Corruption Act on June 17, 1960. (Quah, 2007, pp. 9)
4. **education and competitive compensation** - For Singapore, which is not known for its minerals, it was necessary to compensate for its disadvantage in other ways. Large investments in education have enabled the country to increase the skills of its population, attracting young and skilled people to whom they could offer a competitive salary. In the long run, investment in education has resulted in increased school enrollment rates and significant success in international assessments.
5. **policy diffusion** - Politics in Singapore has been characterized by an effort to learn from the past and the mistakes made by previous governments, along with efforts to draw on experience from other countries. As a result of this diffusion, the right political decisions were taken and adapted to the conditions of Singapore. (Quah, 2018)

### 3 The competitive position of the region

Singapore is currently one of the most important banking and financial centers in the world. Typical features of modern Singapore are skyscrapers and modern architecture. In the previous section, we summarized Singapore's economic development and assessed what was behind the country's economic success. But how will Singapore and the Southeast Asia region itself compete globally? As can be seen in Figures 2 and 3, both the WEF and the IMD identify Singapore as the most competitive economy.

**Figure 2:** The Global Competitiveness Index 4.0 2019 Rankings.

Rank	Economy	Score <sup>1</sup>	Rank	Score
1	Singapore	84.8	+1	+1.3
2	United States	83.7	-1	-2.0
3	Hong Kong SAR	83.1	+4	+0.9
4	Netherlands	82.4	+2	—
5	Switzerland	82.3	-1	-0.3
6	Japan	82.3	-1	-0.2
7	Germany	81.8	-4	-1.0
8	Sweden	81.2	+1	-0.4
9	United Kingdom	81.2	-1	-0.8
10	Denmark	81.2	—	+0.6

Source: WEF

As we can see in Figure 2, Singapore has improved its position and reached the top position as the world's most competitive economy among 141 economies. He scored 84.8 out of 100 points and overtook the USA. The last time Singapore took the top position was in 1999. USA lost 2 points on year-on-year basis and fell to 83.7 due to the ongoing trade war with China, which cost them first place in the rankings.

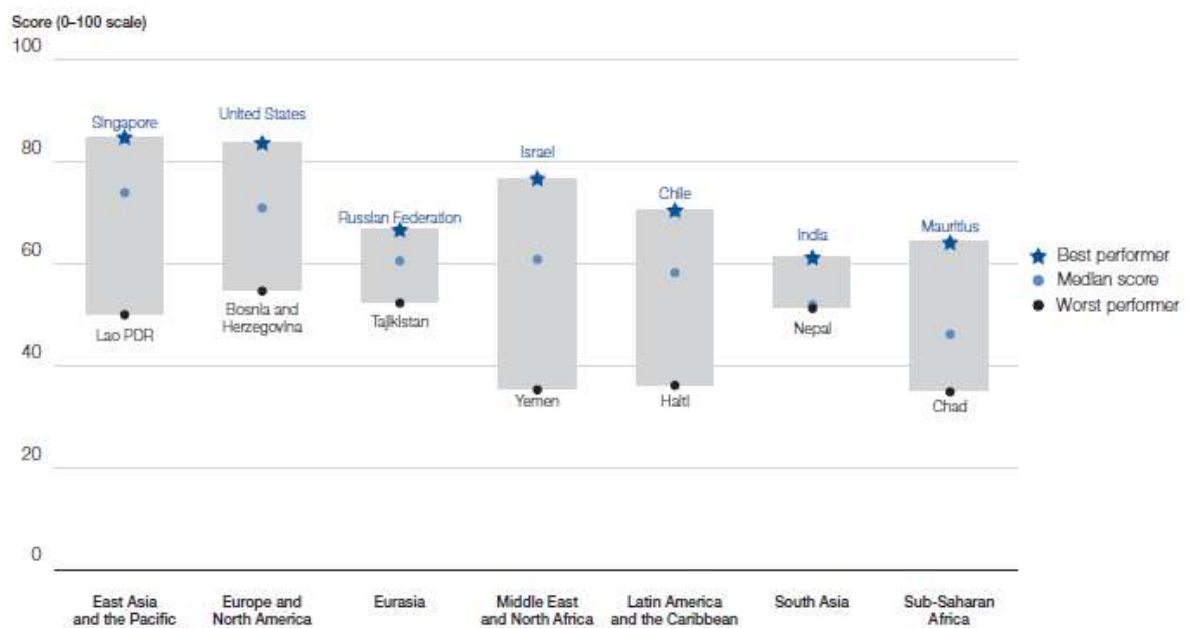
**Figure 3:** IMD World Competitiveness Ranking 2020.

2020	Country	2019	Change
1	Singapore	1	0 —
2	Denmark	8	6 ↑
3	Switzerland	4	1 ↑
4	Netherlands	6	2 ↑
5	Hong Kong SAR	2	-3 ↓
6	Sweden	9	3 ↑
7	Norway	11	4 ↑
8	Canada	13	5 ↑
9	UAE	5	-4 ↓
10	USA	3	-7 ↓

Source: IMD

Singapore also ranked first in the report published by the IMD. (Figure 3) Due to the differences in the methodology and approach to the evaluation of hard and soft data, the order and representation of states in the IMD ranking is different. Japan, for example, is not ranked among the 10 most competitive economies in the IMD, and the US economy is ranked 10th, with a significant year-on-year decline by seven positions. On the other hand, the highest year-on-year increase was achieved by Denmark, which rose from 8th position in 2019 to 2nd place in 2020.

**Figure 4:** Competitiveness gap within regions.



Source: WEF

The region of Southeast Asia is very diverse and includes both poor and rich advanced economies. As stated in Figure 4, there are stark differences between top and worst performer in East Asia and Middle East. The East Asia-Pacific region reveals the widest competitiveness gap, however achieves the highest median score, which means that most of the countries represented in the region achieve above-average levels of competitiveness. In contrast, the sub-Saharan region is the worst, as its median is only 46.3 and 17 of the 34 countries are part at the bottom 20 in the GCI 4.0 rankings.

## Conclusions

Singapore has been able to transform the economy in an incredible way in just a few decades. Foreign capital and investment in education are one of the pillars of

Singapore's success. For many years, the country achieved rapid economic growth and became one of the most important export and manufacture hubs in the world. Without Lee Kuan Yew's clear goal and leadership, the country would not be where it is now. Singapore's economic miracle is impossible to apply to any country in the world. Each country has unique conditions, economic structure, geographical, natural and political conditions, so it cannot be assumed that what worked in Singapore will automatically function in any other country.

However, there are some lessons to be learned from Singapore's economic development. With a clear vision, investment in science, research and measures to improve the business environment, any country can improve its competitive position. The current decade will give us answers to the question of the direction in which Singapore's economy will continue and whether it will be able to maintain its position as the world's most competitive economy in the long term.

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# SENTIMENT ANALYSIS OF BITCOIN USING TWITTER AND PYTHON

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**Abstract.** This paper is aimed at performing sentiment analysis as a way how to save time and make better trading decisions for traders. We are focusing on real-life usable sentiment analysis based on Twitter's data from their tweets. An analyzed financial asset is a financial innovative instrument (FinTech) bitcoin and as a representative of decentralized currency Twitter is the biggest cryptocurrency community space. As there is a priority for an analyzed solution to be feasible for non-institutional traders, therefore, an open-source Valence Aware Dictionary for Sentiment Reasoning (VADER) approach is used to execute sentiment analysis as it is efficient in terms of time, computational power and needed coding skills. VADER has been created as primarily Python-library, therefore to build our code, connect the code with Twitter's API to extract data from posts, and to set up the lexicon and rule-based sentiment analysis tool VADER we are using a Python programming language. To see the perspective of what should we expect from the results of sentiment analysis we will look at bitcoin and its recent price development from a technical point of view. By doing so this paper will look at relationship between intraday price movements of bitcoin and its sentiment on social media Twitter.

**Keywords:** sentiment analysis, vader, bitcoin.

**JEL classification:** C88, G41

## 1 Introduction

There is a large amount of data generated in finance and trading every day. Data that comes in form of brake news, figure releases, official information, or even fake updates, which impact the public (as well as institutional) opinion on given financial asset, the decision to buy, sell or hold and by that impact its price.

Therefore it is of great importance for every trader keeping in track of the latest articles, updates to have all the information possible to ensure the best possible call in placing orders, and thus processing this news takes up a big part of the trader's day.

Sentiment analysis can be used not only as a way to improve customer service, in the marketing of products, etc. but also in recent years it has been the way how a trader can automate the process of staying informed in the world of financial news. It has been observed that even the sentiment on social media has the power to impact the prices of financial assets.

After Elon Musk tweeted about a new product line Tesla's shares increased by 4% which meant a growth of \$1 billion in its market capitalization (Marketwatch, 2015). Elon Musk also tweeted that Tesla goes bankrupt as an April fools' prank which meant a 7% price drop in its stock prices during the next trading day (Washingtonpost, 2018).

This can show us how important social media and so-called influencers in today's world are. Social media are much more important in the case of this paper as we will be focused in our sentiment analysis on a bitcoin as a financial asset and representative of a financial innovative instrument (FinTech), which is lacking official statements, news as bitcoin is created as decentralized. The biggest digital (crypto) currency community is on social media Twitter.

## 2 Sentiment analysis

Sentiment analysis often called also an opinion mining, is an active area of study in the field of natural language processing that is focused on the analysis of people's opinions, sentiments, evaluations, attitudes, and emotions via the computational treatment of subjectivity in text. It is a text analysis method that detects polarity (positive, neutral, or negative) throughout the text that could be done in a whole document, paragraph, sentence, or even just in a tweet on social media (Pedrycz, Chen, 2016).

Sentiment Analysis is also useful for practitioners, scholars, and researchers, especially in fields like economics, finance, sociology, marketing, advertising, psychology, and political science, which rely a lot on human-computer interaction data.

In short, sentiment analysis can be used to:

- analyzing posts on social media over a period of time to detect the sentiment of a specific audience,
- to monitor social media mentions of a brand and automatically categorize by the urgency in change,
- automatically route social media mentions to team members of service that are best fit to respond,
- automate any or all of these processes,
- gain deep insights into what's happening across your social media channels (for investing in financial markets purposes) (Hutto, Gilbert, 2014).

There are two approaches for sentiment analysis that are commonly used, referred to as Machine Learning Approach and Lexicon-based Approach.

When using a machine learning approach, at the beginning we need classified (often extensive) training data which can be sometimes troublesome to acquire. Then an



algorithm will be trained on using this data, in order to learn the algorithm ability to predict the classification of unseen data.

Second, the machine learning approach depends on the training set to represent all needed features for test on unseen data (at least all features that will be in an unseen part of the dataset and often that is not the case especially with social media).

Large amounts of data needed for machine learning algorithms are computationally expensive in terms of CPU processing, memory requirements, and time for training/classification which is a problem for real-life investing.

According to Hutto and Gilbert (2014) machine learning algorithms often derive features from a black box that humans cannot explain and are therefore difficult to modify.

In this paper, we will be using a lexicon-based approach which is based on a dictionary of words together with their polarity. The advantage of using the lexicon-based approach is that the list of sentiment words and their polarity can be searched very quickly, data do not need to be labeled, there is no need for training data and it is computational friendlier than other sentiment analysis methods (Annett, Kondrak, 2008).

## 2.1 Valence Aware Dictionary for Sentiment Reasoning (VADER)

Valence Aware Dictionary and Sentiment Reasoner is a rule/lexicon-based, open-source sentiment analyzer pre-built library, protected under the MIT license. The sentiment analysis model using VADER is sensitive to both polarity (positive, negative, and neutral) and intensity (strength) of the emotion of the text. It is available in the NLTK package since 2014 and can be applied directly to unlabeled text data that means unlike other sentiment analysis methods that require training on the related text before use, VADER is ready to go for analysis without any special setup.

VADER sentimental analysis relies on a dictionary that looks for lexical features to emotion intensities known as sentiment scores and based on the compound score (set inside of the analysis) VADER will define if the text is negative, neutral, or positive. For example, a score for a word “comfort” is lower (positive) than for “euphoria”. The final sentiment score of the text is then obtained as a sum of the intensity of each word in the analyzed text.

VADER is able to understand the basic context of analyzed words, and as “love” is a word with a high positive score, the phrase “did not love” is recognized as a negative statement with a high negative score. It also attempts to capture and score textual features common in an informal online text such as capitalizations, exclamation points, and emoticons which is ideal for social media use.

VADER has a lot of advantages over traditional methods of sentiment analysis which could be summed up as it:

- provides best in the class results in social media type text sentiment analysis,
- doesn't need training data but is constructed from a generalizable, valence-based, human-curated gold standard sentiment lexicon,
- is fast enough to be used online with streaming data,

- does not severely suffer from a speed-performance tradeoff (Hutto, Gilbert, 2014).

Like any sentiment analysis tool, VADER should be evaluated critically and in the context of the assumptions, it makes about communication. VADER was developed in the mid-2010s primarily to analyze the English language on social media sites (Twitter). The context of posts on social media is mostly informal and contains language and feature usage patterns that differ from formal statements, articles, or other formal communication.

However, VADER was also developed as a general-purpose sentiment analyzer, and the Hutto and Gilbert's (2014) initial study shows that it compares favorably against tools that have been trained for specific domains, use specialized lexicons, or resource-heavy machine learning techniques or even against humans.

### 3 Methodology

The first thing we need to do to get started is getting credentials to use the official Twitter API (Application Programming Interface). To accomplish that we need to have a Twitter account and make the request with all the necessary information to upgrade it to a developer account. After successful registration and confirmation (which could take days) we are able to access Twitter's developer portal and create an app for which we will be given keys and tokens which are essential for communication of our Python code with Twitter's API.

```

7 import twitter
8 import os
9 import datetime
10 import nltk
11 import re
12 import matplotlib.pyplot as plt
13 import seaborn as sns
14 from nltk.sentiment.vader import SentimentIntensityAnalyzer
15
16 CONSUMER_KEY = 'swB4uExxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxVzD'
17 CONSUMER_SECRET = 'UuDXS8axxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx49k2Ug'
18 ACCESS_TOKEN = '9042444xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxYXmBKUpi89VuF'
19 ACCESS_SECRET = 'hkSAjTx97xxxxxxxxxxxxxxxxxxxxxxxxM4At2gMqZyz7'
20
21
22 api = twitter.Api(consumer_key=CONSUMER_KEY,
23                  consumer_secret=CONSUMER_SECRET,
24                  access_token_key=ACCESS_TOKEN,
25                  access_token_secret=ACCESS_SECRET,
26                  tweet_mode="extended",)
27
28 keywords = ["Bitcoin"]
29 keywords = ["BTC"]
30 keywords = ["XBT"]

```

**Fig. 1.** Setting up Twitter API in Python. *Source: own processing*

In Figure 1 we can see what libraries we will be using in our code with most important libraries Twitter and NLTK. The Twitter library provides a pure Python interface for the Twitter API (Python-twitter, 2020).

VADER has been included in the NLTK package itself. Module NLTK is used for natural language processing. NLTK is an acronym for Natural Language Toolkit and is one of the leading platforms for working with human language data.

These are the main libraries that we have used in our coding process in Python but it is not all of them. We have used Anaconda Distribution as an open-source data science platform that not only has a lot of science packages, libraries pre-installed but also makes searching and installing other necessary science packages simple and straightforward directly through anaconda's environment.

Last but not least we have used Spyder as a Python IDE development environment that makes possible advanced editing, interactive testing, debugging, and more. Choosing a Python development environment is an only subjective matter and therefore you can use any development environment that suits your preferences as VADER has been primarily developed as a library for Python but it also can be used with R, C#, Java, PHP and other.

When using Twitter data through their API there are some limitations that need to be taken into the consideration before building sentiment analysis. It is important to know that Twitter's API is focused on relevance and not completeness. This means that some tweets and users may be missing from search results. Not all tweets will be indexed or made available via Twitter's API search. Also, every day thousands of developers make requests to the Twitter developer platform. To help manage the sheer volume of these requests (and also because of security issues), limits are placed on the number of requests that can be made (Twitter, 2020).

This limit is 180 requests per 15-minute window (free user). For per-user authentication and per request, maximum of 100 tweets can be asked, which gives a total of 18 000 tweets per 15-minute window. Which is enough when we take into consideration that every day more than 500 000 new tweets are created, when we want to use tweets to create sentiment analysis for real-life investing we need an immediate result of analysis and therefore unless we have a super-fast internet connection and downloading huge amounts of data is no issue and we have a super-fast computer (in terms of computation power CPU, memory, etc.), we will have to limit the number of tweets that we will use to get the sentiment analysis usable for day traders and even for scalpers.

The last thing that we need to set up for VADER sentiment analysis for it to work is compound scores for negative, neutral, and positive sentiment so the algorithm will know in which category based on the score the tweet should be placed. The chosen values are:

- positive sentiment: compound score  $> 0.05$ ,
- neutral sentiment:  $(-0.05 \leq \text{compound score} \leq 0.05)$ ,
- negative sentiment: compound score  $< -0.05$ .

## 4 Results

To be able to fully understand the results of our sentiment analysis first we have to look at the current situation of the crypto market and bitcoin prices. Based on the price development in recent days and weeks (time of writing 06.08.2020), from a mid-term to long-term perspective bitcoin price development looks “bullish”. The closing price of July’s monthly candle at 11355.30 BTC/USD means that bitcoin broke substantial monthly resistance around the level of 10750 BTC/USD and it represents the highest closing price since December 2017 which was the month when bitcoin achieved its ATH (All-Time High) of 19776.99 BTC/USD.

Since then the bitcoin was in a bear trend (downtrend), together with low of bitcoin price 3126.36 BTC/USD in December 2018 and low 3892.74 BTC/USD in March 2020 after rise of bitcoin prices with high of 13854.63 BTC/USD in Jun 2019, July’s monthly close represents higher high on the monthly chart and from a technical point of view, this price development suggests that low of this bear cycle is in (together with March 2020 capitulation low) and bitcoin is in next phase of accumulation and growth which should take the bitcoin price to the new ATH.



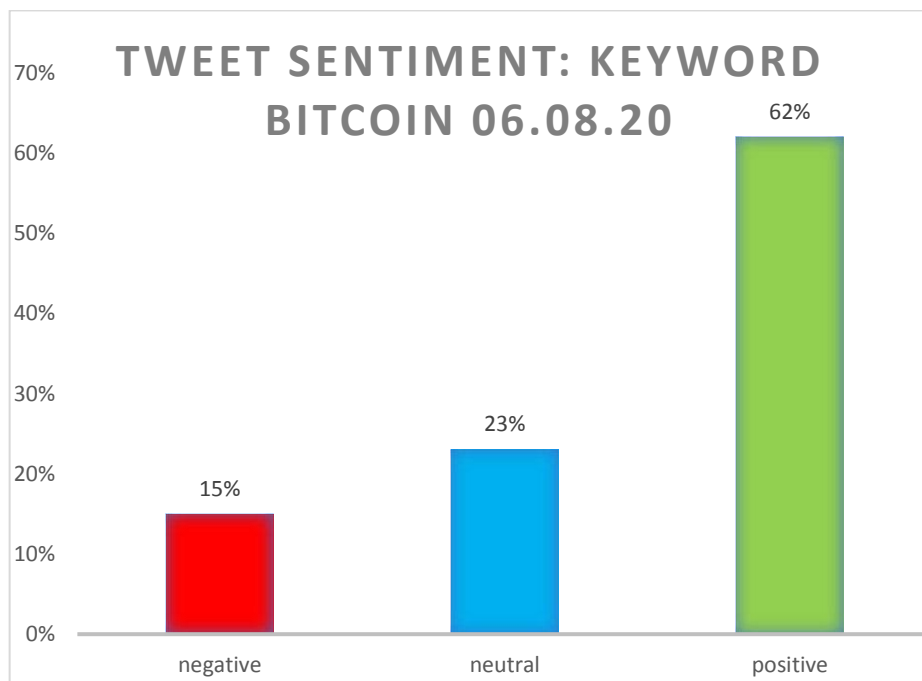
**Fig. 2.** Daily chart of BTC/USD 06.08.2020. Source: <https://www.tradingview.com/>

However, from our sentiment analysis point of view (because of the data limitation on Twitter API platform) more important role for us represents immediate price development on low time frames and therefore sentiment analysis is more usable for day traders and scalpers who place several trades during one day. That means that it is

possible to achieve negative sentiment with this type of analysis even though the mid-term, long-term prices are “bullish” when there would be immediate price drop during the day as the sentiment analysis algorithm is fed with data from Twitter API which is looking at the last 100 tweets that have been written respecting set condition in our Python code per one request (security measures for the stability of provided API by Twitter).

At the time of our analysis the bitcoin was +0.65% in a day to day price at 11832.83 BTC/USD, but more importantly for our expectations of sentiment analysis is that price was climbing back from daily low 11578.39 BTC/USD. We can also look at RSI (Relative Strength Index) which is on a daily chart in “overbought” territory above the 70% level. According to Richard A. Fell (2017), the RSI indicator can stay in the overbought region for extended periods of time while a trading asset is in an uptrend and therefore can be used to determine the trend of an asset.

As a result from the short-term as well as longer-term perspective technically speaking, we can expect sentiment analysis to be positive regarding to the bitcoin as an asset with the biggest market capitalization in the crypto market.



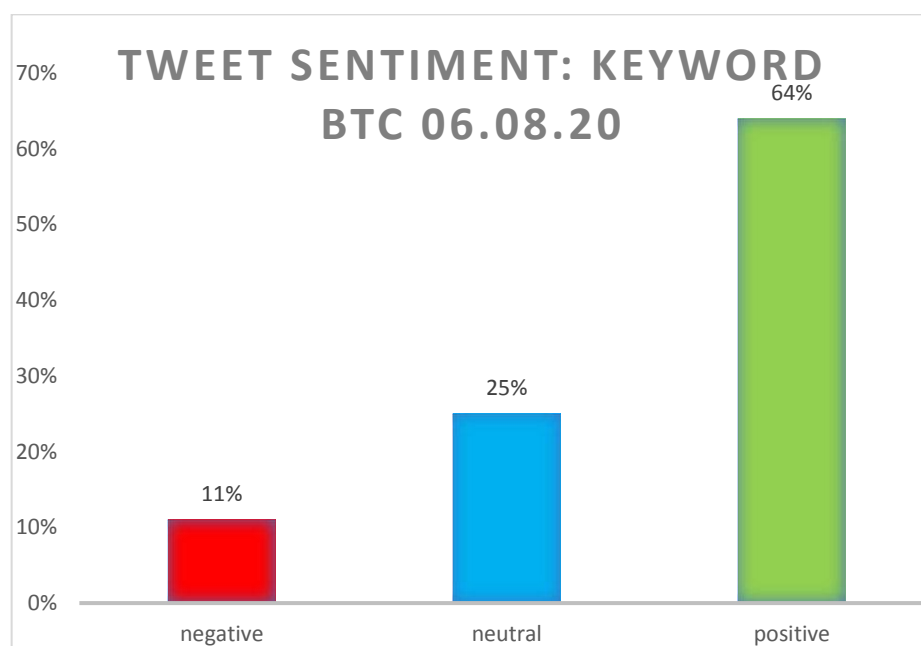
**Fig. 3.** Tweet sentiment Bitcoin 06.08.2020. *Source: own processing based on Twitter data*

Our sentiment analysis was created to find a distribution of tweets into a negative, neutral, and positive category based on written tweets by individual authors using Vader sentiment evaluator.

To have a reference point for comparing results, sentiment analysis was divided into three separate parts each with a single keyword to match the tweets.

First sentiment analysis was done by using word “Bitcoin” as it is a name of the financial asset that we would like to be trading. We can see in Figure 3 that sentiment on social media Twitter on the time of writing was positive with only 15% negative tweets according to the algorithm.

The second part of sentiment analysis was created with “BTC” as a keyword. Word BTC was selected as it is a ticker symbol for bitcoin on most of the exchanges where bitcoin is traded. In the second case, the distribution was even more directional towards positive sentiment with only 11% negative and 25% neutral tweets respectively.



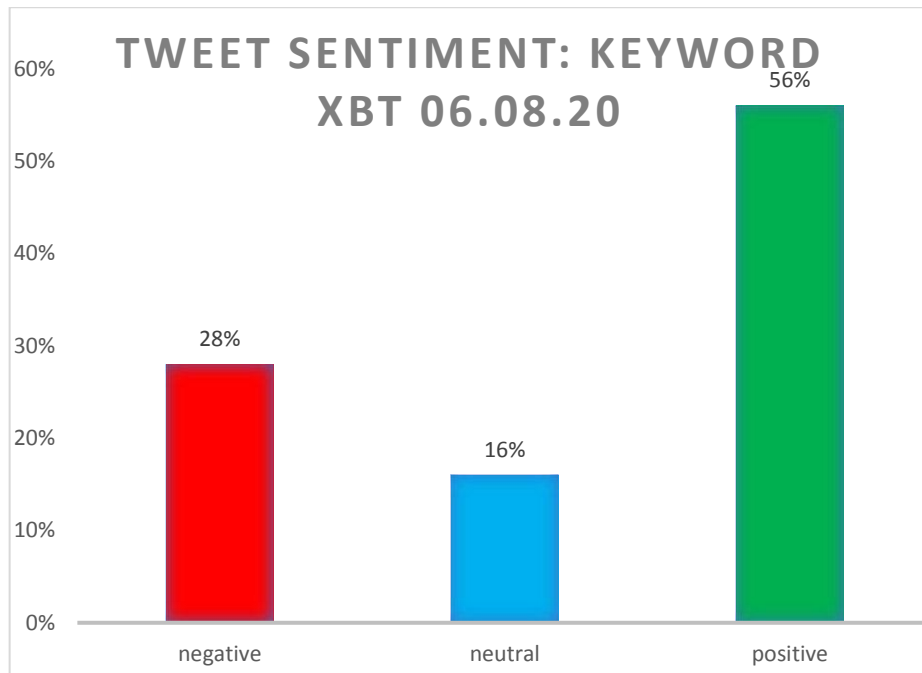
**Fig. 4.** Tweet sentiment BTC 06.08.2020. *Source: own processing based on Twitter data*

The last part of sentiment analysis was built on the keyword “XBT”. XBT represents a ticker symbol for bitcoin that is mainly used on the BitMEX cryptocurrency exchange and derivative trading platform. Results of tweet sentiment analysis using XBT as a keyword complement the rest of the analysis in terms of the highest number of tweets had positive sentiment however number of neutral and negative tweets was reversed.

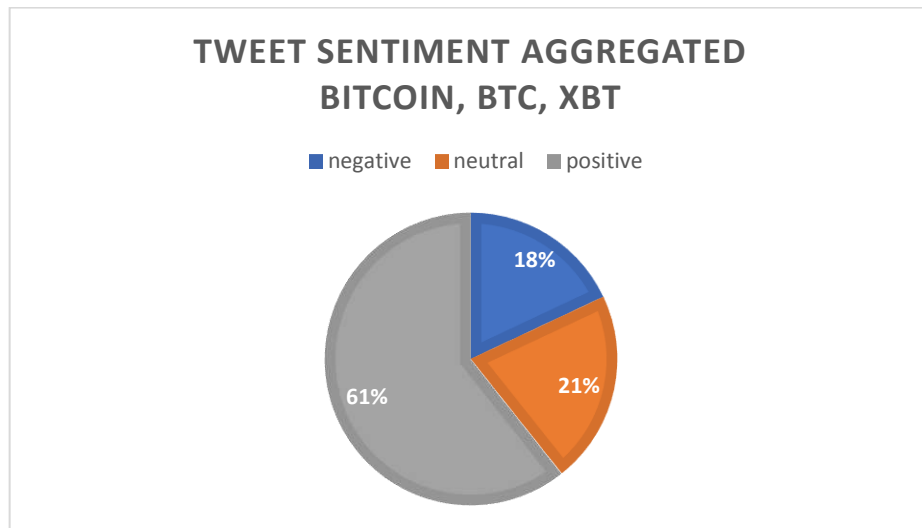
The results of sentiment analysis are in agreement with predicted sentiment based on technical analysis.

When creating sentiment analysis without limitations of provided data or using a sample formed of a greater number of keywords, we would also use aggregated

graphical display of results as can be seen in Figure 6, to ensure that the trading decision will not be made based on extreme values or errors.



**Fig. 5.** Tweet sentiment XBT 06.08.2020. *Source: own processing based on Twitter data*



**Fig. 6.** Aggregated tweet sentiment 06.08.2020. *Source: own processing based on Twitter data*

## 5 Conclusion

Expectations that sentiment level on social media Twitter is related to bitcoin price change was confirmed on this paper's sentiment analysis and presented results. The results of sentiment analysis based on tweets tweeted on 06.08.2020 are in agreement with predicted sentiment based on technical analysis and intraday 06.08.2020 price movements of bitcoin that was rising at the analyzed time. Conducting presented sentiment analysis at different times was not in the scope of this paper as the relationship between sentiment and price of a financial asset has to be done not only from the social media data but also from a price development of analyzed asset at an analyzed time as was done on our example from 06.08.2020.

The presented approach for analyzing current sentiment on financial markets can be used even for non-institutional traders as programming VADER application in Python is user-friendly thanks to the NLTK package that includes the most important parts of the VADER application.

Performing sentiment analysis simultaneously with technical analysis of price movement enables the trader to have more information about the situation at financial markets and thus allows the trader to make a better and faster decision in buying, selling, or holding the position.

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## Control as a three-phase or four-phase process?

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**Abstract.** The aim of this paper is to define and compare the three-phase and four-phase process of the control in management based on research of scientific and professional literature through the opinions of domestic and foreign authors. In this paper, the first group of authors describes the control process as a three-phase process, which consists of different steps depending on the opinion of an author. In addition to the fact that the individual steps differ from each other in terms of content, they are also distinguished from each other in terms of time. The second group of authors characterizes the control process as a process consisting of four steps. This group of authors agrees on the individual steps both in terms of content and time. By studying several domestic and foreign sources, through analogy, analysis, synthesis, and comparison, we were able to create an overview of the research areas and defined the basic areas of control process in management.

**Keywords:** control process, control phases, management

**JEL classification:** *M 10, M 19*

### 1 Introduction

One of the frequently discussed issues in the field of management and business is the topic of managerial functions. The authors, who describe the basic managerial functions, indicate different approaches on the division of these functions. In managerial terminology is often recognized the division according to Henri Fayol (1917), who states that the basic functions of a manager include planning, organizing, personnel planning, management, and control.

As we state, control is therefore one of the five basic managerial functions. Compared to other management functions, less attention is often paid to control in the professional literature. It is due to the fact the most theorists and managers perceive control as the last stage of management and can therefore be considered less important. However, it is closely linked to other functions and is an integral part of planning, decision-making and organization. The word "control" often leads to negative emotions. For many people, control means, above all, limitations, pressure, lack of independence. However, when used properly, control has several positive effects,

including ensuring the efficiency of plans, the efficiency of the entire organization, the effectiveness of business processes, feedback and associated decision support, and so on.

Control provides feedback on the processes carried out and therefore, if a company wants to be competitive and successful, it cannot consider control as less important and must pay due attention to it. Even though we can no longer change what happened in the past, we can avoid the same or similar mistakes in the future and thus prevent the occurrence of excessive damage or unwanted conditions. It is during planning that goals are set, which become standards against which performance is assessed. If performance differs from the standard, corrective action is taken, which may include the development of new plans or setting new standards. The aim of this paper is to define and compare the phases of control process in management.

## 2 Theoretical background

Mišún and Mišúnová Hudáková (2017) state that the management activity of control is a sequence of several steps. Based on the studied foreign and domestic literature, we came to the conclusion that the individual steps of the control process are most often mentioned in the following two basic schemes - while in the first case the authors describe the control process through three steps, the second group of authors mention in their publications up to four steps of the control process.

### 2.1 Control as a three-phase process

Authors who perceive the control process as a three-step process include Robbins and Coulter (2018), Certo and Certo (2016), Williams (2017), Leonard and Trusty (2016), and others. These authors define the control process as a three-phase process, the steps of which differ depending on the individual authors. In Table 1, we have created a brief overview with the steps of the control process according to the mentioned authors.

**Table 1.** Steps of control process according to the authors.

Author, year of publication	First step	Second step	Third step
Certo and Certo (2016)	Measuring performance	Comparing measured performance to standards	Taking corrective action
Leonard and Trusty (2016)	Setting standards	Measuring performance	Taking corrective action

Robbins and Coulter (2018)	Measuring performance	Comparing measured performance to standards	Taking corrective action
Williams (2017)	Setting standards	Comparing measured performance to standards	Taking corrective action

Source: own processing.

Based on the above table, we can state that the authors, who perceive the control process as three-phase, do not completely agree on the individual steps of the control process, except for the last phase. The biggest differences can be seen in the perception of the first step of the control process. While Certo and Certo (2016) and Robbins and Coulter (2018) state that the first step in the control process is performance measurement, Leonard and Trusty (2016) and Williams (2017) consider setting standards as the first step in the process. The control process according to Certo and Certo (2016) and Robbins and Coulter (2018) assumes that performance standards already exist. These are the specific objectives set during the planning process. Therefore, the first step in the control process is to measure the actual performance.

The second step of the control process according to Certo and Certo (2016), Robbins and Coulter (2018) and Williams (2017) is to compare the actual performance with the standard. The authors Leonard and Trusty (2016) have a different opinion. They consider performance measurement as the second step of the control process - authors such as Robbins and Coulter (2018) and Certo and Certo (2016) consider this step as the initial one. Williams (2017), unlike others, does not mention a step called performance measurement. This is caused by not considering measuring performance as a separate phase of the control process, but as part of the second step, which is to compare actual performance.

The third step of the control process was interpreted in the same way by all the mentioned authors, who perceive this process as three-phase - it is the implementation of corrective actions.

The content of the individual steps of the control process is generally very similar to the same. The differences are mainly in the order of individual applied steps of the control process. We will state what the specific content of individual steps is in chapter 2.3 Steps of the control process.

## 2.2 Control as a four-phase process

Authors such as Bateman et al. (2019), Jones and George (2019), Schermerhorn and Bachrach (2018), Dyck et al. (2017), Griffin (2016), Kinicki and Williams (2016) can be included in this group. All these authors agree that the control process consists of

four basic steps and agree on the sequence and content of the individual steps. For a clear display, we have created the following diagram, which we will show in Figure 1.



**Fig. 3.** Steps of control process. Source: own processing.

As we have indicated in the figure 1, among the general stages of the control process mentioned by the mentioned authors, we include:

1. setting standards,
2. measuring performance,
3. comparing measured performance to standards,
4. taking corrective actions.

Agarwal (1982) states that all the mentioned steps of the control process are interdependent. A change in one part of the control process also affects the other parts. An example is a corrective action that includes a revision of the standards. This revision shows that they are changing and thus affecting the whole part of the control process.

## 2.3 Steps of the control process in management

### Setting Standards

The control standard, or performance standard, is the required level of performance for a given goal. Standards can be set for almost anything, although they are best measurable when they can be quantified (Kinicki and Williams, 2016).

Leonard and Trusty (2016) state that standards can be defined as units of measure or criteria against which performance or results are assessed. Standards are goals - they are criteria whose performance is compared to achieve goals. Standards must be set before the activity itself begins or when a particular service or product is completed. Leonard and Trusty (2016) introduced two basic areas of standard types depending on the areas of performance or results to be measured:

- **Material standards:** performance targets for results that are identifiable and measurable. These standards can be set, for example, for measuring the quantity of production, the quality of production, market share, labor costs, overheads and time spent producing the unit or providing the service.
- **Intangible standards:** are the objectives of non-physical outcomes; these standards may cover areas such as the reputation of the organization, the level of employee involvement or the quality of care in the healthcare facility.

Schermerhorn and Bachrach (2018) distinguish two types of standards:

- **output standards** - the actual results of the work are measured through these standards. Examples include earnings per share, revenue growth, or market share as standards for measuring business performance, output, cost, time, or error rate.
- **input standards (input)** - is a measure of work effort and are useful if the outcomes are difficult or expensive to measure. Such a standard in the workplace can be e.g. compliance with rules and procedures, resource efficiency and attendance at work or punctuality.

Jones and George (2019) note that managers must be careful in choosing performance standards that allow them to assess how the company is doing. If managers focus closely on only one standard (for example, production efficiency) and ignore other standards, even though they have the best of intentions, they can harm the organization.

### Measuring performance

According to Certo and Certo (2016) and Robbins and Coulter (2018), the control process begins with the actual measurement of actual performance. As mentioned above, it assumes that performance standards already exist. These are the specific objectives set during the planning process. Therefore, the first step in the control process is to measure the actual performance.

Once managers have decided which standards or goals to use for evaluation, the next step is to measure actual performance. Accurate and up-to-date measurement is essential to find out the differences between what is really happening and what was originally planned (Schermerhorn and Bachrach, 2018).

Performance measurement is a constant and continuous activity for most organizations. For the control to be effective, performance measures must be in place. Daily, weekly, and monthly sales data measure sales performance. Production performance can be expressed in unit costs, product quality or volume produced. Employee performance is often measured in terms of quality or quantity of production, but for many jobs, measuring performance is not that simple (Griffin, 2016)

To determine what the actual performance is, the manager must first obtain information about what he will measure. As mentioned in the previous subchapter, it is necessary to determine what we will measure - and with that comes the choice of standard. We can measure, for example, the already mentioned costs, quality, volume, but also the company's reputation, product quality or customer satisfaction. An important question in measuring actual performance is also "how to measure". The answer to this question is four basic sources from which performance data are derived (Robbins and Coulter, 2018):

- written reports - include reports usually prepared on a computer. Computer data collection and analytical capabilities reduce the cost of large and small companies for this type of data. It can collect a huge amount of performance data. The advantage is also formality, the disadvantage can be considered the length of their preparation.
- spoken, verbal messages - an example of such messages could be a situation where the seller contacts his manager at the end of the working day in order to report the results, problems or reactions of customers during the day. The manager may ask questions to obtain further information or clarify any misunderstandings. If necessary, the discussion may provoke a preliminary correction. The advantage is speed and efficiency. It can be considered a shortcoming that these messages are not documented and can be filtered.
- personal observation - means going to the area where the activities take place and watching what is happening. Managers can directly monitor working methods, non-verbal signals, and the activities of their employees. Personal observation provides a detailed picture of what is happening, but it has certain disadvantages. It does not provide quantifiable data; limited information is usually general and subjective. However, many managers still believe in the value of direct observation. However, the disadvantage is the time and constraint and the associated possibility of distrust.
- statistical reports - the advantages are easy visualization or efficiency for pointing out relationships. The disadvantage may be the ignorance of subjective influences or the provision of limited information.

Majtán (2008) states that measuring actual performance can solve the following tasks:

- can determine the relative degree of success or failure,
- can provide an overview of how the organization worked during the period,
- helps to get an idea of the activities of your own organization in comparison with another organization.

### **Comparison of actual performance with the standard**

According to Bateman et al. (2019) a manager armed with relevant data can evaluate performance. In some activities, small deviations from the standard are acceptable, while in other cases even a slight deviation may be serious. In many manufacturing processes, a significant deviation in any direction is completely unacceptable. In other cases, a deviation in one direction, such as sales or customer satisfaction that falls below the target level, is a problem, but a deviation in the opposite direction, when it exceeds the sales goal or customer expectations, means that employees deliver better results than expected.

Schermerhorn and Bachrach (2018) proposed an equation for this phase of the control process:

$$\text{Need to act} = \text{desired performance} - \text{actual performance}$$

This equation states that if the actual condition is lower than required, there is a certain threat or deficiency. If the actual condition is higher than the standard, there is an opportunity for discovery.

Jones and George (2019) state that during this step, managers assess whether and to what extent performance differs from the performance of selected standards. If performance is higher than expected, managers may choose to set performance standards higher. However, if the performance is too low and the standards, respectively standards have not been met, or if the standards have been set so high that employees could not meet them, managers must decide whether corrective action should be taken and, if so, what. Often, however, the reasons for poor performance are difficult to identify.

Griffin (2016) states that the time aspect is an important aspect of comparing actual performance with the standard. This time aspect depends on various factors, including the importance and complexity of what is being controlled. For longer time horizons and higher standards, an annual comparison may be appropriate. In other circumstances, more frequent comparisons are needed.

### **Taking corrective action**

After comparing actual performance with established performance standards, the next step is to take corrective action if necessary. Before that, however, it is important to understand why the set standard has not been met. Managers should make sure that the standards they use have been set correctly and that their measurement of an organization's performance is valid and reliable.

Griffin (2016) states that there are three general possibilities at this stage:

1. maintain the current state - this option is characteristic of the situation when the detected actual performance reaches the level of the set standards. If performance meets set standards, managers should provide any form of reward to their employees, even if only in verbal praise, to reinforce this desirable behavior. Unfortunately, it is much more likely that the standards are not met, a deviation occurs, and corrective activity is needed.

2. make a correction due to the deviation - this situation is one of the biggest challenges in the control process. Corrective action depends on the discovery of the deviation and the manager's ability to implement this necessary corrective action. They also depend on what the deviation is and what factors affect the company. People who are responsible for implementing corrective action must know that they are responsible for the action and that they have the authority to take it. The job descriptions and specifications of these managers themselves must include specific statements defining these two requirements. Otherwise, the control function will not be able to use its potential to contribute to organizational performance.

3. change standards - a change to an established standard is usually required if this standard was initially set too low or too high. This situation is evident if the high number of employees normally exceeds the standard level with a large margin, or vice versa, if none of the employees has ever met the standard. Also, the standards that seemed appropriate for implementation may need to be adjusted if circumstances have changed since then.

## **3 Research design**

The aim of this paper is to define and compare the three-phase and four-phase process of the control in management. By studying several domestic and foreign sources, we gained a comprehensive overview of the topic. Through analogy, analysis, synthesis, and comparison, we were able to create an overview of the researched areas and define the basic steps of the control process in management. We obtained all the necessary information on the issue from the study literature, where a substantial part of the sources were foreign authors, but we also used knowledge from Slovak authors. Study literature was available in the form of book publications.



## 4 Results and discussions

In this paper, we have listed two basic schemes that are most often applied in the control process. The first group of authors who perceive the control process as three-phase include, for example, Robbins and Coulter (2018), Certo and Certo (2016), Williams (2017), Leonard and Trusty (2016) and others. Apart from the last phase, these authors do not completely agree on the individual steps of the control process. The biggest differences can be seen in the perception of the first step. While Certo and Certo (2016) and Robbins and Coulter (2018) state that the first step is to measure performance, Leonard and Trusty (2016) and Williams (2017) consider setting standards as the first step in the control process. The control process according to Certo and Certo (2016) and Robbins and Coulter (2018) assumes that performance standards already exist. These are the specific objectives set during the planning process. Therefore, the first step in the control process is to measure the actual performance. The second step of the control process according to Certo and Certo (2016), Robbins and Coulter (2018) and Williams (2017) is to compare the actual performance with the standard. Authors Leonard and Trusty (2016) have a different opinion, who consider performance measurement as the second step - authors such as Robbins and Coulter (2018) and Certo and Certo (2016) consider this step as the initial one. Williams (2017), unlike others, does not mention a step called performance measurement. This is because it does not consider power measurement as a separate phase of the control process, but as part of the second step, which is to compare actual performance. The third step of the control process was interpreted in the same way by all the mentioned authors, who perceive this process as three-phase - it is the actual implementation of corrective measures.

The second group of authors characterizes the control process as a process consisting of four steps. Authors such as Bateman et al. (2019), Jones and George (2019), Schermerhorn and Bachrach (2018), Dyck et al. (2017), Griffin (2016), Kinicki and Williams (2016) are included in this group. All these authors agree that the control process consists of four basic steps and agree on the sequence and content of the individual steps. They consider the determination of the control standard to be the first phase of the control process, and the measurement of the actual power continues, followed by a comparison of the actual power with the standard. The control process is completed by the last phase, which is to take corrective action if necessary.

The content of the individual steps of the control process is generally similar to the same. Differences are mainly in the order of individual applied steps of the control process. In addition to the fact that the individual steps differ from each other in terms of content, they are also distinguished from each other in terms of time. The study of the mentioned literature leads to the conclusion that it is not so important to name the individual phases of the control process, but the most important is the content of this complex process, on which the mentioned authors and authors of this paper ultimately agree.

## 5 Conclusion

At the end of the article, we state that the process of managerial control at all levels of management of the organization is still an actual issue. It is the subject of research by many theorists who focus on defining the control process and its individual steps. Control is a critical function in any organization, as failure to meet established performance standards can have negative, even catastrophic, consequences. Improper quality control can result in angry customers, insufficient cost control can lead to reduced profitability and possibly even loss or bankruptcy. The list of possible problems associated with insufficient control is almost limitless. All these problems point to the fact that improving the efficiency and quality of operations is practically impossible without strict control mechanisms and pre-established standards. Managers consistently plan their goals and how to achieve them. They therefore need to complement the planning activity with a control activity - checking that the work is being carried out according to plan and, if necessary, taking corrective action. The sooner the company's management notices deviations, the easier it is to bring the performance into line with the plan.

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# Determinants of the rising household debt in Slovakia

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**Abstract.** Growing retail loans have become an increasingly discussed theme in recent years all over the world. Its importance is mainly linked with assessing future economic growth and maintaining financial stability of the economic system inside the country. This topic is especially relevant in the conditions of the Slovak Republic, because we have recently seen the highest growth rates of loans to households in the European Union, which makes it one of the biggest trends in the Slovak banking sector. In this context, we try to answer questions concerning the quantitative as well as the qualitative aspect of this phenomenon. This paper takes a closer look at the development of the household debt in Slovak economy and explores determinants leading to its excessive growth. Our analysis shows, that average wages and housing prices positively correlate to household debt. Unemployment and interest rates on the other hand show negative correlation to household debt.

**Keywords:** Indebtedness, households, debt, loans, regulation, Slovak banking sector, credit to households

**JEL classification:** G21, R29

## 1 Introduction

During the last 10 years, Slovak economy has experienced rapid growth in household loans, by far the most of all European countries. Household debt was at the end of 2019 at 44% of gross domestic product. On the one hand, this phenomenon may suggest convergence to countries with higher household debt as household debt is historically higher in developed countries and it is composed primarily of housing loans. However, over-indebtedness can weaken the economy of a country and act as a negative factor in a recession. This is due to the fact that households are sensitive to the changes in interest rates or job losses. As interest rates rise, so does the risk of losing the ability to repay loans, as monthly payments increase. This applies to loans with variable rates or fixed rates for a short time period. We can use the same analogy for job loss.

Some papers suggest, that higher level of household debt to GDP increases consumption and economic growth in the short term, but in the long run leads to lower growth and higher vulnerability to fluctuations in the country's economy as mentioned by Lombardi, Mohanty and Shim (2017). The strength of these negative effects depends on the current level of debt to gross domestic product. Therefore, it is very important to monitor its developments in the conditions of Slovak economy.

In recent years, the National bank of Slovakia has prepared several macro prudential policy restrictions, which has successfully lowered year to year debt growth. Some of these restrictions are the maximum level of loan to value ratio, the maximum debt to income ratio, changes in debt service to income ratio or the maximum maturity of customer loans and mortgages.

In this paper, we look closer at the credit growth during recent years and how it is correlated to various economic indicators, such as unemployment rate, interest rate on household loans, prices of housing and average wages in the economy. Secondly, we explore interventions by the National Bank of Slovakia as an effective method to deal with growing household indebtedness.

## **2 Review of authors**

The approach to determinants of household debt varies across studies, however it is possible to distinguish between two sides of determinants – demand-side and supply-side. Some of demand-side factors can be identified as interest rates, income of households, unemployment rate or prices of households. Supply-side factors are related to institutions and laws. Example can be credit standards for households, bank competition or quality of law system inside the country.

Interest rates have been decreasing almost every year since the introduction of mortgages in Slovak banking sector. According to DeBelle (2004), study on data between 1980 and 2000 suggests, that the rise of household debt is reflecting household's response to lower interest rates and easing of liquidity constraints. Moreover, the greater indebtedness has made the household sector more sensitive to changes in interest rates, income and asset prices. Finocchiaro, Nilsson, Nyberg and Soultanaeva (2011) suggest, that in Sweden, there is some evidence, which shows that a combination of low real interest rates and more generous LTV ratios can explain most of the observed increase in debt.

According to Dynan and Kohn (2007), in the United States, the most important factors behind the rise in debt have been identified as the combination of increasing housing prices and financial innovation. Financial innovations can be described as a process of creating new financial products, services or processes. These innovations may open up greater opportunities for households to enter the housing market and for home owners to liquefy their housing wealth, thereby helping them smooth consumption of all goods and services.

We can see this trend highly growing during past years here in Slovakia. The good example can be introducing mortgages as a product in first years of 2000, which

practically started rapid credit growth or the introduction of the possibility to buy various bank products via mobile app and internet banking.

Cross-country analysis done on 32-country dataset during period 1995-2011 by Colleta, De Bonis, Piermattei (2014) suggest, that debt is greater in countries with higher per capita GDP and household wealth. Secondly, the study found correlation between efficiency of bankruptcy law and level of household debt, where longer time to resolve insolvencies may indicate lower debt. Following the 2017 change in legislation about personal bankruptcy in Slovak Republic, it has become a much more accessible way to get rid of its debts for the general public and therefore this may have also caused rise in credit growth during recent years.

According to Djankov, McLiesh and Shleifer (2007), the similar founding has been made in analysis using sample of 129 countries over 25 years, where evidence shows, that legal creditor rights and information-sharing institution are statistically significant and quantitatively important determinants of private credit development.

The empirical study done in Australia in 2011 by Meng, Hoang and Siriwardana (2011) shows, that rising Australian household debt is the result of a favourable macroeconomic environment and the booming housing market. Positive expectations of household because of economic development cause more lending and therefore debt surges. The most important determinants are identified as GDP, housing prices and number of new dwellings with positive correlation and interest rates, unemployment rate and inflation rate with negative correlation.

### 3 Aim and methodology

The main aim of this paper is to describe the growth in household debt during recent years and calculate its correlation to selected macroeconomic and financial indicators. We also try point how macro-prudential policy of the National Bank of Slovakia influences credit growth during these years.

We use data from database of the National Bank of Slovakia on quarterly basis between 1Q2005 and 1Q2020. This dataset includes 61 observations. We perform analysis using Microsoft Excel, Python and Jupyter notebook.

**Table 1.** Correlation matrix based on selected variables

Variable	Description	Source
Credit to households	Quarterly percentage change in loans granted to households and non-profit institutions serving households	National Bank of Slovakia
Interest rates	Quarterly percentage change in average interest rates on loans for housing purchase	National Bank of Slovakia
Unemployment rate	Quarterly percentage change in unemployment rate, seasonally adjusted data	National Bank of Slovakia
Average wages	Quarterly percentage change in gross average wages, seasonally adjusted data	National Bank of Slovakia
Housing prices	Quarterly percentage change in average price of housing in the economy	National Bank of Slovakia

Rising interest rates slows down macroeconomic activity in the country because of higher cost of funds. This also affects households, as their monthly payment rises, especially in case of variable rates on loans. Constant decline in interest rates, as we have seen in case of Slovak banking sector should on the other hand actively support the credit growth of households and therefore be negatively correlated.

The decision of a bank on approving or disapproving loan is dependent on the income of the applier. Positive changes in labour market, especially decreasing unemployment rate means more income for the households and higher consumption overall. Because of this, we expect negative correlation between unemployment rate and credit growth.

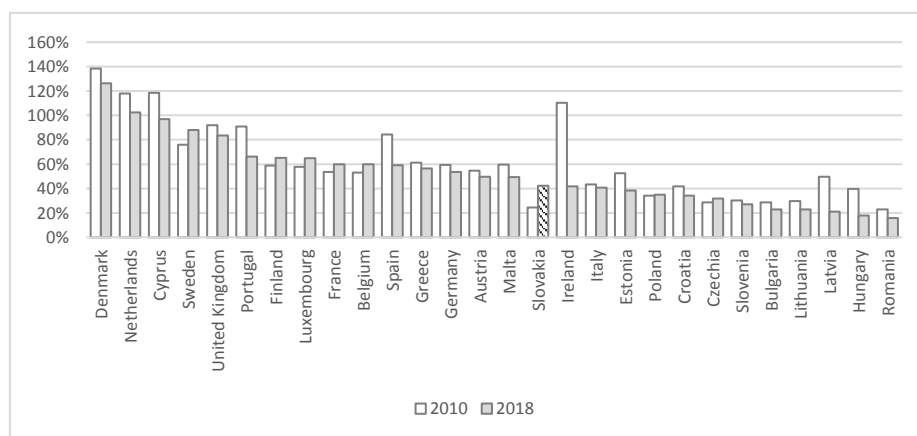
With rising average wages in economy, households are able to apply for higher loans. This is because of debt to income and debt service to income ratios set by individual national banks limit appliers with lower income. Although this might not be the case for advanced European economies with higher debt level, economies in central or eastern Europe as Slovakia may show positive correlation between growth of wages and growth of credit do households.

The loan amount that households need is dependent on the price of housing in the country. Since Slovakia is one of the countries with the least developed rent market, households tend to buy new dwellings, instead of renting them. Therefore, growing prices of household might indicate the need for higher amount of loans and show positive correlation with credit growth.

To sum up, as a result of our analysis, we expect credit growth to be negatively correlated with change in unemployment rate and interest rates. Positive correlation should be found with average wages and the price of housing.

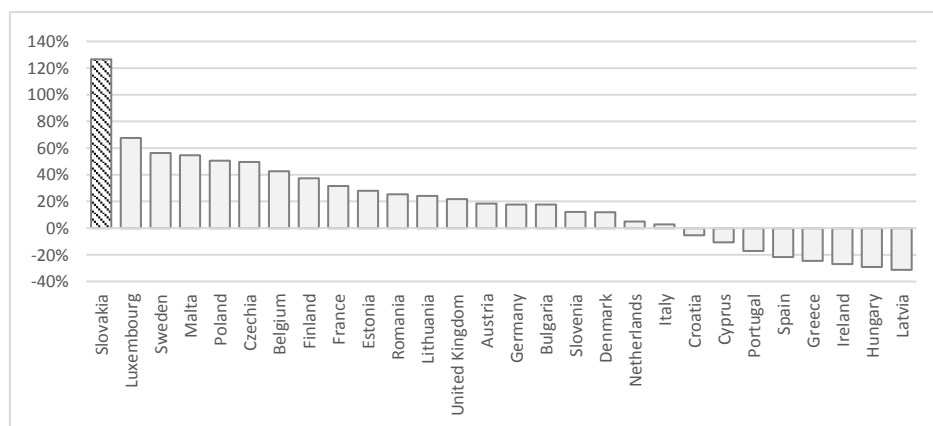
## 4 Results and discussion

Household debt to gross domestic product in the Slovak Republic has reached 44% by the end of the year 2019. When comparing this ratio to other European countries, it is the highest in the region of Central and Eastern Europe. In 2010 however, it was the second lowest in the entire Europe, overtaken only by Romania. This means that Slovak household debt has experienced significant growth over these years.



**Fig. 1.** Household debt to GDP ratio in European countries – 2010 and 2018 comparison. Data (NBS, 2020)

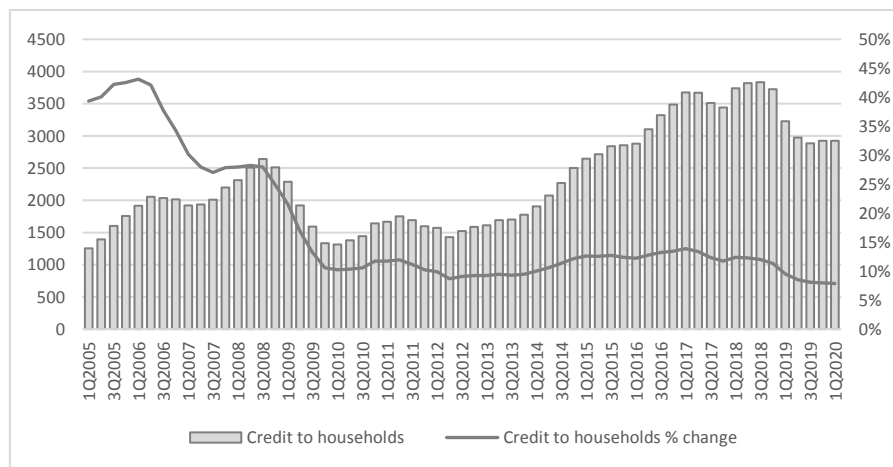
If we look at the percentage change of overall household debt between years 2010 and 2018, we can see that no other European country came close to growth rate in Slovakia, which has accounted for more than 10% every year on average.



**Fig. 2.** % Change in household debt between years 2010 and 2018 in European countries. Data (NBS, 2020)



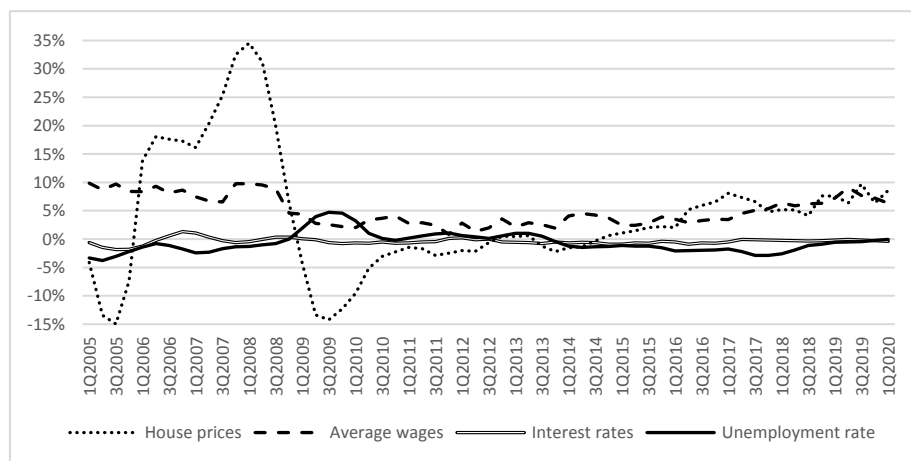
Historically, we could see two peaks of household's credit change in the past. The first happened just before financial crisis, although household debt to GDP ratio was just starting to rise during this time. This growth was caused mainly by lower interest rates, real estate market boom and implementation of new financial products such as mortgages. Second, more stretched growth was during recent years, starting around 2012. Its peak was recorded in 2018.



**Fig. 3.** Annual change in credit to household during years 2005 and 2020. Data (NBS, 2020)

Regarding these events, the National Bank of Slovakia decided to implement more strict rules when applying for a loan. Tightening rules began in 2014, with changes in customer loans and continued in 2016, when new mortgage directive was introduced. In the 2018, the National Bank of Slovakia implemented caps on maximum loan to value ratio (90%), maximum debt to income ratio (8 times annual net income of household), maximum debt service to income (80%, changed in 2019 to 60%) and maturity on loans (8 years for consumer loan and 30 years for mortgage).

If we look at annual change in selected macroeconomic and financial indicators (Figure 4), we can see that there was major peak in change of housing prices which is probably connected to the first peak of growth in credit to households described before. Secondly, we can see that there is not significant change in development of these indicators during 2019. Housing prices and average wages continued with almost same growth. Interest rates on household loans and unemployment rate continued to decrease, even though a little bit slower than before. This probably means, that one of the main reasons in slowdown of new loans to households were not changes in macroeconomic situation in Slovak economy, but rather macro-prudential changes implemented by the National Bank of Slovakia in 2018.



**Fig. 4.** Annual % change in selected indicators during years 2005 and 2020. Data (NBS, 2020)

In our analysis, we have used correlation matrix to calculate linear correlation coefficient between % change of credit to households on quarterly basis during 1Q2005 to 1Q2020 and % change in macroeconomic and financial indicators in Slovak economy, specifically housing prices, average wages, interest rate on household loans and unemployment rate. Analysis confirmed our hypothesis

**Table 2.** Correlation matrix based on selected variables. Data (NBS, 2020)

	Credit to households	Housing prices	Average wages	Interest rates	Unemployment rate
Credit to households	1	0.31	0.72	-0.042	-0.4
Housing prices	0.31	1	0.56	0.46	-0.39
Average wages	0.72	0.56	1	0.099	-0.51
Interest rates	-0.042	0.46	0.099	1	0.053
Unemployment rate	-0.4	-0.39	-0.51	0.053	1

Matrix shows positive correlation between % change of credit to households and housing prices. The coefficient is 0,31, which means that there is low linear correlation. Similar results have been found with unemployment rate, with correlation coefficient at -0,4. Coefficient for correlation with interest rates is at -0,04, which means no linear relationship between two variables.

Only variable with strong linear correlation is average wages at 0,72. This means that change in average wages can be referred as a strong determinant when analysing growth of the new loans to households.

## 5 Conclusion

Household debt in Slovakia has been rising rapidly during recent years and in 2019, its ratio to GDP was 44%, which is the most in the central and eastern Europe. As mentioned in Global Stability Report by International Monetary Fund (2017), there is a trade-off between the short-term benefits of rising household debt to growth and its medium-term costs to macroeconomic and financial stability. In the short term, an increase in the household debt-to-GDP ratio is typically associated with higher economic growth and lower unemployment as seen in the example of Slovak economy, but the effects may be reversed in three to five years, where higher growth in household debt may be associated with a greater probability of banking crises and lower economy growth.

Fast growth in household debt during last 10 years was supported by good macroeconomic situation in Slovak economy, especially positive development in labour market and decreasing interest rates on household loans, which were one of the highest in Europe in 2010, but in 2020 they are one of the lowest. In 2019, we could see decrease in household debt growth mainly due to macro-prudential policy of the National Bank of Slovakia, even though other macroeconomic indicators did not show change in trend.

Based on quarterly data between 2005 and 2020, we found that there is positive linear correlation between % change in credit to households, housing prices and average wages meaning, that if these indicators rise, credit to households should rise too. Negative linear correlation has been found between % change in credit to households, interest rates on household loans and unemployment rate. In this analysis, only average wages showed moderate to strong correlation coefficient, other indicators showed low correlation or no linear relationship during selected years.

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## Market Power in Food Supply Chain – Does Estimation Method Matters?

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**Abstract.** This paper aims to investigate the systematic differences in market power estimates between most dominate estimation approaches and to assess the determinants related to market power estimates. Meta analysis was used to estimate the impact of the assessment approach on the magnitude of market power index in the food supply chain. Using three different linear regression models, we investigated the determinants of MP estimates. We have collected the most comprehensive list of studies investigating processors' market power index in the food supply chains. In total, in our analysis, we use 472 unique market power index estimates. Our results show that there is indeed a systematic difference between the approach used and an MP estimate. Besides the estimation approach, there is also a significant impact of the number of observations used in a study, frequency of data collection and country of interest on the market power index estimates.

**Keywords:** Market Power, Food Supply Chain, Bargaining Power

**JEL classification:** D43, L13, L16, L66

### 1 Introduction

Analysis of the market power (MP) along food supply chains have a long history in economic literature. However, during the last few decades, it was becoming even more and more discussable among researchers, authorities and prominent international organisations (OECD, 2014; European Commission, 2015). One of the reasons why analysing a market power has become such a widespread issue could be the fact that while both consumer and producer food prices had increased rapidly during the global food crisis in 2007–2008, producer prices quickly dropped below the pre-2007 level in 2009, consumer prices, however, remained high (Swinnen and Vandeplas, 2010). Consequently, the European Commission warned of adverse long-term effects of the oligopsony power of processors and retailers for the entire agri-food sector (European Commission, 2009).

Despite the broad public interest, so far, there is no unified and generally accepted estimation method of the MP level (Fałkowski *et al.*, 2017; Sexton and Xia,

2018). Even though that there were plenty of different approaches developed for the market power analysis, a closer examination of the scientific literature, reveals that the range of methods used empirically can be summarised to three main approaches: Production-Theoretic Approach (PTA), General Identification Method (GIM) and Stochastic Frontier Estimation (SFE) framework.

Until the middle of 2010s, there was a vast amount of empirical literature which estimates the degree of MP applying approaches in line with the New Empirical Industrial Organization (NEIO) framework. These NEIO studies included two main strategies of the empirical MP estimation: PTA was firstly introduced by (Appelbaum, 1982) and the GIM developed by (Bresnahan, 1982). These two methods have a lot in common, both approaches have similar data requirements and share common roots in model construction. However, they are significantly different in the types of assumptions used to develop these market structure models (Digal and Ahmadi-Esfahani, 2002). Throughout the years of utilising of these approaches in empirical papers, criticism towards the validity and reliability of NEIO studies was growing. The criticism of many researchers was related to the extensive set of assumptions used in NEIO studies and to the arbitrary decision of the functional forms for the demand or supply function (Alston, Sexton and Zhang, 1999; Sexton, 2000). This criticism resulted in certain carefulness of policymakers when it comes to implementing the empirical research results. The detailed comparison of PTA and GIM approaches as well as their main differences, strengths and weaknesses are beyond the scope of this paper, for further details reader may refer to the (Perekhozhuk *et al.*, 2016).

Consequently, as an answer to the criticism of the NEIO studies Stochastic Frontier Estimation (SFE) was developed by (Kumbhakar, Baardsen and Lien, 2012). According to authors, the critical advantage of this method over older ones is that it allows researchers to use either input price data, as in the NEIO approach, or input quantity data for MP estimation, which significantly lower data requirements. Another advantage of this method is that it can reliably estimate market power with or without constant returns to scale, which is not always the case with the NEIO framework. Moreover, according to (Lopez, He and Azzam, 2018), since the mark-up in SFE is measured for each observation, compared to a single parameter in NEIO, the SFE allows to avoid *ad hoc* parameterisation of the conjectural elasticity to generate time-variant mark-ups. Another attractiveness of SFE is that it allows examination of factors affecting the deviation from the marginal cost frontier. Despite the relative novelty, many empirical papers which utilise SFE framework have already been published (see Table 1).

Therefore, our study has three main objectives: (1) provide an overview of the recent empirical MP studies related to agriculture and food supply chains, (2) investigate if there are any systematic differences in MP estimates between most dominate estimation approaches, (3) estimate the determinants related to MP estimates.

This paper is organised as follows: first, we describe data collected as well as dependent and independent variables that are used in our analysis, then we discuss the results and the last chapter brings the conclusions.

## 2 Data and Method

Our data is based on the level of processors' market power estimates which were collected from 52 recently published papers. To the best of our knowledge, we collected the most comprehensive list of studies investigating processors' MP in the agri-food supply chains compiled in recent years. It was drawn from various scientific databases including Scopus, Web of Science, Science Direct, Emerald, EconLit and Google Scholar. All of the studies focus on the estimation of a Market Power Index (MPI) related to a specific approach, sector, the direction of MP, product etc. In total, in our analysis, we use 472 unique MPI estimates (Table 1).

Most of the studies use country-level data in their estimations; few articles use plant-level data (Paul, 2001; Perekhozhuk *et al.*, 2013) and some region-level data (Perekhozhuk *et al.*, 2015; Silva *et al.*, 2019). However, in our analysis, we do not differentiate papers by this feature since the fraction of studies use country-level data are significantly prevalent.

For our study, we only used MP estimates statistically significantly different from zero. The focus was paid to articles which utilise one of the three beforementioned approaches. Studies which utilise unconventional methodologies, e.g. (Grau and Hockmann, 2018) was not used in our analysis.

We employed three linear models estimated via OLS to analyse the differences in MP estimates between most dominate estimation approaches and the determinants of MP estimates.

### *Dependent variable*

Our dependent variable is a Market Power Index that can be described in the following way: when the market is competitive, the product price equals marginal costs (MC), so the mark-up component is zero. However, in a situation with market power, the literature has focused on the identification of monopoly pricing from the evidence that output price (P) exceeds the marginal cost. Traditionally MC is calculated from an estimated cost function. Mark-up is then derived from  $(P - MC) / MC$ , a positive value of mark-up indicates the presence of non-competitive behaviour in the market. The higher the mark-up is, the greater is the degree of market power or, in other words, the market is closer to monopoly (Kumbhakar, Baardsen and Lien, 2012). We use log-transformed MPIs as a dependent variable in throughout our analysis. Log transformation was done to alleviate heteroscedasticity issues and to ameliorate the interpretation of the results.

**Table 1.** List of Studies Used

Authors	Approach	Type of Marker Power	Data Frequency	Observation Period	Number of MPI
(Ahn and Lee, 2010)	GIM	Oligopoly	Yearly	1975-2002	1
(Anders, 2008)	GIM	Oligopsony	Monthly	1995-2000	2
(Anders, 2008)	GIM	Oligopoly	Monthly	1995-2000	2
(Appelbaum, 1982)	PTA	Oligopoly	Yearly	1947-1971	2



(Azzam and Pagoulatos, 1990)	PTA	Oligopsony	Yearly	1959-1982	1
(Azzam and Pagoulatos, 1990)	PTA	Oligopoly	Yearly	1959-1982	1
(Bakucs <i>et al.</i> , 2009)	PTA	Oligopsony	Monthly	1993-2003	1
(Bakucs <i>et al.</i> , 2009)	PTA	Oligopsony	Monthly	1995-2004	1
(Bergman and Brannlund, 1995)	PTA	Oligopsony	Yearly	1960-1988	1
(Bettendorf and Verboven, 2000)	GIM	Oligopoly	Monthly	1992-1996	1
(Bhuyan and Lopez, 1997)	PTA	Oligopoly	Yearly	1972-1987	3
(Bhuyan and Lopez, 1998)	PTA	Oligopoly	Yearly	1972-1987	38
(Čechura, Kroupová and Hockmann, 2015)	SFE	Oligopoly	Yearly	2003-2012	25
(Chen and Yu, 2018)	GIM	Oligopsony	Monthly	2008-2016	1
(Chidmi, Lopez and Cotterill, 2005)	GIM	Oligopoly	Monthly	1996-2000	1
(Chirinko and Fazzari, 1994)	PTA	Oligopoly	Yearly	1973-1986	1
(Chirinko and Fazzari, 1994)	PTA	Oligopoly	Yearly	1973-1987	1
(Mello and Brandao, 1999)	PTA	Oligopoly	Yearly	1962-1991	1
(Genesove and Mullin, 1998)	GIM	Oligopoly	Yearly	1890-1914	1
(Hockmann and Vöneki, 2009)	PTA	Oligopsony	Monthly	1998-2006	1
(Hovhannisyan and Gould, 2012)	GIM	Oligopoly	Weekly	2001-2006	1
(Ji and Chung, 2016)	PTA	Oligopsony	Monthly	1980-2009	1
(Kumbhakar, Baardsen and Lien, 2012)	SFE	Oligopoly	Yearly	1974-1991	2

(Lopez, 1984)	PTA	Oligopoly	Yearly	1965-1979	1
(Lopez and You, 1993)	GIM	Oligopsony	Yearly	1954-1984	1
(Lopez and Azzam, 2002)	PTA	Oligopoly	Yearly	1972-1997	25
(Lopez, He and Azzam, 2018)	SFE	Oligopoly	Yearly	1990-2010	23
(Čechura, Kroupová and Hockmann, 2015)	SFE	Oligopsony	Yearly	2003-2012	94
(Čechura, Kroupová and Hockmann, 2015)	SFE	Oligopoly	Yearly	2003-2012	70
(Mei and Sun, 2008)	PTA	Oligopsony	Yearly	1955-2003	1
(Mei and Sun, 2008)	PTA	Oligopoly	Yearly	1955-2003	1
(Merel, 2009)	GIM	Oligopoly	Quarterly	1985-2005	1
(Millán, 1999)	PTA	Oligopoly	Yearly	1978-1992	14
(Murray, 1995)	PTA	Oligopsony	Yearly	1958-1988	1
(Murray, 1995)	PTA	Oligopsony	Yearly	1958-1989	1
(Muth and Wohlgenant, 1999)	GIM	Oligopsony	Yearly	1967-1993	1
(O'Donnell <i>et al.</i> , 2007)	GIM	Oligopsony	Yearly	1989-2000	28
(O'Donnell <i>et al.</i> , 2007)	GIM	Oligopoly	Yearly	1989-2000	12
(Panagiotou and Stavrakoudis, 2017)	SFE	Oligopsony	Yearly	1970-2009	1
(Panagiotou and Stavrakoudis, 2018)	SFE	Oligopsony	Yearly	1970-2009	2
(Panagiotou, 2019)	SFE	Oligopsony	Yearly	1970-2010	3
(Perekhozhuk <i>et al.</i> , 2013)	PTA	Oligopsony	Yearly	1993-2006	2
(Perekhozhuk <i>et al.</i> , 2015)	PTA	Oligopsony	Monthly	1996-2003	1
(Perekhozhuk <i>et al.</i> , 2016)	GIM	Oligopsony	Monthly	1996-2003	1
(Perekhozhuk <i>et al.</i> , 2016)	PTA	Oligopsony	Monthly	1996-2003	8

(Lopez, Zheng and Azzam, 2015)	SFE	Oligopoly	Yearly	1979-2009	36
(Salhofer, Tribl and Sinabell, 2012)	GIM	Oligopsony	Monthly	1997-2008	1
(Salhofer, Tribl and Sinabell, 2012)	GIM	Oligopoly	Monthly	1997-2008	1
(Bhuyan and Lopez, 1997)	PTA	Oligopoly	Yearly	1972-1987	37
(Scalco and Braga, 2014)	GIM	Oligopsony	Yearly	1997-2011	1
(Scalco, Lopez and He, 2017)	SFE	Oligopsony	Monthly	2010-2015	1
(Scalco, Lopez and He, 2017)	SFE	Oligopoly	Monthly	2010-2015	1
(Silva <i>et al.</i> , 2019)	PTA	Oligopsony	Quarterly	2016-2017	2
(Stalgienė and Jedik, 2015)	PTA	Oligopsony	Quarterly	2004-2014	3
(Suzuki, Lenz and Forker, 1993)	GIM	Oligopoly	Yearly	1979-1989	1
(Weerahewa, 2003)	GIM	Oligopsony	Yearly	1970-2000	3
(Weerahewa, 2003)	GIM	Oligopoly	Yearly	1970-2000	3
<b>Total</b>					<b>472</b>

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Source: Articles cited, Note: the number of MPI depends on the number of supply chains analysed in the study

### *Independent variables*

We use four groups of explanatory variables. *The first group* is based on a geographical factor. Most of the studies were concluded using the data from the USA and other western countries. There is a quite limited number of papers related to developing countries. Therefore, for our analysis, we decided to use regional dummy variables: *USA*, *Europe* and *Other*. First one includes all of the observations from the USA. The second variable contains countries of the European Economic Area. Furthermore, the “*Other*” dummy variable will consist of all other countries; also, it will serve as a base group to compare results with other variables.

*The second group* of the independent variables is based on the industry analysed. For our analysis, we grouped all observations in 8 main groups which have at least ten observations. As can be seen from Table 2, almost 20% of all MPI observations are attributed to the “*Dairy*” sector, which includes milk, cheeses, butter,

and other dairy products. “*Beverages*” dummy includes all the observations related to tea, coffee, wine, water, beer etc. Studies related to beef, hog or poultry, slaughtering are grouped in the “*Meat*” dummy. The *Cereals* category include observations which contain MPI of wheat, barley, oat and other grains. Most of the observations in this group can be attributed to the article by (O’Donnell *et al.*, 2007). The *Oils* group include observations of canola and other oils. “*Tobacco*”, and “*Fruits and Vegetables*” variables are self-descriptive. Finally, *Other industry* consists of all other observations which cannot be included in any of the beforementioned groups; it also serves as a base group in the regression. Each of the beforementioned groups is used as a binary variable in further analysis.

The *Third group* is aimed to capture the difference caused by the estimation procedure. One of the independent variables is intended to capture variations of the observation frequency, which were used to estimate MPI. In the majority of the studies, data with yearly frequency was used for the MP estimation. For the analysis, we created *Yearly* dummy variables. Another essential piece of information is the number of observations used for MPI estimation, which vary significantly across papers. “*Observation number*” variable was calculated as the observation period multiplied with the data frequency (Table 1). We hypothesise that the higher number of observations used the lower average MP level is.

Also, we created “*After 2005*” dummy, to see if there is any difference in reported MP levels between older and newer papers. Another group of dummy variables are “*Oligopsony*” and “*Oligopoly*” which capture the input and output direction of MP, respectively. Finally, the last group of variables contains dummies related to approach used, namely: *GIM*, *PTA* and *SFE*. The summary statistics of all variables can be seen in Table 2.

**Table 2.** Descriptive Statistics

Statistic	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
MPI	0.140	0.121	0.007	0.064	0.179	0.815
Observations number	19.874	25.987	4	9	20	348
After 2005	0.706	0.456	0	0	1	1
Yearly	0.935	0.247	0	1	1	1
Oligopsony	0.349	0.477	0	0	1	1
Oligopoly	0.651	0.477	0	0	1	1
Meat	0.166	0.372	0	0	0	1
Tobacco	0.024	0.153	0	0	0	1
Beverages	0.081	0.273	0	0	0	1
Dairy	0.198	0.399	0	0	0	1
Oils	0.048	0.214	0	0	0	1
Fruits and Vegetables	0.122	0.328	0	0	0	1
Cereals	0.176	0.382	0	0	0	1
Other industry	0.185	0.389	0	0	0	1
Europe	0.460	0.499	0	0	1	1
USA	0.407	0.492	0	0	1	1
Other countries	0.133	0.340	0	0	0	1

GIM	0.118	0.323	0	0	0	1
PTA	0.320	0.467	0	0	1	1
SFE	0.562	0.497	0	0	1	1

Source: Articles cited

### 3 Results and Discussion

Based on the data introduced in the previous section, we developed three linear models which were estimated via OLS. In the first model (1) we included all variables related to the approach used and type of market power used in a study and the dummy “*After 2005*”. Variables *SFE* and *Oligopoly* serve as a base group; therefore, the coefficients in each group can be compared with them. The second model (2) contains all the variables from the first and also variables related to data frequency of and geographical information of the MPI. Finally, the last model (3) includes all the data from previous models but also the information related to the industry in which MPI were observed. The statistics of all three models can be seen in Table 3.

It should be noted that from the initial data set we excluded observations in which MPIs are highly close to zero since such a small values make a model less stable and thus may distort the reliability of the coefficients. Therefore, we excluded 12 observations in which MPI is lower than 0.005. Since we reduce our data set in less than 3%, we assume it will not have any detrimental consequences of the reduced sample size.

In all of the model, we used the log transformation of our dependent variable. There were two primary motivations to do so. First of all, there was evidence of heteroscedasticity issue in all of the models we estimated, so log transformation is used to alleviate this issue. Secondly, the absolute change of the MPI by itself does not have any definite interpretation. For example, it is hard to tell what means the absolute difference between different group of MPIs by 0.01. However, using the log transformation, we can interpret coefficients as a percentage change. Finally, it should be noted that even after the log transformation of the dependent variable, we could still reject the homoscedasticity hypothesis using Breusch Pagan Test. In other words, there was still a sign of heteroscedasticity presence in our models. Therefore, we additionally estimated heteroscedasticity robust standard errors to eliminate this issue. Thus, all the standard errors and marks of the statistical significance in Table 3 use these robust standard errors. The residual-based diagnostic tests proved the stability of all models.

**Table 3.** Regression Results

	Market Power Index (log)		
	(1)	(2)	(3)
Intercept	-2.078*** (0.159)	-0.272 (0.642)	-0.546 (0.643)
PTA	0.350** (0.152)	0.404* (0.232)	0.462** (0.235)

GIM	-0.606***	-0.391*	-0.363
	(0.163)	(0.221)	(0.222)
After 2005	-0.305*	-0.130	-0.067
	(0.163)	(0.237)	(0.245)
Oligopsony	-0.023	0.008	-0.008
	(0.072)	(0.075)	(0.074)
Obs. Num. (log)		-0.546***	-0.539***
		(0.100)	(0.099)
Yearly		-0.788***	-0.760***
		(0.282)	(0.279)
USA		0.548***	0.607***
		(0.182)	(0.187)
Europe		0.014	0.007
		(0.157)	(0.155)
Meat			0.191
			(0.127)
Tobacco			0.443**
			(0.208)
Beverages			0.222
			(0.164)
Dairy			0.145
			(0.133)
Oils			-0.100
			(0.171)
Fruits			0.167
			(0.142)
Cereals			0.247*
			(0.148)
<i>Observations</i>	459	459	459
<i>Adjusted R-squared</i>	0.224	0.282	0.288
<i>Residual standard error</i>	0.700	0.673	0.671
<i>F statistic</i>	34.134***	23.535***	13.346***
<i>Notes:</i>	*** p < .01; ** p < .05; * p < .1		

First and foremost, let us review our key variables of interest, which are PTA and GIM. It should be noted that there is indeed a systematic difference between the approach used and an MP estimate. All three models suggest that PTA estimates, provide 40% higher MP estimates than SFE. Talking about GIM, the results vary slightly across the models. For example, according to the first model, GIM provides, on average, 60% lower MPIs than SFE (which is a base group). However, after the addition of other control variables, according to models 2 and 3, we can conclude that there is not enough

evidence to say that there is a difference between these two estimation frameworks. We perceive the last two models as more reliable and descriptive since they take into account more nuances. Therefore, according to our analysis, we can conclude that PTA studies tend to report a higher level of MP than other two methods. At the same time, there is no statistically significant difference between GIM and SFE. From our study, we cannot conclude which estimates are more “correct” and reliable. We can only state that there is a systematic difference in the estimates.

Another notable finding is that there is a high and consistent correlation between a number of observations used for MP estimation with the reported results. According to our analysis, we can say that increase in the number of observations by 1% on average decrease MPI on approximately 0.54%. This observation might be explained that articles with a small sample size are more likely to report an extreme level of MP and vice versa. At the same time, studies with *Yearly* data frequency tend to report around 75% lower MPI estimates than studies with more frequent data. In other words, a long observation period used in a study, on average, provide significantly lower estimates, which may occur due to the regression toward the mean effect.

It should also be noted that there is a dramatical difference between the average level of MP in the USA and other countries. According to our analysis articles based on US data, on average, report 60% higher MP level as in other countries. At the same time, there is no evidence that there is a statistically significant difference between *Europe* and other countries.

Among all of the *industry* variables, with 95% confidence, we can say that only MPIs related to *Tobacco* systematically higher than industry groups. At the same time, we can reject the hypothesis of difference in MP estimate in older and newer articles, the variable *After 2005* does not differ from zero in any of the models. There is also no statistically significant difference between *Oligopoly* and *Oligopsony* MP estimates.

Finally, it should be mentioned that taking into account the considerable data limitations the results of this analysis should be perceived with the high caution, and should be interpreted only as a measurement of the difference of MP estimate between different approaches. In future, this research can be extended by including proxies of organisational structures and industries concentration ratios to examine the relationship between market structure and the level of market power.

## Conclusion

Market power analysis has long attracted the attention of researchers and policymakers as it has important policy implications the efficient functioning of the supply chain mechanism. Agri-food supply chains are of particular importance because of their direct impacts on the welfare of primary agricultural producers as well as consumers. There has been a bunch of literature published that aims to estimate the market power of different food supply chains in different regions or countries. We aim to investigate the systematic differences in market power estimates between most dominate estimation approaches and to assess the determinants related to market power estimates. We employed a meta analysis approach and using linear models we estimated the impact of the estimation method and additional variables on the market power index obtained

in up to date published studies. Collecting the most comprehensive list of studies investigating processors' market power index in the food supply chains enabled us to obtain 472 unique market power index estimates. According to our analysis, we can conclude that PTA studies tend to report a higher level of MP than other two methods. At the same time, there is no statistically significant difference between GIM and SFE. We can also conclude that increase in the number of observations by 1% on average decrease MPI on approximately 0.54%. Usage of *Yearly* data frequency in estimation is associated with a 75% decrease in the derived MPI estimate, compared to monthly or weekly data frequency. Having all other variables fixed, articles based on US data report 60% higher MP level as in other countries; however, there is no evidence of the statistically significant difference between *Europe* and other countries. Finally, among all the industry variables, it seems that only MPIs related to *Tobacco* significantly differ from other groups.

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## The role of Turkey in China's Belt and Road Initiative

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**Abstract.** The process of globalization has brought new key players to the world economy, of which China is certainly the most prominent. In 2013, China launched a major effort to renew the Silk Road in the form of Belt and Road Initiative (BRI) to streamline the connection between Europe and Asia. Thanks to its geo-strategic location, Turkey, which has deepened international cooperation with China in recent years, also plays an important role in this connection. It is one of the countries of the so-called gateways to Europe. This article focuses on highlighting Turkey's role in revitalizing the Silk Road, describes relations between these countries, analyses Chinese investment in Turkish territory and focuses on major projects under the initiative. The results showed that countries in economic interest are deepening their mutual cooperation despite cultural and ethical problems. The paper also points out the most important BRI projects, with the opening of the Baku–Tbilisi–Kars railway being identified as the most significant project implemented. This railway opens a new land route so-called southern branch of the New Silk Road.

**Keywords:** Belt and Road Initiative, investment, China, Turkey

**JEL classification:** F 20, F 50, P 45

### 1 Introduction

In 2013, Chinese President Xi Jinping presented a vision for reviving the Silk Road in the form of the Belt and Road Initiative (BRI). One of the principal goals of the BRI is to improve connectivity between Europe and Asia. The BRI can, therefore, be seen as an interconnection between the countries and economies of the Eurasian continent in particular, through a range of projects aimed primarily at supporting the development of infrastructure, and coordination of national and regional development plans. The BRI should thus expand and interconnect transport networks and markets, disperse and improve Eurasia's production capacity, facilitate the transit of goods, capital, energy, raw materials, and, to some extent, information, people, and culture. It plans to do this through substantial investments in road, rail, port and aerial infrastructure, along with

ancillary facilities such as power grids, energy pipelines and high-speed fibre optic cables (Ghiassy & Zhou, 2017). Baláž, Zábajník, and Harvánek (2019) state that this project is a geopolitical response of China to challenges of the Eurozone crisis and the decline of the economic performance of the USA

This initiative, presented mainly as a long-term vision of infrastructure development and economic integration, focused on the world's largest continental area – Eurasia has two major components. The overland routes called "*the Silk Road Economic Belt*", which was later extended to six corridors. They are tasked with connecting China with not only Europe, but also with other parts of Asia. The second part is called "*21st Century Maritime Silk Road*", which is to connect China's largest ports with Southeast Asia, Africa and Europe.

Turkey plays an important role in both parts of the initiative. Thanks to its geostrategic position or its own infrastructure initiatives, it forms a so-called gateway to Europe for China. This opens up the possibility of using land routes (railways and roads) also on the southern side of Eurasia.

### 1.1 Methodology

The paper aims to point out the position of Turkey in the Chinese Belt and Road initiative on the basis of existing and planned cooperation within the initiative.

To achieve the major aim, we set sub-aims:

- briefly characterize the BRI,
- assess international relations between Turkey and China as a key precondition for cooperation on the initiative,
- analyse Chinese investment in Turkey since 2013,
- bring together the most important BRI projects related to logistics and infrastructure in Turkey.

The article draws on qualitative methods, including secondary data and information analysis. The BRI issue is dynamic and constantly evolving and non-transparent, which is why the article is based mainly on press releases, government announcements, and Internet sources. By selecting and synthesizing these most relevant data from an available sources, we obtained an overview of the researched issues. In view of the difficulty of transparency in Chinese investment, the data by China Global Investment Tracker (CGIT), compiled by The American Enterprise Institute and The Heritage Foundation, are used to analyse investments in Turkey. CGIT provides a comprehensive set of data on foreign direct investment (FDI) and China's construction contracts, which are shown in a graph and table for a better overview.

## 2 Turkey & China relations in the context of the implementation of the BRI

Diplomatic relations between Turkey and China were established in 1971, but a significant deepening of relations was not recorded until 2010. The countries agreed to improve their bilateral ties to a level of strategic cooperation during then-Chinese Prime Minister Wen Jiabao's visit to Turkey (Atli, 2016). Thanks to this cooperation, the countries began to conclude agreements on joint projects, including infrastructure, and consideration was given to connecting Istanbul and Beijing by rail. There are several reasons why it took almost 40 years for relations to reach a new level. In most cases, the common denominator remains the issue of Uyghurs living in the Xinjiang Autonomous Region, where even in recent history, Turks have acted as protectors of this minority in Chinese territory.

The paradox is that, although China continues to be publicly criticized by the Turkish side on the Uyghur issue, relations between China and Turkey are deepening. Stronger cooperation is influenced by several factors. First, since the failed 2016 coup attempt, Turkey has sought new partners to reduce the country's dependence on traditional Western allies, which is also related to Turkish President Recep Tayyip Erdogan's pro-Islamic ideology, which focuses more on Eastern partners. Second, the election of Donald Trump as President of the United States contributed to the further alienation of Turkey from its traditional allies. The diplomatic dispute with the United States culminated in August 2018, when the American president announced through a social network his decision to double tariffs on imports of Turkish aluminium and steel (Dopp, 2018). The decision stemmed mainly from torn political relations in Syria and also because of the detention of an American pastor accused by Turkey of espionage and terrorism. The measures taken by the American president further deepened the Turkish economic problems they faced in August 2018.

Following these events, the Chinese Ministry of Foreign Affairs said it had noted a "*new direction*" for the Turkish economy and its foreign relations. During the same period, Turkey signed a financing agreement with China's Industrial and Commercial Bank (ICBC) amounting to 3.8 bil. \$. The ICBC spokesman did not comment on the details of what the funds were to be used for (Blanchard & Shu, 2018). On the other hand, D. Trump's protectionist policy also had a negative effect on Sino-American relations, which resulted in a trade war.

The third and most important geostrategic and geopolitical reason, Turkey's participation in the Chinese BRI initiative, which expands cooperation in many areas of infrastructure and funding projects, deepens cooperation dialogues. In 2018, the number of companies with Chinese capital in Turkey increased to 1,000 (HSBC, 2019). Turkey also caters to China in building special economic zones and industrial zones, in which only Chinese companies invest.

Turkey is also considered a key transit country within the BRI, as China can benefit from a strategic position between Asia and Europe. Turkey can thus use its location to make the country the centre of freight transport between Asia and Europe in terms of trade routes, transport, and energy resources, as Turkey's government intended

through the "*Middle Corridor*"<sup>1</sup>. In November 2015, during the G-20 summit in Antalya, China and Turkey signed a Memorandum of Understanding on Aligning the Belt and Road Initiative and the Middle Corridor Initiative (Hamilton & Noi & Altay, 2018). R.T. Erdogan confirmed Turkey's participation in both the BRI initiative and the Belt and Roads International Cooperation Forum in Beijing in March 2017. He said the Chinese Silk Road Economic Belt initiative was linked to Turkey's "*Middle Corridor*" project, which aims to connect Europe with the Middle East. Asia and then China via Anatolia, and within this framework, Turkey would like to work together with China and other countries along this route. He also noted that progress would be made in the implementation of various projects in Turkey and the region of countries involved in the "*Middle Corridor*" initiative, which aims to be one of the main and complementary elements of the BRI. He ended his speech by saying that Turkey was ready to provide all kinds of support for this cooperation. The first key project for this cooperation was the opening of the Baku-Tbilisi-Kars railway line (Presidency of the Republic of Turkey, 2018). And according to the Turkish ambassador to China E. Önen, Turkey is ready to work with Chinese companies to create a more integrated Eurasia within the BRI (Meng, 2018). This means further cooperation with Chinese partners in the field of major BRI goals as Chinese investments and infrastructural projects.

## 2.1 China's investment activity in Turkey

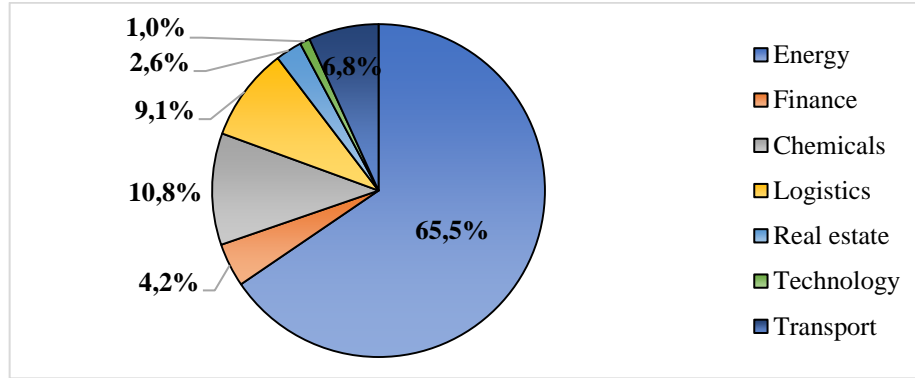
Chinese investment in the BRI is massive. Overall BRI investment projects are estimated to add over USD 1 trillion of outward funding for foreign infrastructure over the 10-year period from 2017 (OECD, 2018). BRI mainly creates a certain coordination and strategic emphasis on the development of investments of Chinese companies (private and state-owned companies) (Baláz et al., 2019).

According to AEI (2020), since the announcement of the initiative (in 2013), China has invested more than 10.1 bil. \$ in Turkey. These projects are FDI, but mostly public investment contracts financed by Chinese banks. The breakdown of these Chinese construction project costs and investments by sectors is displayed in Fig.1. Out of the total projected construction costs more half are budgeted for energy sector (65.5%), and further significantly less for the chemical sector (10.8%). The logistics (9.1%) and transport (6.8%) sector follows. Less than 5% of total Chinese investment

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<sup>1</sup> The Trans-Caspian East-West-Middle Corridor, called the "*Middle Corridor*", is Turkey's largest multilateral logistics initiative. It starts in Turkey and passes through the Caucasus region in Georgia, Azerbaijan, the Caspian Sea, Central Asia to China, where it passes through either Turkmenistan-Uzbekistan-Kyrgyzstan or Kazakhstan. On this route, the major hubs of multimodal transport on the Caspian transit corridor are the ports of Baku Alat in Azerbaijan, Aktau, and Kuryk in Kazakhstan. In this initiative, Turkey also points to the importance of the original Silk Road in the transit of goods and emphasizes the use of land, especially rail, to transport goods from Asia to Europe. According to Turkey's officials, the use of this route is more efficient, as the Central Corridor is faster than the so-called The northern corridor passing through Russia, because it is 2,000 km shorter.

and construction project budgets went to other sectors (finance, real estate, and technology).



**Fig. 4.** Breakdown of Chinese construction contracts costs and investments by sectors in between 2013 and 2019 (in %). Source: own research based on data from AEI.

Table 1 provides an overview of investments and construction projects that, according to AEI & The Heritage Foundation, belong directly to the BRI. In September 2019, construction began on the Hunutlu Thermal Power Plant, and is announced as China's largest direct investment in Turkey (Xinhua, 2019). The contract between Turkish and Chinese state-owned companies, in the amount of more than 1.3 bil. \$, is a flagship project linking the China-proposed Belt and Road Initiative with Turkey's "Middle Corridor" vision.

Also, the second investment of more than a billion concerns the construction of a coal power plant, in which one of the five largest state-owned electricity producers in Mainland China - PowerChina invests. The third most significant BRI investment concerns the construction of the high-speed railway Kars - Edirne, which is described in the subchapter 2.2.

**Table 2.** List of Chinese investments and contracts in Turkey that are part of the BRI

Year	Month	Chinese Entity	Mill. \$	Transaction Party	Sector
2014	April	ICBC	320	Tekstil Bankasi	Finance
2015	February	Sinomach	380	OEDAS and OEPSAS	Energy
2015	May	Sinoma	160	Limak Holdings	Real estate
2015	May	Sinoma	100	Votorantim Cimento	Real estate
2015	September	China Merchants, CIC, COSCO	940	Fina Liman	Logistics
2016	January	Dongfang Electric	660	Hattat	Energy
2016	May	Bank of China	110		Finance



2016	December	ZTE	100	Netas	Technology
2017	November	Power Construction Corp	1090	Teyo	Energy
2019	September	State Power Investment, AVIC	1320		Energy
2019	November	China Electronics Technology	110	Kaylon	Energy
2019	December	China Merchants-led consortium	690		Transport

Source: processed by the author according the data from AEI (2020).

Although the world economy is slowing due to a global pandemic, significant Chinese investment in Turkey will continue in 2020. In March, Turkey Wealth Fund (TWF) signed a memorandum of understanding with China's Sinosure to provide insurance support up to 5 bil. \$ for financing activities. The deal will see Sinosure provide support for TWF financing activities of BRI projects and to promote bilateral trade.

## 2.2 The most significant BRI projects in Turkey

According to the NDRC (2015), not only investment and trade cooperation plays a major role in the reviving of Silk Road. Facilities connectivity is a priority area for implementing the BRI. It is large-scale infrastructure projects that are one of the main pillars of the BRI. Despite the relatively short time since the initiative has been implemented in Turkey, several important transport hubs have been identified.



**Fig. 2.** Map of the Baku - Tbilisi - Kars railway line. Source: <http://www.caspianpolicy.org/baku-tbilisi-kars-is-among-train-lines-that-could-transform-how-people-travel/>

The Baku-Tbilisi-Kars (BTK) railway is also called the *"Iron Silk Road"* (Aydin, 2017). The BTK railway line is one of the most important components, which is included in the project both under the BRI initiative and the Middle Corridor. The railway passes through the capital of Azerbaijan - Baku and the cities of Tbilisi and Akhalkalaki in Georgia to the city of Kars in Turkey. It can be described as the third stage of the infrastructure interconnection of these countries, as the Baku - Tbilisi - Ceyhan oil pipeline and the Baku - Tbilisi - Erzurum gas pipeline already exist. It was put into operation on October 30, 2017, when they were ceremoniously opened in Baku with the participation of R.T. Erdogan (Morrison, 2017).

As Fig. 2 illustrates, the railway line aims to connect Azerbaijan and Turkey. The total length of the BTK railway line is 825 km (503 km passes through Azerbaijan, 244.5 km through Georgia and 77.5 km through Turkey).

The opening of this railway meant that Russia's monopoly position (via The Trans-Siberian Railway) in land transport between China and Europe would be reduced, opening up the "southern branch" of the New Silk Road, as goods could be transported from China to Kazakhstan and then across the Caspian Sea to Baku, from where it will be transported to Turkey via BTK and finally to Europe, where the existing railway lines can transport goods all the way to London. According to the available data, the volume of freight carried on the BTK railway line in the first year of its operation was 110,000 tones carried by 116 trains (DailySabah, 2018a). According to the latest statements by the Turkish Transport and Infrastructure Minister in May 2020, on this line, 240,000 tons of exported goods in 5,250 containers and 280,000 tons of imported goods or transit cargo to Europe in 5,300 containers have been transported so far (PortsEurope, 2020).

The next step in strengthening Turkey's position as an important BRI transit country should be the construction of a 2,000 km long high-speed rail line from Kars to the town of Edirne, located approximately 7 km from the Greek border and 20 km from the border with Bulgaria and following the BTK. Turkey thus has the opportunity to connect the easternmost and westernmost cities. The project also talks about China's participation, as confirmed by Ambassador E. Önen, who confirmed in January that negotiations on a joint agreement should be concluded in the coming months with a positive outcome (Meng, 2018). According to the information provided by the Chinese authorities, the length of the transport of goods from China to Turkey will be reduced to one day thanks to such a railway network (DailySabah, 2018b). In addition, Chinese goods will be shipped to Europe within 18 days.

Although the shores of Turkey are bordered by the Black Sea, the Mediterranean Sea and the Aegean Sea, Turkish ports are not shown on the original plans of the 21st Century Maritime Silk Road. A key port in this area has been the Greek port of Piraeus, in which China has invested since 2009 and made the most significant investments in 2016, when Chinese state-owned company COSCO first bought a 51% stake and then a 67% stake for 419.7 mill. \$ (Stamouli, 2016). Piraeus has thus become

one of the most famous projects within the BRI. However, in 2015, a joint venture set up by a Chinese consortium of investors bought a 64.5% stake in Turkey's third largest Kumport container terminal in Istanbul's Ambarli port (Investment Office, 2015). A consortium of COSCO, China Merchants Holdings and the Chinese State Fund bought a majority stake for 940 mill. \$, giving China another strategic port near Europe. During the first year, when the terminal was managed by COSCO, according to statistics, 665 thousand TEU were transferred. According to 2018, the number of containers transported is increasing, with 1,258 million TEUs being transshipped at Kumport terminals in 2018, an increase of 18.3% compared to 2017 to 1.063 million, again indicating an increase in transit goods in Turkey. (PortsEurope, 2019).

In addition to *"classic"* infrastructure projects, Turkey has begun working with China in the digital world. One of Turkey's largest telecommunications service providers, Turkcell has teamed up with one of China's largest information and communication technology providers, Huawei, and Turkcell aims to leverage Huawei's and the Chinese government's experience in software development and innovative solutions. In 2020, Turkcell announced that it has completed the World's leading high-speed data transmission trial with Huawei out of China on a live Mobile Carrier network (Huawei, 2020). This gives Turkcell a competitive edge in high speed transmission while also driving the evolution of this technology in 5G era.

### 3 Conclusion

A decisive factor in the current global economy is an increasingly active interference of the globalization processes that are directly or indirectly present in almost all types of economic activities (Kašťáková & Drieníková & Zubařová, 2019). China's boom due to seizing the rapid development opportunity of economic regime reform as a process of globalization has secured China its position as the largest exporter of goods since 2009. For the world's largest exporter, shipping routes are extremely important, which is why it is understandable why it is in China's interest to make the most efficient use of logistics links. The vision for the renewal of the Silk Road in the form of BRI, which China launched in 2013, seeks to streamline logistics connections as well as effectively utilize Chinese resources.

Turkey plays an important role in this initiative, as it is one of the countries that represents the so-called gateway to Europe. Thus, China gains the opportunity to exploit Turkey's strategic position, and vice versa, Turkey is gaining a strong partner to support projects it needs to activate within the Middle Corridor to fully exploit its own transit potential.

The process of globalization has also brought a growing degree of economic interdependence, which is also reflected in these two partners. Despite the fact that the relations between the two economies have long been plagued by cultural and ethical problems, their mutual cooperation for economic benefit seems more important. In addition to the statements of both governments, Chinese investments also prove it. In the process of reviving the Silk Road, Turkey and China work together in areas such as energy, chemicals, transport, logistics but also real estate. Many of the large and

costly contracts mainly concern the construction and expansion of coal-fired power plants in Turkey. This may raise concerns for another important Turkish partner and BRI participant - the EU, which promotes "*green*" policies without coal-fired power plants.

This initiative has already brought significant projects that make it possible to increase transport flexibility and, if necessary, bypass Russia on the southern branch of the Silk Road on the land route between Europe and Asia. This connection made it possible, especially by open the Baku - Tbilisi - Kars railway line. The route, which runs east-west through the Caspian Sea, continues in the capital of Azerbaijan - Baku, then passes through the Caucasus to the capital of Georgia - Tbilisi and ends in the Turkish city of Kars. From there, the goods can go to all corners of Europe. This route also proved to be an extremely important transport hub during the pandemic, when it was in the interest of countries to shorten the accompanying routes as much as possible. Moreover, according to Turkish officials, between March and May 2020, about 140,000 tons of goods were transported via BTK. This was a three-month record for the BTK railway since its launch (Garibov, 2020).

The implementation of other planned projects may shape further cooperation between China and Turkey and also make transport through Turkish territory even more attractive.

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## Impact of the COVID-19 Pandemic Situation on Required Capital of the Insurance Company

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**Abstract.** Pandemic situation is causing many issues to all financial institutions worldwide but especially to insurance companies. These companies are strongly affected by the current COVID-19 pandemic situation which affects many risks that insurance company faces to. Premiums that were invested on the financial markets lost their value in the time of historical market drop and very slowly raise back to pre-pandemic values. Volatility of the financial markets, exchange rates and yield curves move the exposures and risk capital in negative directions, also solvency sufficiency becomes uncertain due to volatility. For this reason, reporting results of the insurance companies depends on the exact reporting date what significantly worsens their informative value. Regulatory required pre-defined stress scenarios from the past with totally improbable situations make sense now and attract much more attention than even before. Main aim of the article is showing to reader current COVID-19 pandemic situation effects towards insurance companies and the consequences for these financial institutions.

**Keywords:** Insurance Company, Risk Capital, Solvency, Pandemic.

**JEL classification:** G 22, G 28

### 1 Pandemic situation in Insurance Industry

Unforgettable year 2020 will be forever connected with pandemic situation caused by the virus COVID-19, where millions of people and companies were directly affected, and impact of the pandemic will be part of our lives also in upcoming few years. Economic crisis caused by the pandemic situation can cause financial instability of such large and stable institutions as insurance companies.

Insurance companies are usually well prepared for various types of claims – natural catastrophes, individual customer's claims (such as car crash, injury or death), financial market profit decrease, etc. Actuaries in insurance companies are responsible for predicting claim probability occurrence, but also for very important

capital calculation. These calculations are extremely important mainly in difficult times because shows conditions of the insurance company. Insurance companies test their real preparedness for the worst scenarios by using pre-defined stressed scenarios which are usually required by regulators. Insurance companies have to prepare and run them on a regular basis for such reasons we can see nowadays. I suggest that all of the biggest insurance companies like Allianz, Generali, Zurich Insurance Group or Swiss Re are well prepared for the situation and with some restrictions definitely will survive with financial sufficiency and solvency ratio in pre-specified limit.

Main drivers of possible problems for insurance companies are [5]:

- **low interest rates for a long time** – nowadays we can spot the lowest interest rates in the last decades (mainly in the first and second quarter of the year 2020);
- **globally raising claims** – current situation with global increase in claims in this significant volume is not typical;
- **high exposure in some areas** – exposure grow as consequence of pay-out for claims, unearned premium risk and reduced interest in certain types of insurance (e.g. travel insurance);
- **raising regulation** – regulators are more interested in solvency adequacy of the insurance companies and require providing ad-hoc reports especially in pandemic volatile times;
- **changes in investment strategy** – lots of insurance companies celebrated one of the most successful year conclusions, but pandemic situation led to change and/or refuse expected dividend payments, planned investment strategies and planned developments.

### 1.1 Impacted Risk Types

Insurance companies face to many risks. Depending on the methodology used for capital modelling (SST – Swiss Solvency Test, SII – Solvency II), we recognize several types of risks [14]:

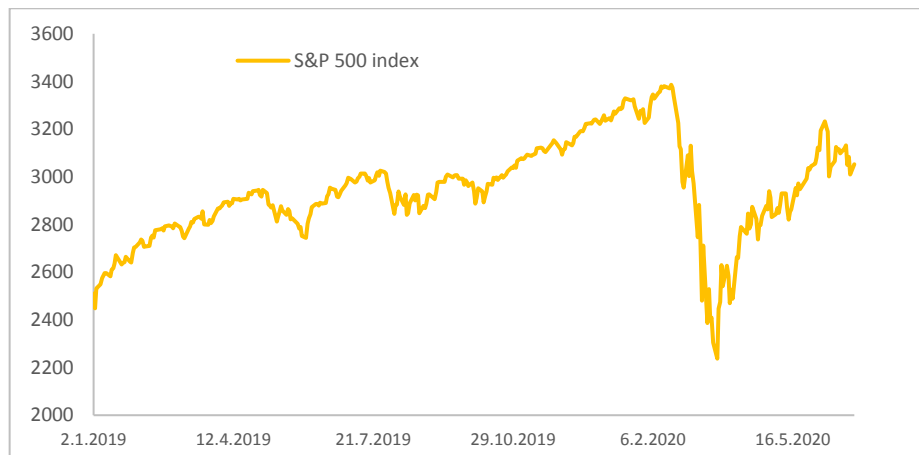
- **Market risk** – market risk is the possibility of losses due to factors that affect the overall performance of the financial markets; market risk may be reflected in insurance company's technical provisions financial placement of the and cannot be diversified.[7]
- **Credit risk** – risk of default by the eminent, including also reinsurance credit risk which refers to reinsurer default or downgrading.
- **Life Liability risk** – risk of an adverse value impact due to developments of mortality and disability parameters; we distinguish:
  - Mortality risk – potential variations in death rates for business for which increase mortality rates and reduce available capital,
  - Longevity risk – potential variations on life expectancy for business for reduced mortality rates and reduce available capital,
  - Morbidity risk – potential adverse variations in rates of incidence.
- **Premium & Reserve risk** – risk that insurance claims pay-outs and reserve changes will exceed expected pay-outs; we distinguish:

- Premium risk – risk that claims related to premiums earned in the year are higher or lower than expected claims at the beginning of the year,
- Reserve risk – risk that claims from business earned in previous years deviates adversely from what is assumed in the claim reserves, over a one-year time horizon.
- **Operational risk** – risk of loss resulting from inadequate or failed internal processes, people and systems or from external events as litigation, business disruptions, fraud.
- **Catastrophe risk** – risk with rare occurrence with massive destruction of property, lives, environmental or economy sphere.
- **Business risk** – risk of adverse changes in volume, costs and margins.

## 2 Financial Markets under Pandemic Situation

Pandemic situation caused lot of issues to all insurance companies worldwide and main problems are not health related risks as one might think, but issues coming from the financial markets. Pandemic COVID-19 caused historical drop on the Wall street with volume of -11 % on the 24<sup>th</sup> of February in 2020 [13] and the drop was the worse from the financial crisis in 2008.

S&P 500 is stock index (see Fig. 1.) containing equities of the 500 largest traded companies in the United States and one of the world's most important stock indices. Average day-end value of the S&P 500 index (1<sup>st</sup> January 2019 – 30<sup>th</sup> June 2020) is 2939.43 USD. On the March 23<sup>rd</sup>, 2020 value of the index decreased to 2237.39 USD (almost 24 % decrease). Interesting thing is that on February 19<sup>th</sup>, 2020 index reached one and half-year's maximum with value of 3386.15 USD. [17]



**Fig. 5.** S&P 500 index evaluation from 1<sup>st</sup> January 2019 to 30<sup>th</sup> June 2020 with significant drop on 23<sup>rd</sup> March 2020. [17]



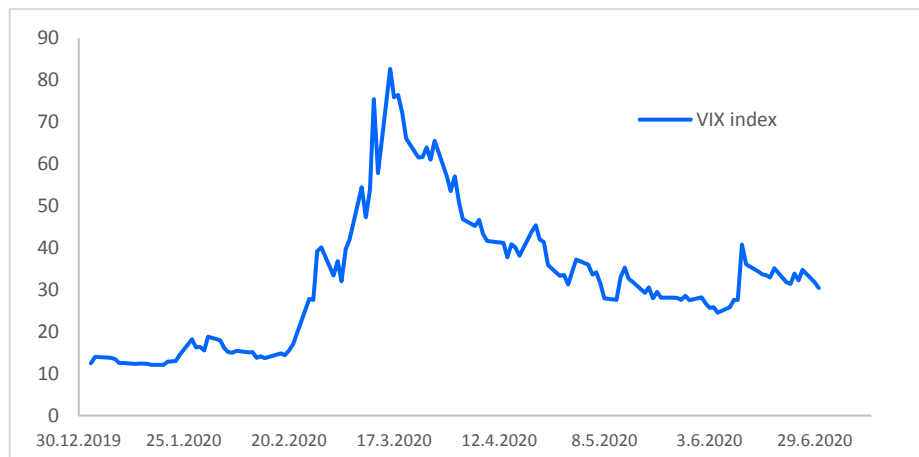
Newly raised term “2020 Stock Market Crash” defines global market crash starting on February 20<sup>th</sup> of 2020 which caused historical declines since great recession in 2008 and extreme volatility. Combination of COVID-19 pandemic statement and oil price war between Russia and Saudi Arabia will be forever known as “Black Monday”, March 9<sup>th</sup> of 2020. [1]

Insurance companies assume huge amounts of money coming from premiums and most of them are invested on the financial markets. Wide combination of the financial instruments with different sensitivities to market movements and/or with different maturities allow insurance companies to stay solvent in different unexpected situations. Worldwide pandemic situation shown us how strongly are insurance risk types connected with financial industry. Especially market risk is one of the most sensitive risk types. Market risk is suggestible by financial markets movements, political and regulatory decisions, catastrophic events (including terrorist attacks) and last but not least, by the volatility of risks mentioned above.

## 2.1 Volatility

One of the main drivers of solvency inconsistency in pandemic situation is volatility of the financial markets factors (e.g. exchange rates, indexes and yield curves). Generally, volatility can be defined as a statistical measure of the variance in value for a particular asset, market index or interest rate and sometimes is called “standard deviation of the returns”. Volatility is the degree to which the observed variables move around their mean value. In general, the greater the volatility is the higher the risk is

Figure 2. shows us evaluation of the VIX index which measures the expectation of stock market volatility over the next 30 days implied by S&P 500 index options.

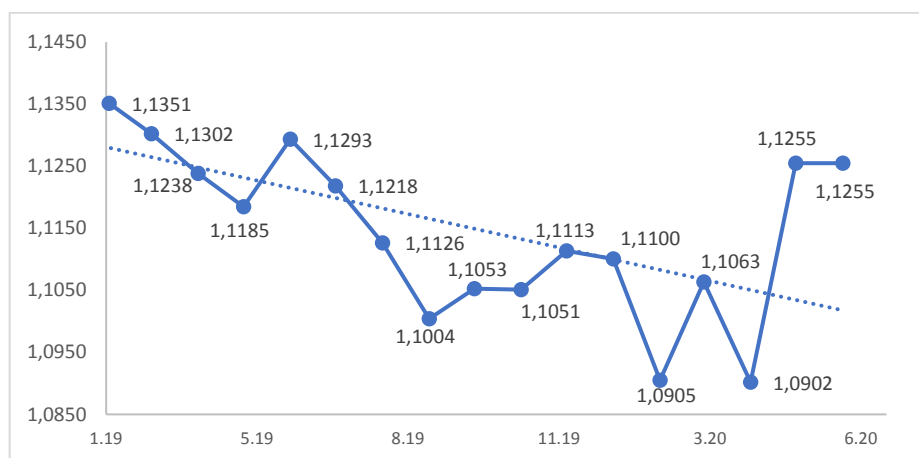


**Fig. 6.** VIX index (CBOE Market Volatility Index) evaluation from 1<sup>st</sup> January 2020 to 30<sup>th</sup> June 2020 with significant increase on 16<sup>th</sup> March 2020[3]

### Exchange rates volatility

How do exchange rates should negatively impact the insurance company? Most of the international insurance companies have business also in Euro, Swiss Franc or British Libra currency-based countries. Movements in exchange rates to United States Dollar with negative impact (view as decrease in local currencies to global currency) means that present value of actual reserves/premiums/investments in global currency are lower what cause increase in exposures and basically increase in many risk types of the company.

Exchange rates and yield curves are the most plumbed economic assumptions in economic capital modelling therefore volatility in these assumptions are dangerous for the correct quantification of capital and solvency level.



**Fig. 7.** EUR to USD average exchange rates evaluation from 1<sup>st</sup> January 2019 to 30<sup>th</sup> June 2020[9]

Same as in S&P 500 index development (see Fig. 1) we can see significant drop on February 20<sup>th</sup>, 2020. Uncertain situation is difficult mainly for intercontinental insurance companies with business and investments in Euro (or other) currency countries reporting numbers in foreign currency, especially global currency United States Dollar.

### Yield Curves and Interest rates

Yield curve is kind of illustration of the evaluation of the interest rates with changing maturities and we can say that this curve is a base for all models and calculations (including capital modelling) inside the insurance company. Interest rates data are available on the markets until the last liquid point (the latest time point for usage of market data) and from this date are curves usually extrapolated by Wilson-Smith method. Specific approach is defined in the methodology of the insurance company and confirmed by a regulator.

### 3 Required Capital Calculations and Solvency Sufficiency

Main interests of the partners and investors are solvency condition, ratings of the company and business operating profit. These three indicators can disclose if company is healthy enough, whether its business continues to grow and how securely other institutions see the company.

One of the most important indicators of the health condition of the insurance company is solvency ratio. Solvency ratio reflects both sides – if investments a company has available are big enough and if the capital required to cover unexpected claims (with set-up probability level) is not too high. If the situation with low available capital and high required capital happened, it means that insurance company has raised claims and raised risk. Nowadays we are in a situation where both sides of the ratio were affected by the pandemic – available sources decreased due to lower interest rates and required capital part increased due to raising claims, exposures, etc.

We've prepared short introduction to solvency ratios calculated in Zurich Insurance Group, Ltd., one of the biggest insurance companies worldwide. International insurance company calculates solvency ratios based on internal model for three methodologies: Swiss Solvency Test (SST), which is required by Swiss regulator FINMA, Solvency II methodology and internal approach – Zurich Economic Capital Model (Z-ECM).

#### 3.1 Zurich Economic Capital ratio

Zurich Economic Capital (Z-ECM) ratio defines if Zurich's market value balance sheet remains solvent over a one-year time horizon given a certain level of probability (99.95 %) following unexpected adverse events. The 99.95 % is chosen in line with Zurich's "AA" target rating. Z-ECM ratio is calculated as:

$$Z - ECM \text{ ratio} = \frac{AFR}{RBC}$$

where

- *AFR (Available Financial Resources)* are those resources company considers to be available to cover policyholder liability claims in excess of their expected value in a stress scenario;
- *RBC (Risk Based Capital)* is capital required to protect company's policyholders against any economic insufficiency to meet their claims over a one-year time horizon due to the risks assumed by the Group from all its activities at 99.95 % confidence interval.

In other words, risk-based capital defines the amount of unexpected losses which might impact the market value of the group balance sheet what translates the risk into amount of capital required to provide protection against risks at 99.95 % probability.

### 3.2 Swiss Solvency Test ratio

Swiss Solvency Test (SST) determines a quantitative solvency condition in the form of a comparison between risk-bearing capital and target capital. If in the one-year period from the reference date an insurance company adheres to its own realistic business plan, there should be a high probability of it being able to meet its existing insurance liabilities at the end of the one-year period without taking on new business.[6]

In other words, the SST defines the minimum amount of economic capital an insurance company must have available. This amount is determined based on the risks the company assumes. The higher the risks are, the larger its capital requirements will be. Swiss Solvency Test ratio has defined formula in certain way:

$$SST\ ratio = \frac{AFR - MVM}{TC - MVM}$$

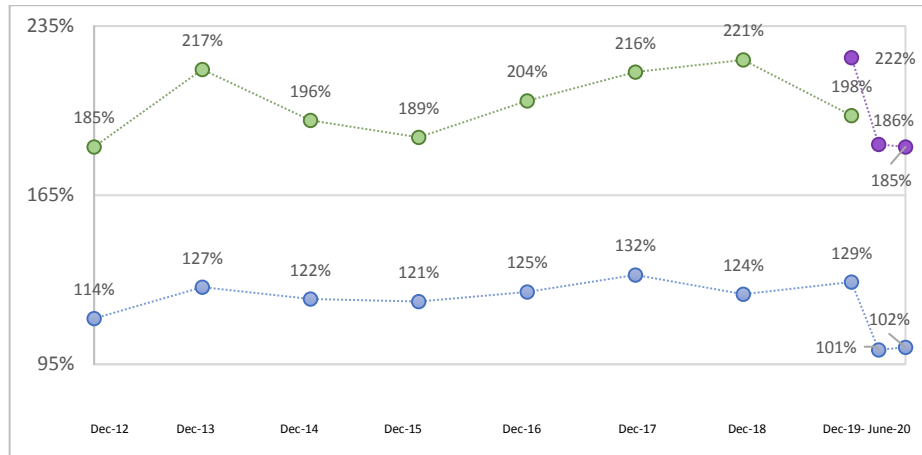
where

- AFR (*Available Financial Resources*) are those resources company considers to be available to cover policyholder liability claims in excess of their expected value in a stress scenario;
- TC (*Target Capital*) – FINMA (Swiss regulator) determines capital requirements in such a way that an insurance company will remain financially unscathed even when faced with a once-in-a-century negative event; capital calculated in this way is referred to as target capital;
- MVM (*Market Value Margin*) – smallest amount of capital which is necessary in addition to the best-estimate of the liabilities, so a buyer would be willing to take over the portfolio of assets and liabilities.

Unlike the Zurich Economic Capital ratio calculation, market value margin is deducted from both parts of the calculation. Target capital is modelled using Expected shortfall 99 %. Zurich Insurance Company modelled both ratios on the same – risk-free yield curves but this was changed to yield curves requested by the regulator which put the insurance company to more comparable position to other companies on the market.

### 3.3 Real impact in numbers

In this sub-chapter we will summarize impacts of the COVID-19 pandemic situation connected with financial markets issues onto insurance companies. Most important indicator of the companies' health condition is solvency ratio. In this solvency ratio information are interested in all partners of the insurance company – investors, banks, clients, media, e.g.

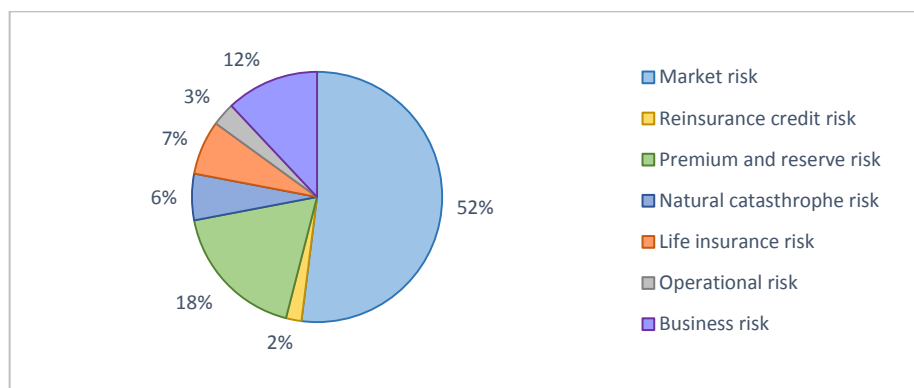


**Fig. 8.** Evaluation of Zurich Economic Capital Model ratio and Swiss Solvency test ratio (with change in approach from old Yield curves (“SST old YC”) to FINMA’s Yield curves (“SST new YC”)) in years 2012-June 2020.[8]

As mentioned in previous chapter, ratios differ on the methodology used for the estimations and calculations and we will show impacts on the financial results of the Zurich Insurance Group, Ltd.

Zurich Economic Capital Model ratio decreased from 129 % in end-year 2019 to 102 % in 2020 half-year (101 % quarter year) what makes almost 21 % drop. Development of the Z-ECM ratio was mainly caused by [8]:

- increase in business profit with volume of 3 %;
- 33 % decrease due to market changes;
- 4 % decrease due to dividend accrual and other – non specified changes, increased ratio up to 8 %.



**Fig. 9.** Z-ECM Risk Based Capital estimated for end-June results by risk types.[8]

**Life Insurance risk**

Life risk will be one of the most impacted risk types. Raised mortality with absolute uncertainty of the future mortality rates development creates many questions for mortality modelling. Nevertheless, Continuous Mortality Investigations (CMI) proposes to do not weight on 2020 data for next mortality projections. [4]

**Catastrophe risk**

Risk of significant deviations from the assumption over a short term due a sudden, temporary catastrophic event (also natural catastrophic). A mortality pandemic has been identified as the sole biometric catastrophe event that could materially affect Zurich capital. Increase in pandemic related claims will increase the required capital.

**Market risk**

The main sensitivities in market risk such as negative movements in interest rates, credit spreads and equities increase the risk. Decrease in interest rates negatively impacts asset-liability surplus (mainly increase the liabilities value) what causes increase in market risk, so that increase of required capital (risk-based capital or target capital depending on the methodology approach).

**Premium & Reserve risk**

Increase in risk cause increase in required capital if volatility of premiums and reserves increase, exposures increase, reinsurance volume decrease what is typical in pandemic situations and decrease in discounting, e.g. decreased present value of accumulated reserves.

**Operational risk**

Indicators which increase operational risk and similarly also required capital are increases in number of loss events (frequency parameters) and worse loss frequency, median of observed losses (severity) and observed loss amounts.

**Credit risk**

Increase in exposures and decrease in ratings (what is seen nowadays after financial markets drops) increase the credit risk and similarly the required capital.

**Conclusion**

In the article we summarised how the COVID-19 pandemic situation impacts insurance companies, how affects risk types an insurance company faces to and we described sources of the insurance losses. Lloyd's economic study estimated that reduction in the

investment values and underwriting losses takes creates 203 billion [12]. We focused on international business insurance companies with interests mainly in required capital modelling and solvency sufficiency. We suppose that consequences of the COVID-19 pandemic will be present in the insurance business for many years. Possible long-term consequences we expect are raising mortality, uncertainty in future health conditions of ones who overcame the disease, legal proceedings due to property losses (e.g. business interruption or workers compensations) or implementation of “Protection gap” recommended by OECD.

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## Gender as a Predictive Factor for Money Attitudes

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**Abstract.** The goal of this research was to investigate and summarize relations between gender (as a biographical factor) and money attitudes as evidenced by the relevant literature. As indicated by the research results, gender is considered as an independent variable which can predict certain money attitudes. Males focused stronger on the power-prestige aspect of money while females showed higher anxiety-oriented and retention-time/saving-oriented money attitudes. Moreover, gender-specific investment patterns were found. Males generally were more obsessed with money, they followed a stronger materialistic approach and showed a higher willingness for taking moral risks. Males further attached less relevance to effort and ability as prerequisites for acquiring money. The identified relations are of practical relevance for developing more efficient, gender-adjusted business strategies (e.g. in the context of marketing activities).

**Keywords:** money attitudes, gender, MAS.

**JEL classification:** D 14, G 50, J 16

### 1 Introduction

We use money in the one or the other way every single day. It can be assumed that most people would agree with the statement that money is of personal importance to them. Thus, it seems worth taking a closer look at the role of money from a psychological viewpoint.

From a practical point of view, money allows individuals to acquire goods, services, energy and time [1]. But behind these obvious functions money represents a source for strong feelings like joy and anxiety. Moreover, this feelings can accumulate on high levels: In such cases individuals experience money-related joy like human love or money-oriented anxiety comparable to the anxiety of impending death [2].

Such individually perceived importance of money is a result of our expectations which we relate to money. As a result, money manifests as a powerful driving force in our lives [3]. It appears not unrealistic that e.g. persons remain in an unsatisfactory professional situation because of a prospected monetary reward in the mid-term

perspective. However, the motivation for extra hours, neglecting one's private life or risking one's personal health is not money per se. In fact, the indirect (and maybe unconscious) driving forces are the aforementioned promising feelings which are linked to the expectation of future possession. For example, despite current job-related disadvantages, having the future ability or chance to purchase a mansion in a wealthy district could be a possibility to demonstrate one's (future) power and success and to receive high recognition in the personal environment.

In contrast, anxiety can act as a negative driving force in the context of money: Persons who are threatened by poverty in some cases are willing to commit property crimes to reduce their money-related anxiety.

## 2 Literature Review

As illustrated in the examples above, a wide range of reasons provides the basis for the human strive for money, wealth and possession. This strive can be ascribed to four human money-related main emotions [4, 5]:

- Money provides an emotional lifejacket or a security blanket against anxiety. A strong focus on this security dimension of money leads to behavior like compulsive saving, fanatic collecting or distrustful attitudes towards others. For example, an individual with a pronounced anxiety-related money attitude could show a long-lasting and disciplined savings behavior without specific financial goals (like certain investment or consumption purposes). The accumulated reserves then are rather kept in a safe place instead of using them for generating interest or other financial return.
- Money also is strongly associated with feelings of love for some individuals. In that case, money is used for obtaining self-worth and loyalty: Such a love-related money attitude might predominate in case of the stereotypical image of an elderly multi-millionaire who surrounds himself with multiple young photo models.
- Furthermore, money is the ideal instrument for demonstrating power, importance, control and domination. Besides, personal advantages could be gained by targeted and calculated use of money (e.g. in the case of bribery or corruption). For example, having such a power-oriented money approach seems almost required for certain positions in the political, social and economic life. Money is strongly related to power and prestige for the individual, e.g. in case of purchasing luxury branded goods to impress others.
- Another less obvious, money-related emotion is freedom. A sufficient financial backup allows individuals to focus on their personal interests. The burden of a regular, maybe unsatisfying, professional situation disappears. Instead of such limitations, individuals could gain independence and possibilities on base of sufficient monetary reserves. This freedom-related money approach might be the main factor for individuals who pursuit a

frugal lifestyle with the simultaneous goal of maximizing personal autonomy and independence.

Closely related to those feelings are our attitudes as learned predispositions referring to certain objects (e.g. money). Such (money) attitudes remain consistent and persistent in a favorable or unfavorable way [6]. Money attitudes refer to individual fantasies, wishes and fears. They link money to distortions and denials and connect it towards our impulses and defense against impulses [3].

A widely used instrument for measuring money attitudes is Yamauchi and Templer's money attitude scale (MAS). The similarities with the MAS factors support the relevance of the aforementioned money-related emotions: Based on 29 (finally remaining) items, the four MAS attitude factors power-prestige, retention-time, distrust and anxiety were identified [7].

Attitudes can predict behaviors in many cases, yet not always. The existence and extent of an attitude-behavior relationship depends on the investigated field, past experience, accessibility to attitudes, confidence, change of attitudes, attention, exposure to information as well as past behavior [8, 9, 10].

Hence it must be concluded that a relation between predictive factors for money attitudes and a certain (financial) behavior does not exist necessarily.

Past research has identified age, gender, educational level as well as the cultural background as particularly relevant biographical factors which potentially influence our money attitudes [11]. Study results which refer to gender as a relevant biographical factor were identified in the research process and are further summarized in this paper.

### **3 Methodology**

A systematic literature review was conducted to identify and describe gender as a predictor for money attitudes.

Scientific databases were used as relatively comprehensive sources on base of referring search terms. Moreover, the relevance of the sources (impact factors, journal quality, citation rate) was considered in the analysis. The relevant study results were described in tabular form. These results then were clustered together systematically on base of the identified gender-dependent variables.

However, it must be pointed out that further (biographical but non-gender-related) predictive factors exist, which are not included in this contribution.

### **4 Results and Discussion**

The relevant research findings which indicate the relevance of gender as a predictive factor for certain money attitudes are described in the following table:

**Table 1.** Gender as predictor for money attitudes.

Sources	Gender-related results
Chi and Banerjee, 2013 <i>United States</i> ( <i>n</i> = 224 students)	<b>Gender and anxiety</b> The research results indicate different results, but with the overall tendency that females comparatively stronger focus on the anxiety and worrisome aspect of money.
Fünfgeld and Wang, 2008 <i>Switzerland</i> ( <i>n</i> = 1,282 adults)	The US study among a sample of bicultural college students showed that females felt significantly more anxious and worrisome in the context of financial insecurity, while no gender-related differences were found for the other money attitude dimensions.
Lim et al., 2003 <i>Singapore</i> ( <i>n</i> = 605 adults)	In addition, in the Swiss study three times more females than males were classified in a cluster of “anxious spenders” (insecureness about financial matters, need for precautionary saving).
Özgen and Bayoğlu, 2005 <i>Turkey</i> ( <i>n</i> = 300 students)	The female tendency for an anxiety-pronounced money attitude was verified again (e.g. stronger fears regarding the future living standard or the country’s economic situation in the future) in the Turkish study. Women in this study also showed less interest in money-related issues together with a tendency to more easily spend money. Remarkably, the opposite was the case in a Singaporean sample of 605 adults. Men in comparison with women were more anxious in terms of their finances. The authors of the study explain this contrary result by the family responsibilities of males in Singapore (role of the family breadwinner).
Baker and Hagedorn, 2008 <i>Canada</i> ( <i>n</i> = 200 adults)	<b>Gender and power/prestige/success</b> In the analyzed studies, male individuals showed a more pronounced focus on the power-related money attitude dimension. They further valued the general importance of money in their lives higher. Males, in contrast to females, also were found to rather perceive money as a measurement for successfulness.
Hanashiro et al., 2004 <i>Japan, United States</i> ( <i>n</i> = 208 + 170 students)	The Canadian study (which was based on MAS items) showed a comparatively weaker focus of females on the power-prestige aspect of money.
Lim et al., 2003 <i>Singapore</i> ( <i>n</i> = 605 adults)	Moreover, the intercultural comparison study between Japanese and US students proved the pronounced male perception of money as a symbol of power and as a tool for controlling others in both (western and oriental) societies.
Sabri et al., 2006 <i>Malaysia</i> ( <i>n</i> = 120 adults)	
Simkiv, 2013 <i>Ukraine</i> ( <i>n</i> = 246 adults)	

Watson et al., 2004  
*United States*  
 (n = 418 students)

Chavali and Mohanraj, 2016  
*India*  
 (n = 101 adults)  
 Furnham, 1985  
*Great Britain*  
 (n = 256 adults)  
 Hanashiro et al., 2004  
*Japan, United States*  
 (n = 208 + 170 students)  
 Lim et al., 2003  
*Singapore*  
 (n = 605 adults)

Furnham, 1984  
*Great Britain*  
 (n = 256 adults)  
 Lim and Teo, 1997  
*Singapore*  
 (n = 152 students)  
 Sabri et al., 2006  
*Malaysia*  
 (n = 120 adults)

The Singaporean study results also support the findings above, as Singaporean males more likely than females showed a power-oriented money attitude.

Comparable results were found in the Malaysian study: Males significantly stronger focused on the power-related money aspect and they were more obsessed with money, while no significant gender differences were identified in the other money dimensions.

The Ukrainian study also found that males significantly stronger perceive money as a measurement for successfulness in life as well as a tool for influencing other people.

Furthermore, the US study among students showed significantly higher narcissistic power-oriented money attitude scores for the males in the sample.

#### **Gender and saving/time-retention**

A comparatively higher relevance of the saving and budgeting money dimension was found for females repetitively. Females in general rather tended to focus on the future-oriented saving/budgeting dimension of money than males.

In the Indian study, which investigated differences in investment patterns, gender was identified as the only relevant demographic factor with an impact on the preferred form of investment. Men in particular preferred life insurances while females favored gold as investment form. Furthermore, men strongerly tended to invest in risk-associated products.

The British study results indicated that women, significantly more than men, invested with a future-oriented focus on retirement pensions, prevention in the case of illness, children education and holidays.

In the intercultural study between Japanese and US students as well as in the Singaporean study, the results suggested more stable saving attitudes for females with a stronger focus on the budget/retention money dimension in general.

#### **Gender and money obsession**

In close relation to power/prestige/success, males seems to be more obsessed with money and use money rather as an instrument for comparison and evaluation.

The gender comparison in the British study showed that males generally were more obsessed with money in comparison to females. Though, in the same study also females with strong Protestant work ethic beliefs (discipline, hard work) were found to be strongly obsessed with money.

Furnham, 1984 <i>Great Britain</i> ( <i>n</i> = 256 adults)	Furthermore, the Singaporean and the Malaysian study both identified a stronger obsession with money for the male participants in the samples. <b>Gender and conservative/retentive money attitudes</b> A strong conservative and retentive money attitude (closely connected/overlapping with the saving/time-retention money attitude) was found for females with a higher educational level as well as for elderly females in the British study.
Furnham, 1984 <i>Great Britain</i> ( <i>n</i> = 256 adults)	<b>Gender and effort/ability</b> Effort and ability, more by women than by men, were perceived as main prerequisites for acquiring money (especially by females with strong Protestant work ethic beliefs) in the British studies. In general, women rather were convinced that money can be accumulated through effort than simply by random change.
Furnham and Okamura, 1999 <i>Great Britain</i> ( <i>n</i> = 277 adults)	<b>Gender and materialism</b> In this British study, in contrast to other existing literature, no significant gender-related differences were found regarding the materialism dimension. Furthermore, both genders show comparable values for negatively money-related emotions.
Furnham and Okamura, 1999 <i>Great Britain</i> ( <i>n</i> = 277 adults)	<b>Gender and moral risks</b> A close connection to the gender differences in the context of power/prestige seems indicated for the following finding: British females, rather than males, were less prepared to take moral risks in the context of money.

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Sources: [1, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24]

The results in the table refer to the effect of gender on money attitudes. One major issue regarding the results is the description of the dependent variables. Some of those variables are money attitudes by definition (e.g. based on the MAS testing instrument: anxiety or power-prestige) while other variables show less overlapping with money attitudes (e.g. moral risks). However, this diverse approaches permit new insights, but with the restriction of inconsistency in terms of the dependent variables.

The derived findings can be summarized on the meta level: In most studies (except in one), women seemed to dispose over stronger anxiety-related money attitudes than men [15, 15, 20, 21]. Also a stronger saving/budgeting-oriented (retention-time-oriented) money attitude was found for women in the studies investigated [1, 13, 17, 20]. Women also stronger believed in the relevance of effort and ability as a factor for financial success [16, 18].

On the contrary, the overall picture based on the study results indicates that males focused comparatively stronger on power and prestige in the context of money perceiving money as an instrument for acquiring and measuring influence or success [1, 12, 20, 22].

Comparable gender-specific results (especially for power-prestige and retention-time) were found in many aspects in a MAS-based study which was conducted by the author among Austrian Business Education students [25].

A main reason for this difference might can be found in the different socialization of females and males and in gender stereotypes. Furthermore, different sociocultural environments might be a relevant influencing factor. Females are strongerly than men in the role of taking care about the family in a protective way in many cultures. This could implicate a more pronounced risk-avoiding (and therefore a stronger female orientation towards anxiety and retention-time/saving) behavior, which might be also the case in money-related issues. Males in many cultures by comparison are socialized based on the picture of a male stereotypical image, which idealizes the male strive for power, success, influence and prestige.

## 5 Conclusion

This research investigates the existence of gender-related money attitude differences through a comprehensive literature analysis. The main gender-related results of the selected studies were summarized and clustered on base of the identified gender-dependent and money-related variables to provide a systematic overview on the meta-level.

Results indicate that males showed a higher power-prestige and success-oriented money attitude. Furthermore, woman focused stronger on the time-retention and saving dimensions of money and they showed a more anxiety and worrisome money attitude. Remarkably, those differences occurred across different cultures (except the stronger male anxiety-orientation in a Singaporean study).

Possible causes might be found in gender stereotypes, sociocultural socialization and education. Further research should investigate the factors which contribute to the development of such gender differences. Further additional biographical factors (e.g. educational background and age) must be considered for completing the picture of relevant money attitude predictors.

The findings from a commercial perspective are of practical relevance for the development of target-oriented and thus more efficient gender-specific business strategies. For example, marketing strategies could be consequently adjusted toward gender specific money attitudes.

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## Students Behaviors and Attitudes Towards Environmentally-friendly Products

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**Abstract.** Today's advanced economies facing the big challenges. They have to integrate environmental sustainability with economic prosperity, diminishing the environmental damage caused by economic growth. Concerning sustainable development, the goal is the quality of life for everyone, today and in the future. The aim of the paper was to clarify behaviors and attitudes to sustainable consumption of consumers. Analysis of secondary data from Flash Eurobarometer (2012) was realized to achieve the aim. We supplemented the secondary data with primary data obtained by the standardized query method. We found out that 63% of students sometimes buy environmentally-friendly products. There is protentional segment of future buyers of environmentally-friendly products – 16% of students. Purchases of environmentally-friendly products are more typical for students who work during study. The most purchase environmentally-friendly products is food stuff, drugstore goods, textiles and clothing. The highest impact on the purchase has product quality, impact of the product on the environment and price.

**Keywords:** environment, environmentally-friendly products, students

**JEL classification:** M30, Q50

### 1 Introduction

The big challenge facing today's advanced economies is to integrate environmental sustainability with economic prosperity, diminishing the environmental damage caused by economic growth and thus creating “more with less”.

Concerning sustainable development, the goal is the quality of life for everyone, today and in the future. To ensure that design and product development progresses in the right direction, we need to include a holistic perspective that includes environment, people, economy and culture [10].

In 2015, the European Commission put forward a package to support the EU's transition to a circular economy. Three years after adoption, the Circular Economy Action Plan can be considered fully completed. According to the findings of the report,

implementing the Circular Economy Action Plan has accelerated the transition towards a circular economy in Europe. In 2016, sectors relevant to the circular economy employed more than four million workers, a 6% increase compared to 2012. Circularity has also opened up new business opportunities, given rise to new business models and developed new markets, domestically and outside the EU. In 2016, circular activities such as repair, reuse or recycling generated almost €147 billion in value added while accounting for around €17.5 billion worth of investments [4].

In today's competitive environment, "innovation" serves as a competitive advantage that allows companies to dominate particular market segments. With respect to corporate strategy, innovation is not only the key to extended market share, but also the key to increased commercial gains [1]. Recent studies in several countries or regions (including the EU territory) point to the fact that, in general, around 55-60% of the innovations include environmental benefits, that contribute to sustainability and sustainable growth. This implies that eco-innovation is already an integral part of design and innovation activities both within and outside businesses [8].

Research from Tukker [9] suggests that the three domains of mobility, housing and food are responsible for 70–80% of the lifecycle environmental impacts of society. Within these domains particular forms of activity are identified as especially problematic, including car and air transport (in mobility); heating/cooling, appliance use, building and demolition (in housing); and in the domain of food, the burden associated with animal-based agriculture and the production and consumption of meat. Maccioni, Borgianni, and Basso [7] studied value perception of green products. Green products, for which participants required greater efforts in the search for relevant information, boost the value attributed to creative solutions still believed of high quality. This effect is significantly more evident for participants showing remarkable interest for sustainability issues. Conversely, alternative products feature greater value perception because they are acknowledged to be functional and reliable.

Haned [6] in the survey found that, for 45% of the responding companies, ecodesign has a positive effect on the bottom line, in absolute terms, while the effect was neutral for 51 %. From a social standpoint, ecodesign is a thus win-win solution, as it generates environmental benefits for all, without any negative impact on profitability. For a large portion of companies, the ecodesign approach also has positive, non-financial impacts, like improved reputation and recognition.

Cerri et al. [3] stressed the importance of making information about product's sustainability accessible, especially because the lack of information is perceived as a major limitation presently. Indeed, research has shown that when potential consumers are explicitly asked about sustainability issues, the declared interest in environmental issues and the actual purchasing behavior are often inconsistent [2].

## 2 Methodology

The aim of the paper is to clarify behaviors and attitudes to sustainable consumption of consumers. Analysis of secondary data from Flash Eurobarometer 367 was realized to achieve the aim. We supplemented the secondary data with primary data obtained by

the standardized query method. The primary survey was aimed at students of the University of Economics and was attended by a total of 50 respondents and data were collected in June 2020.

The fieldwork for Flash Eurobarometer 367 [5] was carried out by TNS Political & Social network in the 27 Member States of the European Union and in Croatia between 4th December and 10th December 2012. 26,573 citizens were interviewed.

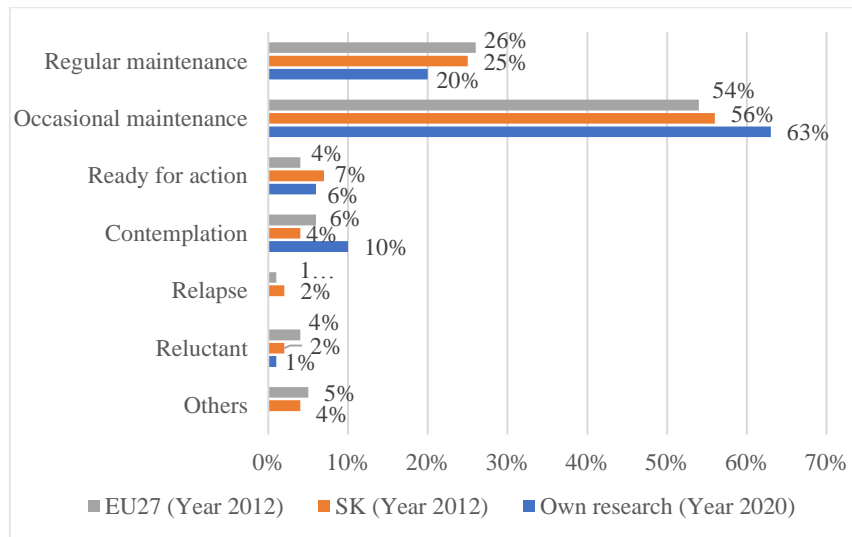
### 3 Results and discussion

Respondents were asked about their behavior towards environmentally-friendly products in general. By environmentally-friendly products or green products we mean products that have a less negative impact on the environment during production, in terms of use and disposal compared to other products [5].

From this, they were categorized into one of six behavior stages:

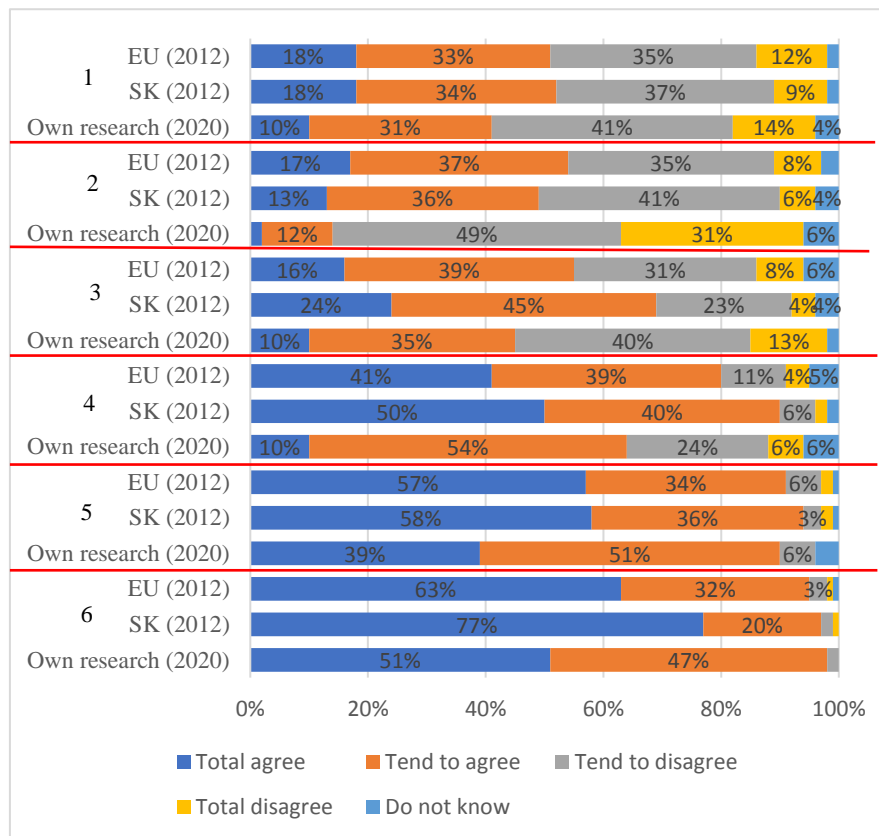
- Regular maintenance: the respondent often buys environmentally-friendly products;
- Occasional maintenance: the respondent sometimes buys environmentally-friendly products;
- Ready for action: the respondent does not buy environmentally-friendly products but definitely intends to do so in the future;
- Contemplation: the respondent does not buy environmentally-friendly products but may do so in the future;
- Relapse: the respondent used to buy environmentally-friendly products but stopped;
- Reluctant: the respondent does not buy environmentally-friendly products and does not intend to do so [5].

The most of consumer are occasional buyer of environmentally-friendly products (Fig. 1). In EU was 54% of respondents occasional buyer, in Slovakia it was 56%. From our survey we found out that 63% of students sometimes buy environmentally-friendly products. With segment of regular buyers is the number higher. In EU 70% of respondents buy environmentally-friendly and in Slovakia it is more than 70% of respondents. More than 80% of students buy environmentally-friendly products, but students are more likely occasionally buyers. This can caused the income, which can be lower than the income of working consumers.



**Fig. 1** Purchase of environmentally-friendly products. Source: own processing based on Flash Eurobarometer (2012) and own research.

Slightly more than half of EU citizens think that environmentally-friendly products are easy to differentiate from other products (51%), with 47% disagree (Fig. 2). Slovak citizens have nearly the same opinion on this fact. 52% think that environmentally-friendly products are easily differentiate form other products. But less Slovak students agree with this statement (41%) and 55% disagree that environmentally-friendly products are easily differentiate from other products. More than half of Europe citizens (54%) think that environmentally-friendly products are easily available in shops. But less than half of Slovak citizens (49%) think that too, disagree with this statement 47%. Only 24% of Slovak students from our survey think that environmentally-friendly products are easily available in shops. The reason can be that students shopping's are fast, and they have no time for searching environmentally-friendly products, or they shop in smaller shops where is not so rich offer.



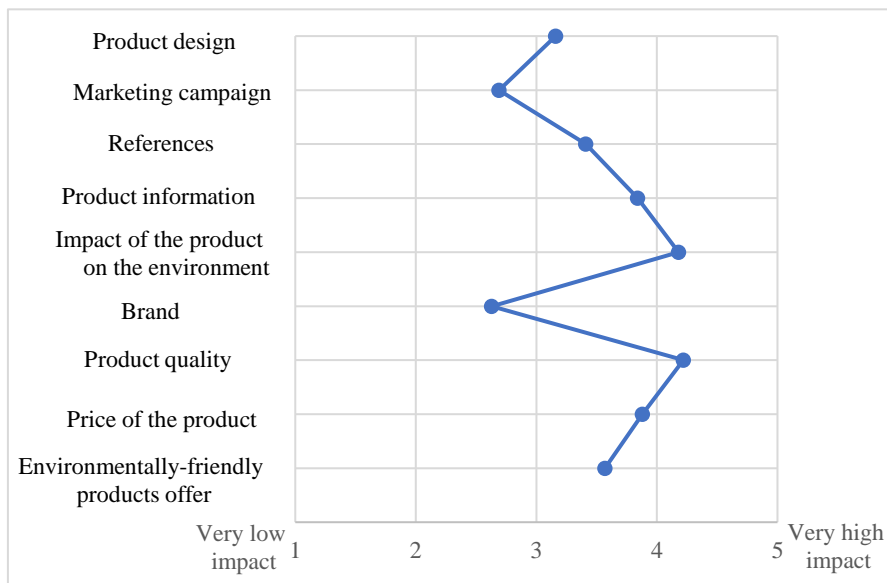
**Fig. 2** Purchase of environmentally-friendly products. Source: own processing based on Flash Eurobarometer (2012) and own research.

Explanatory Notes: 1 - It is easy to differentiate environmentally-friendly products from other products. 2 - Environmentally-friendly products are easily available in shops. 3 - Environmentally-friendly products are good value for money. 4 - Family or friends will think it is a good thing if you use environmentally-friendly products. 5 - Buying environmentally-friendly products sets a good example. 6 - Using environmentally-friendly products is the right thing to do.

More than half of EU citizens (55%) agree that environmentally-friendly products are good value for money (Fig. 2). Less than half of Slovak citizens (49%) and Slovak students (45%) agree with this. 80% of EU citizens have family or friends who think that using environmentally-friendly products is good thing. On Slovakia think that 90%. From our survey we found out that 64% of students have family or friends who think that using environmentally-friendly products is good thing. This lower number can be caused by the fact that students live without family in college where they have limited options, or they have limited budget for buying environmentally-friendly products. More than 90% of EU and Slovak citizens and also students think that buying

environmentally-friendly products sets a good examples. And more than 90% of EU and Slovak citizens and also students think that using environmentally-friendly is good thing.

In primary survey we wanted to find out how selected criteria impact students during their purchase of environmentally-friendly products (Fig. 3). The highest impact has product quality and then impact of the product on the environment. On the third place is price. The lowest impact on purchase has brand and marketing campaign.



**Fig. 3** Impact of selected criteria on purchase of environmentally-friendly products. Source: own processing.

The most purchase environmentally-friendly products is food stuff buy by 70.6% of respondents, than drugstore goods buy by 60.8% of respondents and textiles and clothing buy by 33.3% of respondents. Purchases of environmentally-friendly products are more typical for students who work during study.

## 4 Conclusion

The aim of the paper was to clarify behaviors and attitudes to sustainable consumption of consumers. The most of consumer are occasional buyer of environmentally-friendly products. In EU was 54% of respondents occasional buyer, in Slovakia it was 56%. From our survey we found out that 63% of students sometimes buy environmentally-friendly products. There is protentional segment of future buyers of environmentally-friendly products – 16% of students. Students are limited by their financial situation, so

in the future they can have higher income and then they will be able to buy more environmentally-friendly products.

Less than half of Slovak students agree that environmentally-friendly products are easily differentiate from other products and more than half of students disagree. And only 24% of Slovak students think that environmentally-friendly products are easily available in shops. It can caused that students purchases are fast and often in a small shops with limited offer, so they have no chance to find environmentally-friendly products. Producers could improve labeling of goods to make it more differentiate and easily to find.

The most purchase environmentally-friendly products is food stuff, drugstore goods, textiles and clothing. The highest impact on the purchase has product quality, impact of the product on the environment and price. On the other hand, the lowest impact has brand and marketing campaign. Producers should focus on the improving the quality of products and reducing the negative impacts of the production and consumption of selling products.

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## The impact of the tax-insurance burden on unemployment in terms of districts of the Slovak Republic

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**Abstract.** Unemployment is affected by several factors. This study focuses specifically on one of them - the impact of taxes on unemployment. The Slovak Republic, divided into districts, serves as a studied geographical area. Several authors have examined this issue, but mostly from an international perspective. Nevertheless, after adjustment, their approaches are taken into account in the calculations. The result is confirmation of the relationship under study, but a more in-depth examination is needed to determine causality. When calculating the tax burden, the influence of the non-taxable part of the taxpayer and its effect on the tax wedge is mainly used. After taking into account the econometric methods of several authors, regression analysis was preferred. It can be stated that the relationship provides economic policy makers with a wide scope for influencing unemployment, especially in regions with higher unemployment rates.

**Keywords:** Tax Burden, Unemployment, Districts of Slovakia

**JEL classification:** H 24, E 24, J 01

### 1 Introduction

Unemployment is affected by several factors. Their significance varies depending on the region, socio-political conditions, economic fundamentals. This study wants to focus on unemployment and the factors that affect it especially from a tax perspective. The price of labor and its net form depends, among other things, on the tax burden of labor. The calculations are based on the assumption that unemployment is affected by this burden. The analyzed geographical area is the Slovak Republic and its districts (okresy). Districts are administrative units that take into account smaller regional

divisions. A more detailed overview of wage levels and unemployment can be found in the appendix.

## 2 Literature review

Several authors solve the dependence between unemployment and tax rates, especially at the international level. These studies are part of the resource literature mainly for the analysis of the methodological approach, which they use. The studies should be divided into groups dealing with the impact of corporate tax and personal income tax. In order to examine econometric methods, there is presented a study by Zirgulis and Sharapovas, who examined the impact of corporate taxation on unemployment. They state that this is a highly speculated relationship, but generally little studied. The authors consider endogeneity and error in the methodology, as there is two-way causality, unemployment affects tax rates and vice versa. During recession, companies lay off employees and, based on this situation, the state adjusts fiscal policy through tax rates. At the same time, a change in tax rates may make it necessary to lay off employees or motivate them to increase their workforce. In econometrics to eliminate endogeneity, the GMM (Generalized Method of Moments) model or the Monte Carlo model, or other, may be preferred over the 2SLS model (two-stages least squares regression analysis).

$$Unemp_{i,t} = Unemp_{i,t-1} + \beta_1 Tax_{i,t} + \beta_2 X_{i,t} + \gamma_i + \varepsilon_{i,t} \quad (1)$$

$Unemp_{i,t}$	unemployment rate in the country and at time t
$Tax_{i,t}$	corporate tax rate
$X_{i,t}$	other control variables
$\gamma_i$	fixed effects
$\varepsilon_{i,t}$	error

Other control variables are not used in this study because some cannot be quantified regionally, or they are not relevant to national research or they are not statistically surveyed. The main new result of this research is the fact that an increase in the expected average corporate tax rate is associated with an increase in the unemployment rate. This relationship is robust. This study contributes significantly to the literature on the relationship between corporate tax and unemployment.[1]

Daveri, in his study, deals with the variables X, which are different in different authors. The biggest problems include the presence of undetectable and mathematically unquantifiable variables and the endogeneity of variables for regression. Most of the X indices are often the result of the aggregation of individual labor market characteristics, the extent of which has been evaluated by labor market experts in each country. The subjective and qualitative nature of such aggregate indices generally makes them susceptible to endogeneity and measurement errors and is difficult to update over time.

When assessing the wage and the impact of taxes on it, the channel of the impact of taxes on unemployment through wages should be tested and an equation can be created where the dependent variable is the wage growth rate and independent variables will be the change of personal income tax rate and a set of control variables (marginal

variables). such as replacement rates,[2] which is defined as the individual net pension entitlement divided by the net pre-retirement income, taking into account personal income taxes and social security contributions paid by workers and pensioners,[3] and the past unemployment rate and labor demand variables such as the projected rate of GDP per capita growth and total factor productivity,[4] calculated as the difference between the growth of output and the growth of a combination of all inputs, usually labor and capital.[5] Daveri and Tabellini estimate that the rate of change of the tax rate in continental European countries is 0,4, for the Scandinavian countries it is at the level of 0,2 and for the USA, Canada and Japan it is statistically 0.[6] Alesina and Perotti arrived at very similar results. the positive relationship between labor taxes and unit labor costs in the sample of annual data of 14 OECD countries and the difference compared to the previous study that Denmark is represented here instead of Spain. The estimated coefficients were again 0,4 for countries in continental Europe, 0,3 for other EU countries and zero for the USA and Canada.[7] Recent research with aggregated data has generally strengthened the case of the empirical link between income taxes and unemployment. However, whether the partial correlation formula is to be interpreted causally remains highly controversial.[8]

Dolenc, Laporšek and Šeparović solve the problem of the relationship between unemployment and the tax burden through a tax wedge using the OECD methodology. They calculate the tax wedge as the share of total taxes on labor income in the total labor costs paid by the employer. They also use regression analysis to calculate, but it is modified unlike previous authors to use the measurement of the tax burden through a tax wedge, and the equation has the following form:

$$UR_{i,t} = \alpha + \beta_1 TW_{i,t} + \beta_2 D_{i,t} + \beta_3 DTW_{i,t} + \Pi \begin{bmatrix} EPL_{i,t} \\ GDPpc_{i,t} \\ IR_{i,t} \\ LP_{i,t} \end{bmatrix} + e_{i,t} \quad (2)$$

$UR_{i,t}$  unemployment rate in the country and at time t

$TW_{i,t}$  tax wedge

$EPL_{i,t}$  unemployment protection index

$GDPpc_{i,t}$  gross domestic product per capita

$IR_{i,t}$  inflation rate

$LP_{i,t}$  work productivity

The parameter  $e_{i,t}$  determines stochastic errors. The variable  $DTW_{i,t}$  is calculated as a multiple of the tax wedge and the dummy variable  $D$ , which takes on the value 0 or 1, depending on whether it is a country with a high tax wedge (1) or a low tax wedge (0). All variables were logarithmized. In parallel, a panel regression analysis was repeated using the employment rate as a dependent variable.[9]

Lora and Fajardo examine the impact of taxes on wages and, ultimately, on unemployment and the labor market in Latin American countries. Until then, the given part of the world has been little researched in this area, so it is a unique research of 15 states of the mentioned region. The research leads to three main conclusions:

- Each tax has different effects, similar to empirical research in developed countries.
- The findings confirm the hypothesis that the effects of taxes on the labor force vary significantly between groups.
- Several aspects of the existence and functioning of institutions and their way of enforcing the Labor Code and tax laws are important.[10]

Buti and Noord examine, in particular, the impact of taxes on the budget deficit, the economic stability and the interconnectedness of tax systems with social systems in the payment of social benefits and unemployment solutions. They point to the fact of the effect of automatic stabilizers on disposable income. Taxes and subsidies affect the level of equilibrium unemployment and potential output.[11]

Meyer uses regression and the least squares model (OLS) in the analysis. The equation itself has a similar shape as in the above-mentioned works. Taxes are represented through the top marginal corporate tax rate (TMCITR) and as control variables are the urban population, population density, the share of government expenditure in GDP, the share of foreign direct investment in GDP and others. Countries are divided into clusters with a higher tax rate (average tax rate 35.9%) and a lower tax rate (average tax rate 27.7%).[12]

### 3 Methodology

The aim of this work is to examine the relationship between the unemployment rate and the tax burden of the districts (okresy) of the Slovak Republic. The methodology of the work is based mainly on the above-mentioned theoretical approaches. The source of basic data is from the survey of the Statistical Office of the Slovak Republic.[13] The year 2018 is the last year to have a complete database of data at the time of preparation of this paper (data for 2019 have not been completed), so it is the base year for the analysis. The main econometric method is the regression and least squares (OLS) method, as used in the Meyer study. This study uses the OLS method with respect to the assumptions of using this method. The problem may occur with a certain degree of autocorrelation of variables, but despite this fact, the OLS method is used in practice to calculate the investigated relationship, which is also evident from scientific studies of other authors.

The Slovak Republic is divided into 79 districts, including 5 districts of the city of Bratislava and 4 districts of the city of Košice. Districts are administrative units, but they do not have such subjectivity and bodies as higher territorial units. Districts primarily reflect the division of the republic into regions in which there is partially centralized population movement and economic life. Nevertheless, there is a migration of the population for work between districts, so centralization is only partial. This ultimately also affects the unemployment rate. For this study, however, this is not the primary problem of bias, it is mentioned because of possible questions.

The measurement of the tax burden follows from the Income Tax Act and the Social Insurance Act. The monthly wage is used as the basis for the calculation of taxes and levies, which includes benefits related to the basic wage determined according to wage

regulations, including the basic components of contractual salaries and wages for overtime, compensation of wages for time not worked, monthly and long-term bonuses, bonuses, fulfilment of evaluation criteria, allowances for overtime work etc. This wage is not an expression of real wages.[14]

From the above salary, social insurance is first calculated. As the wage statistical indicator used does not express the total labor costs and the super-gross wage, the employer's contributions are not taken into account, but only the employee's contributions. According to the Social Insurance Act, an employee pays 1.4% of his / her salary for sickness insurance, 4% for old-age insurance (the capitalization type of old-age savings called Pillar II is not taken into account here), 3% for disability insurance, 1 % for insurance in unemployment. For the purposes of the calculation on the basis of the legal definition of the assessment base, we take the statistically determined wage as the basis.[15] According to the Health Insurance Act, the rate per employee is 4%.[16] Together, health and social insurance contributions account for 13.4% of the assessment base.

According to the Income Tax Act, for the purposes of calculating the income tax base, taxable income is taken, which according to § 5 also includes the above-mentioned items and components of wages, from which social and health insurance contributions are deducted. Subsequently, the non-taxable part of the taxpayer's tax base (NČZDD) is deducted, which represents 19.2 times the subsistence minimum for a calendar month for the purposes of calculating monthly advances. As the statistical wages do not exceed 100 times the subsistence level, the above calculation is used. Other non-taxable parts of the tax base and tax bonuses will not be taken into account for the purposes of the calculation, as their claim is only optional after the relevant conditions have been met. It is not possible to assign these tax base adjustments from the database. The income of pensioners is also not taken into account if they also receive old-age insurance benefits at the same time as their salary. The tax rate is 19% or 25% of the tax base exceeding 176.8 times the amount of the applicable subsistence minimum. We do not exceed the given limit, so only a rate of 19% is considered.[17] The NČZDD in the amount of EUR 319.17 was used to calculate the monthly income tax advance.[18] For 2017, the NČZDD monthly was EUR 316.94.[19]

## 4 Results

To get to know the initial situation in the territory of the Slovak Republic, a table is given in the appendix - a basic overview by district on the registered unemployment rate and average wages before the payment of levies and taxes. The registered unemployment rate ranges from 1.68% to 16.15%. The districts with the lowest unemployment are Hlohovec, Galanta, Piešťany, Trenčín, Bratislava V and the districts with the highest unemployment rate are Vranov nad Topľou, Revúca, Rožňava, Kežmarok, Rimavská Sobota. These districts have long been among the districts with the highest / lowest unemployment rates. The average monthly wage before levies and taxes is in the range of 726 – 1 696 EUR per month. According to own calculation the amount of the real tax burden from above mentioned wage is in the range of 21.5% –

26.28%. The real amount of the rate is mainly affected by the non-taxable part of the taxpayer's tax base. This is a hypothetical amount, as it is not possible to assign and quantify other social elements in the tax system to average wages. This burden does not reflect the contributions paid by the employer.

#### 4.1 Linear regression

Regression was performed for analysis. The first model was a linear regression in the form:

$$Unemp_{i,t} = \alpha + \beta_1 Levies_{i,t} \quad (3)$$

$Unemp_{i,t}$  registered unemployment rate in 2018 for the relevant district

$Levies_{i,t}$  real rate of tax burden

Unemp2018	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Levies	-2.340231	.3397266	-6.89	0.000	-3.016714	-1.663749
_cons	61.43936	8.125848	7.56	0.000	45.25873	77.61999

The regression confirmed the negative relationship between the unemployment rate and the tax burden at a coefficient of -2,340231. This model as a whole is statistically significant at the 95% significance level. The variable itself is also statistically significant at a given level. This fact is in line with theoretical knowledge and was expected. The coefficient of determination ( $R^2$ ) was 0,3813.

#### 4.2 Regression with quadratic term for 2018

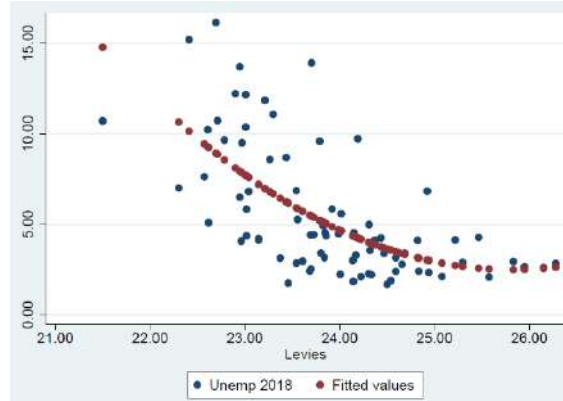
In order to try to prepare the most accurate regression in the next step, a quadratic regression with an equation in the form:

$$Unemp_{i,t} = \alpha + \beta_1 Levies_{i,t} + \beta_2 Levies^2_{i,t} \quad (4)$$

$Levies^2_{i,t}$  real rate of tax burden<sup>2</sup>

Unemp2018	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Levies	-34.01321	12.22203	-2.78	0.007	-58.35548	-9.67093
Levies2	.658616	.2540566	2.59	0.011	.1526185	1.164613
_cons	441.6305	146.8655	3.01	0.004	149.1225	734.1385

The regression with the quadratic term also has a similar result, again it is twice the statistical significance at the 95% significance level. The coefficient of determination ( $R^2$ ) was higher at 0,4316. This form of the model better reflects the given dependence between the variables. The following graph shows the predicted values for the registered unemployment rate in 2018 calculated from this model and the actual values of this dependent variable.



**Fig. 1.** Registered unemployment rate in % - Unemp 2018 (Y axis), predicted values of the registered unemployment rate in% - Fitted values (Y axis) to the real rate of tax burden for the year 2018 in % for the districts of the Slovak Republic

#### 4.3 Regression with quadratic term for 2010

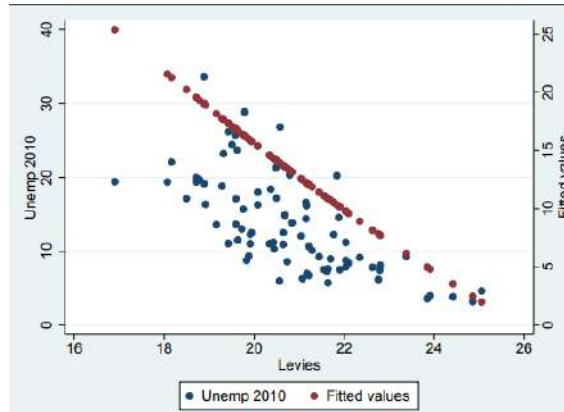
Data for 2010 were also processed for comparison. The given year represents a larger time lag from the observed year 2018. Employment policies have changed over time, various measures have been taken, but this year 2010 is characteristic as a year of efforts to continue the economy from economic crisis with a view to its recovery. Over a period of 8 years, there have been significant changes in the results of the economy, as well as in employment and household income. The regression analysis used the same formula as for 2018 in the form:

$$Unemp_{i,t} = \alpha + \beta_1 Levies_{i,t} + \beta_2 Levies^2_{i,t} \quad (5)$$

The result was the following values of the variables, which are displayed graphically:



Unemp2010	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Levies	-5.219974	6.443567	-0.81	0.420	-18.05345	7.613502
Levies2	.0560295	.152205	0.37	0.714	-.2471131	.3591722
_cons	97.59629	67.98796	1.44	0.155	-37.81346	233.006



**Fig. 2.** Registered unemployment rate in % - Unemp 2018 (Y axis), predicted values of the registered unemployment rate in% - Fitted values (Y axis) to the real rate of tax burden for the year 2010 in % for the districts of the Slovak Republic

In this graph, the adjustment of the y-axis is different compared to the previous graph. Fitted values have their own axis and are graphically shifted slightly upwards compared to the Unemp 2010 variable.

For the purposes of the calculation, the values of the variables were determined and calculated in the same way as for 2018. The statutory method of calculating the tax burden did not change in the observed period. The only change occurred when using a different value of the non-taxable part of the tax base per taxpayer, which was valid in the 2010 tax period.[19][20]

In 2010, the predicted values have an almost linear shape, as evidenced by the calculated coefficients. The coefficient of determination ( $R^2$ ) reached the level of 0.4708. However, significance is problematic for a given year, mainly due to the confidence interval. It follows from the given that the given relationship also applies in the long-term multi-year interval and the examined relationship also applies under changed economic conditions. Another possible solution is to use linear regression. Its results are statistically significant with a similar value of the coefficient of determination. The coefficient of the variable Levies reaches the value -2,8514.

#### 4.4 Delayed regression with quadratic term

Based on the work of other authors, the following regression uses the variable rate of the real tax burden in 2017 with an equation in the form:

$$Unemp_{i,t} = \alpha + \beta_1 Levies_{i,t-1} + \beta_2 Levies^2_{i,t-1} \quad (6)$$

Levies<sub>i,t-1</sub> real rate of tax burden in 2017 for the relevant district

Unemp2018	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Levies2017	-25.09838	9.807207	-2.56	0.012	-44.63112	-5.565633
Levies2_2017	.4853181	.2078351	2.34	0.022	.0713785	.8992576
_cons	326.6353	115.5844	2.83	0.006	96.42898	556.8416

A quadratic shape was used based on previous more accurate results. The regression with this control variable was aimed at finding out whether the change in the tax burden will only be reflected with a one-year delay. This could be explained by the fact that companies react only with a certain delay and the tax system reflects the previous year in its administrative actions. The statistical significance of the model is still within 95%. The coefficient of determination ( $R^2$ ) is at the level of 0,4338, which is a slight increase compared to the quadratic regression model with the variable Levies2018. The results of these regressions do not differ much, as there were no such significant changes in one year in the amount of wages and the tax system. Results similar to other authors were also confirmed in this work.

#### 4.5 Regression with surrogate dependent variables

Subsequent regressions examined the possibility of replacing the variable Unemp2018 with variables for other population groups. The Unemp2018 variable includes all unemployed persons, regardless of age, health, etc. Other dependent variables are specified for this variable:

Disab<sub>i,t</sub> n. of juvenile job seekers to number of economically-active population

Graduates<sub>i,t</sub> n. of applicants - graduates for employment to the number of economically-active population

Young<sub>i,t</sub> n. of severely disabled job seekers to the number economically-active pop.

Longterm<sub>i,t</sub> n. of long-term unemployed jobseekers to the number of economically active population

The independent variable Levies remained unchanged as the only variable. The calculation is performed for 2018. In all four cases, the variable Levies was confirmed as statistically significant at the significance level of 95%. The coefficients for Levies have taken the following negative values:

Disab<sub>i,t</sub> - 0.1345225

Graduates<sub>i,t</sub> - 0.1212202

Young<sub>i,t</sub> - 0.0298895

Longterm<sub>i,t</sub> - 1.687128

## 5 Conclusion

The result of the research is a demonstrable and statistically significant relationship between the unemployment rate and the real tax rate, or wages reduced by the tax burden. It should be noted that this cannot be considered as a causal effect. Other auxiliary independent variables were not taken into account here. The regression effect is created primarily by the non-taxable part of the tax base for the taxpayer. This confirmed the significant effectiveness of this social tax instrument and quantified its size. For fiscal and social policy makers, the use of this instrument and its diversification within the country remain to be considered. The Slovak Republic has less developed districts, which it subsidizes with subsidies. The use of this tool, which could have a multiplier effect, also remains to be considered. On the one hand, the consumption of the population would increase by reducing the tax burden, and at the same time, with a potential reduction in contributions, the wage costs of companies would be reduced, which could have a positive effect on unemployment. The adjustment could consist of different tax rates for less developed districts, possibly by increasing the NČZDD, or by introducing a special tax bonus, or by adjusting the levy burden. Similar adjustments have existed or exist in other EU countries, e.g. Greece, Slovenia.

The results of the work confirm the importance of subsidies to districts with lower employment and their return. If these subsidies help to increase employment, it also increases wages and, ultimately, the real tax burden, which increases revenues to public budgets and social security systems. This mechanism is different from the studies mentioned in the theoretical part, as they solve the situation at the transnational level. However, if the importance of the relationship between the unemployment rate and the real tax burden, whether legal entities or individuals in the case of Slovakia, has been independently confirmed, it is appropriate to open this issue at the regional level.

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## Appendix

Average monthly wage in EUR (column A) and registered unemployment rate in% (column B) by districts of the Slovak Republic in 2018

OKRES	A	B	OKRES	A	B	OKRES	A	B
Bratislava I	1 553	2,66	Nové Zámky	961	2,85	Žarnovica	1 230	6,83
Bratislava II	1 696	2,83	Šaľa	1 077	2,1	Žiar n. H.	1 119	4,24
Bratislava III	1 508	2,94	Topoľčany	1 008	3,16	Bardejov	726	10,7
Bratislava IV	1 637	2,62	Zl. Moravce	1 002	3,4	Humenné	890	6,81
Bratislava V	1 417	2,07	Bytča	1 063	4,52	Kežmarok	815	15,2
Malacky	1 331	2,89	Čadca	887	4,36	Levoča	945	8,68
Pezinok	1 037	2,23	Dolný Kubín	1 009	4,54	Medzilaborce	849	10,7
Senec	1 152	3,15	Kys N. Mesto	1 308	4,13	Poprad	1 006	4,92
D. Streda	983	2,41	Lip. Mikuláš	963	5,26	Prešov	1 022	5,84
Galanta	948	1,75	Martin	1 167	2,79	Sabinov	925	11,1
Hlohovec	1 133	1,68	Námestovo	880	4,07	Snina	833	7,62
Piešťany	1 062	1,84	Ružomberok	1 094	4,98	S. Ľubovňa	887	5,83
Senica	1 011	4,36	Tur. Teplice	904	4,14	Stropkov	881	9,5
Skalica	1 234	2,33	Tvrdošín	984	4,41	Svidník	913	11,9
Trnava	1 270	2,11	Žilina	1 174	3,4	Vranov n. T.	872	12,2
Bánovce n.B.	1 061	3	B. Bystrica	1 126	3,38	Gelnica	858	9,65
Ilava	1 099	2,21	B. Štiavnica	878	6,49	Košice I	1 205	4,11
Myjava	985	2,53	Brezno	990	4,42	Košice II	1 382	4,27
N Mesto n. V.	1 152	2,39	Detva	1 039	5,58	Košice III	936	3,13
Partizánske	971	2,96	Krupina	838	5,09	Košice IV	1 157	3,38
Pov. Bystrica	1 067	3,29	Lučenec	920	8,58	Košice okolie	1 071	9,72
Prievidza	1 034	4,46	Poltár	837	10,2	Michalovce	1 000	9,59
Púchov	1 208	2,4	Revúca	878	13,7	Rožňava	986	14
Trenčín	1 141	1,88	R. Sobota	847	16,2	Sobrance	886	10,4
Komárno	904	4,2	Veľký Krtíš	803	7,01	Spiš. N. Ves	961	6,86
Levice	1 106	4,11	Zvolen	1 096	3,56	Trebišov	886	12,2
Nitra	1 093	2,26						

Source: Štatistický úrad Slovenskej republiky. Regionálne štatistiky for years 2010 and 2018. [online] Accessible from <[http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b\\_action=xts.run&m=portal/cc.xts&gohome=>](http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b_action=xts.run&m=portal/cc.xts&gohome=>)>.

## Further Professional Training of Small, Young, and Family Farmers

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**Abstract.** The article deals with the professional training of small, young, and family farmers due to their importance in ensuring employment in the rural area and providing the population with farm products. The institutions of the European Union (European Parliament, Council of Europe) together with the responsible institutions of the member states (Ministry of Agriculture and Rural Development of the SR) address the issue as well, proposing strategies to improve the conditions for rural development. This involves the development and provision of educational activities in order to change agriculture into a progressive and growing sector. The aim of the article is to identify, based on empirical research, the problems in the area of entrepreneurial, managerial, and IT skills together with the accessibility of education necessary for entrepreneurship in agriculture. Another aim is to suggest necessary areas for further education and training of small, young, and family farmers and thus contribute to an increased interest of young people in employment within the agricultural sector. For the elaboration of the paper, we used standard scientific methods such as literature analysis, extraction, for identification of measurable indicators, questionnaire survey among small, young, and family farmers in SR, descriptive statistics and Data Mining for data analysis, and synthesis to formulate our conclusions. The results discovered relatively great deficiencies in entrepreneurial and IT skills of farmers. At the same time, they confirmed their interest in further education though, it usually fails due to lack of time for training outside their workplace and lack of educational opportunities.

**Keywords:** Agricultural Entrepreneur, Entrepreneurial Skills, IT Skills, Personal Development and Development of Co-workers, Young, Small, and Family Farmers.

**JEL classification:** O 13, O 32, Q 12

## 1 Introduction

Professional and geographical mobility currently influence all aspects of the development of a society and strongly affect the development of the rural area. Extensive migration of the population from the countryside to cities limits any further advance of the rural areas. The more mature population of 50+ remains in the countryside but the young generation keeps heading for the cities to study and work.

Employment in agricultural primary sector has become unattractive for lifelong employment for many. The Ministry of Agriculture and Rural Development of the SR prepares various programmes for rural development concurring the policies of the European Union. In agreement with the regulations of the European Parliament and the Council of the European Union, the Ministry prepares proposals of strategies to improve the conditions for rural development. Among others, creation and provision of training activities present another opportunity to change agriculture into a progressive, developing sector.

Young farmers are a top priority for the European Commission. The reason for that can be found in the alarming figures when the percentage of youth in the countryside is much lower than people over 65. But it is the young farmers who are often more innovative, introduce new technologies and are more flexible under new conditions. Both the world and agriculture change very quickly. Transformation requires new approaches that could be found in the training of young, small, and family farmers. To become one of the most decisive sectors of the economy, agriculture needs flexible, highly efficient and professionally adaptable human resources.

The aim of the article is to identify, based on empirical research, the inadequacies in the entrepreneurial, managerial and IT skills of the farmers as well as the appropriate approaches to the training necessary for private enterprise in agriculture. Another aim is to propose the relevant areas for further training of young, small, and family farmers and thus contribute to an increased interest of young people in the employment in agriculture.

## 2 Theoretical background

The theoretical foundation of our paper was based on an analysis of the key competencies applicable in agriculture, analysis of the relevant literature to identify the indicators necessary for a questionnaire survey, and evaluation of sets of skills needed in agriculture (specifically for young, small, and family farmers).

### 2.1 Key competencies

We will define the key competencies necessary for the paper as a combination of knowledge, skills and attitudes acquired through both formal and informal education and training. Competencies represent sets of activating and practically oriented outcomes of training attainment which is a long and complex process and are acquired through lifelong education and training. According to Veteška the key competencies

characterize the framework for various levels of training and/or education [34]. The European Commission defined in the European Framework of References the following eight key competencies for lifelong education [4]: literacy, multilingualism, numerical, scientific and engineering skills, digital and technology-based competencies, interpersonal skills and the ability to adopt new competencies, active citizenship, entrepreneurship, cultural awareness and expression of thoughts, experiences and emotions.

All cycles of training aim to provide each individual with a set of key competencies on the highest attainable level. The competencies were developed in the context of lifelong education since early childhood and continuing throughout their adulthood. Key competencies are those that are needed by all individuals for self-fulfilment. They establish conditions for self-development, employment, lifelong employability, social inclusion, and active citizenship. Therefore, key competencies should be part and parcel of further education and training carried out outside the formal educational system and become a complement of professional training contributing to a complex set-up of human resources.

## 2.2 Literature analysis – identification of indicators

We focused our literature analysis on skills necessary for the key competencies (work with digital technologies, learning, initiative, and entrepreneurship) and other skills (in addition to the professional ones). The topic is discussed in the works of several authors who approach agricultural entrepreneurship from various aspects. We present the ones that contributed to our research (see Table 1).

**Table 1.** Literature analysis

Indicator	Sources
Farmer's gender	Hafkin and Taggart 2001; McElwee et al. 2005; Rudmann et al. 2008.
Farmer's age	Hakelius 1999; Rudmann et al. 2008; Haq 2012.
Farmer's education	Martin 1987; Hakelius 1999; Hafkin and Taggart 2001; Rudmann et al. 2008; Haq 2012.
Number of employees	European Commission, 2018.
Agriculture as a source of income	Blaas 2003; Schmitzberger et al. 2005; Walder et al. 2012.
Entrepreneurial skills	De Wolf and Schoorlemmer 2007; Hafkin and Taggart 2001; Hakelius 1999; Kountios et al. 2011; Rudmann et al. 2008; Schmidt et al. 1994; Seuneke et al. 2013; Vesala and Pyysiäinen 2008; Von Munchhausen and Haring 2012; Zagata and Sutherland 2015; Zondag et al. 2015; Blaas et al. 2010; Kapustová et al. 2017; Rumanovská, et al. 2018.
IT skills	Hafkin and Taggart 2001; Hakelius 1999; Kountios et al. 2011; Rudmann et al. 2008; Schmidt et al. 1994; Seuneke et al. 2013; Várallyaia and Herdon 2013; Kučera et al. 2005; Látečková et al. 2018; Szabo et al. 2017.



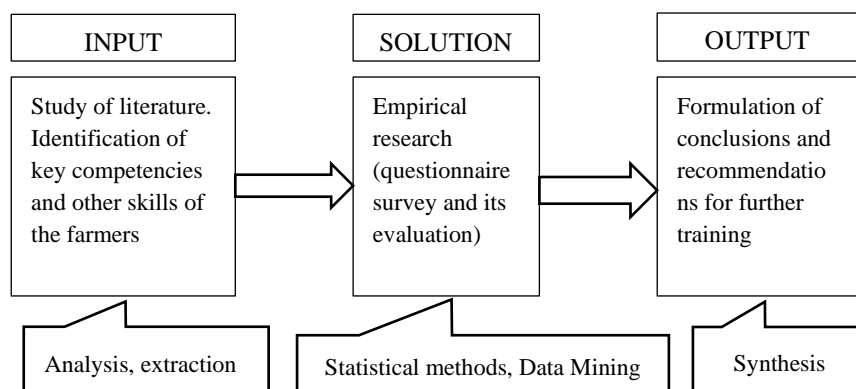
	Hafkin and Taggart 2001; Katchova and Ahearn 2015; Kountios et al. 2011; Levchenko et al., 2018; Martin 1987; McElwee 2006;
Human resources and Education	Pyysiäinen et al. 2006; Rudmann et al. 2008; Schmidt et al. 1994; Seuneke et al. 2013; Šikýř et al. 2018; Văcărescu-Hobeanu, 2018; Von Munchhausen and Haring 2012; Zagata and Sutherland 2015; Veteška 2009; Pirohová 2008; Holická 2009; Veteška 2009.

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### 3 Research framework and methodology

The main aim of the paper is to identify, based on empirical research that analyses the entrepreneurial and managerial skills for private entrepreneurship in agriculture, the problems and propose areas of further education for young, small, and family farmers thus contributing to an increased interest of young people in employment in agriculture.

To achieve our goal, we created a research framework (Fig.1) consisting of identification of key competencies and further skills of young, small, and family farmers, of implementation and evaluation of a questionnaire survey (based on our research model) and formulation of conclusions.



**Fig. 10.** Research framework.

#### 3.1 Research model

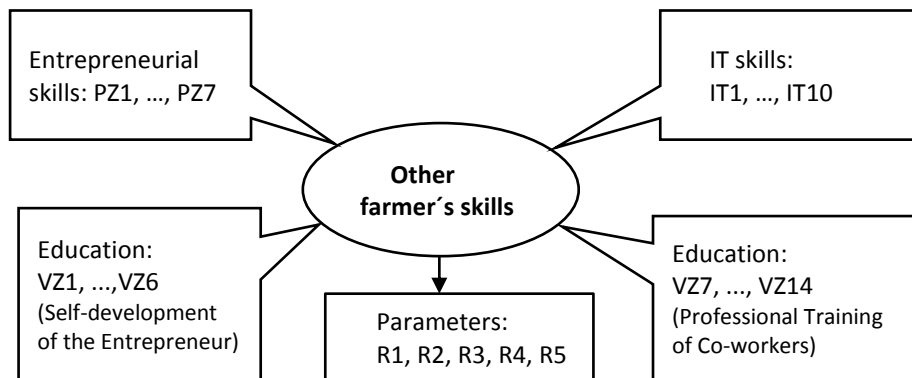
The research model (Fig.2) consists of four groups of research indicators (Table 2, Table 3, Table 4, and Table 5).

The first group consists of parameters R1, R2, ..., R5 characterizing the research sample. Based on them, we evaluated the other groups of indicators of the research model. The second group of indicators (PZ1,..., PZ7) evaluates the self-assessment of entrepreneurial skills of the farmers, the third group (IT1,..., IT10) deals with the utilization of information technology and the fourth group of indicators helps to evaluate the farmers' self-development (VZ1,..., VZ6), and the development of their co-workers on the farm (VZ7, ..., VZ14).

We chose the method of a questionnaire survey, one of the often-used research methods, due to its advantages such as possibility to address a large number of respondents, enough time to consider the answers, and a relatively easy evaluation. At the same time, we tried to eliminate the disadvantages of that method (such as low return rate, verification of provided information, low flexibility, and limited choice of answers) by follow-up phone calls.

The questionnaire survey took place from May to November 2019. The 122 respondents were agricultural entrepreneurs, i.e. private farmers (young, small, and family farmers). The respondents were selected on purpose to ensure proportional regional representation while according to Gavora et al., it met the conditions of available selection [5]. The research sample was analyzed according to gender, age and education of the entrepreneurs, according to the number of employees at the farm, and whether farming was the main or supplementary source of income of the farmers.

The respondents assessed the indicators based on a 7-point Likert scale from 0 to 6 with the following meaning: 0 – disagree, 1 – somewhat agree, ... 6 – strongly agree.



**Fig. 2.** Research model.

### 3.2 Methodology

Since the collected empirical data of the survey have been already statistically evaluated by classical statistical methods (PSPP) [17], we decided to apply Data Mining using WEKA program [7].

The process of Data Mining was carried out in the following steps: definition of the problem, study and preparation of data, choice of an algorithm and a model, solution, and visualization of the results and finally, interpretation of the results.

**Problem definition:** To mark, using Data Mining techniques, groups of respondents with distinct results according to set attributes, identify groups with worse results according to the designated indicators of entrepreneurial and IT skills, and indicators of self-evaluation of knowledge and skills, and propose further training and education.

**Study and preparation of data:** The WEKA program uses data in ARFF format (Attribute Relation File Format). To carry out data mining on our dataset, we needed to change their format into an acceptable one for that analytical software. Often, the data

The solution, visualization, and interpretation of the results: the most even percentual distribution of the research sample into clusters with the smallest absolute error was registered in the case of 4 clusters, therefore, we chose that solution. The results and interpretation are presented in part 4, Results and Discussion.

We present the results in the following structure: characteristics of the research sample, characteristics of the measurable indicators, and chosen descriptive statistics, results obtained by Data Mining.

The research sample consisted of 122 enterprises and their percentual representation based on the identified parameters is shown in Table 2.

Parameters	Attributes	% occurrence	
<b>R1</b>	Gender	Male	84.40 %
		Female	15.60 %
<b>R2</b>	Respondent's age	21 – 30	6.60 %
		31 – 40	39.30 %
		41 – 50	33.60 %
		51 – 60	20.50 %
<b>R3</b>	Respondent's education	Primary	54.10 %
		Secondary	36.90 %
		Tertiary level, Bachelor's degree	3.30 %
		Tertiary level Master's degree	5.70 %
		Tertiary level Doctorate	0.00 %
<b>R4</b>		Less than 5	4.90 %

		5 to 10	38.50 %
	Number of employees (in 2019)	10 to 20	51.60 %
		More than 20	4.90 %
<b>R5</b>	Agriculture as a source of income	Main	73.77 %
		Supplementary	26.23

#### 4.2 Characteristics of measurable indicators

The meaning of the measurable indicators, their mean value, and their standard deviation (STDEV) are indicated in Table 3, Table 4 a Table 5.

**Table 3.** Indicators of the farmers' entrepreneurial skills

Indicator and its meaning		Mean	STDEV
PZ1	Administrative skills (writing on a typewriter, computer, writing letters, reports...)	2.11	1.60
PZ2	Mathematical and statistical skills (I can calculate my economic results, average results etc.)	1.40	1.53
PZ3	Numeric skills for the planning of the economic year (SWOT analysis)	1.24	1.52
PZ4	Professional economic and communication skills needed for communication with governmental institutions (social insurance agency, tax office...)	3.17	1.77
PZ5	Professional economic and communication skills needed for communication with the financial community (investors, banks, financial institutions...)	2.48	1.74
PZ6	Presentation and communication skills needed for communication with clients, public or media	1.95	1.63
PZ7	Communication skills needed for communication with customers and suppliers (of products, raw materials, technology...)	4.14	1.78

**Table 4.** Indicators of the farmers' IT skills

Indicator and its meaning		Mean	STDEV
IT1	Acquisition of current news connected with work (current exchange rates, tax returns, weather information, pollen information, ...)	2.86	1.54
IT2	Return of online forms for governmental and public institutions (health insurance company, social insurance agency, ...)	3.72	1.69
IT3	Using information from maps and navigation	2.28	1.32
IT4	Using information published by government agents and institutions (government, ministries, statistical office, tax	2.63	1.76

	office, social insurance agency, health insurance companies, ...)		
IT5	Using data from publicly accessible portals (Land Register Portal, Trade Register, Business Register, FINSTAT ...)	2.23	1.71
IT6	I use the appropriate and current internet browser, e.g. Internet Explorer, Google Chrome, Mozilla Firefox, Opera	4.70	1.99
IT7	To protect myself from phishing sensitive information, I always verify the safety of the connection to web pages when uploading sensitive information	2.11	1.77
IT8	I use effective antivirus protection, and regularly back up important data	2.97	1.70
IT9	For group (team) cooperation, I use one of the following software: MS Outlook, Google calendar, MS Exchange	0.90	1.61
IT10	We use office tools such as MS Word, Excel a PowerPoint	2.87	1.63

**Table 5.** Indicators of further development of the entrepreneur and his co-workers

Indicator and its meaning		Mean	STDEV
<b>Self-development of the Entrepreneur</b>			
VZ1	I engage in knowledge acquisition (laws, rules, regulations) only when I realize that I lack them	3.74	1.51
VZ2	I prefer self-study (of professional literature)	2.93	1.67
VZ3	I prefer courses in educational institutions (schools)	1.04	3.74
VZ4	I regularly improve my knowledge and skills	1.03	1.38
VZ5	I do not have time for further education	1.42	1.86
VZ6	I perceive education as very important and I wish to pursue it systematically	1.84	1.84
<b>Professional Training of Co-workers</b>			
VZ7	They complete only training required by law (Occupational Safety and Health Training, driving license for agricultural vehicles and machines etc.)	4.48	1.34
VZ8	They complete only training needed for new technologies, changes in law etc.	3.48	1.70
VZ9	Regular training to ensure improvements in the workplace	3.57	2.10
VZ10	Regular training to ensure improvements outside the workplace	0.66	0.92
VZ11	We do not engage in any training	0.71	1.52
VZ12	We would like to engage in it, but we do not have time and finances	1.84	1.46
VZ13	Lack of training opportunities	2.10	1.59
VZ14	The only time for training is bad weather	2.38	2.00

### 4.3 Results of cluster analysis obtained by Data Mining

The results of the cluster analysis for 4 clusters are presented in tables (Table 6, Table 7, Table 8) in 5 columns. The Full Data column provides the mean values of the whole research sample (all clusters), while the other columns show the results of individual clusters identified by SimpleKMeans algorithm (one cluster contains similar results, dissimilar to any other cluster).

**Table 6.** Results of cluster analysis. Indicators of the farmers' entrepreneurial skills

Attribute	Full Data	Cluster 0	Cluster 1	Cluster 2	Cluster 3
	100%	(31 %)	(12 %)	(37 %)	(20 %)
Gender	Male	Male	Female	Male	Male
Age	31 - 40	31 - 40	31 - 40	41 - 50	51 - 60
Education	Primary	Primary	Tertiary level Master's degree	Primary	Secondary
Number of employees	10 to 20	5 to 10	5 to 10	10 to 20	10 to 20
Agriculture as a source of income	Main	Supplementary	Main	Main	Main
PZ1	2.11	1.29	4.87	1.33	3.17
PZ2	1.40	0.63	4.01	0.62	2.41
PZ3	1.24	0.55	3.73	0.49	2.17
PZ4	3.17	2.03	5.20	2.53	4.91
PZ5	2.48	1.16	4.67	1.98	4.13
PZ6	1.95	1.08	4.13	1.40	3.00
PZ7	4.14	3.16	5.07	4.51	4.42
<b>Mean</b>	<b>2.36</b>	<b>1.41</b>	<b>4.53</b>	<b>1.84</b>	<b>3.46</b>

The highest level of entrepreneurial skills has been registered in Cluster 1 constituted by the 12% female graduates in the 31 – 40 age range with 5 - 10 employees for who agriculture is the main source of income.

Cluster 2 (37%) is the most populous one. It includes men in the 41 – 50 age range with primary education, 10 – 20 employees and agriculture as the main source of their income. They, unfortunately, reached a value of >2 and together with Cluster 0 (31%, men in 31 – 40 age range, primary education, supplementary source of income) manifested the lowest mean level of entrepreneurial skills.

**Table 7.** Results of cluster analysis. Indicators of the farmers' IT skills

Attribute	Full Data	Cluster 0	Cluster 1	Cluster 2	Cluster 3
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	100%	(17 %)	(32 %)	(32 %)	(19 %)
Gender	Male	Female	Male	Male	Male
Age	31 - 40	31 - 40	41 – 50	31 - 40	51 - 60
Education	Primary	Secondary	Primary	Primary	Secondary
Number of employees	10 to 20	5 to 10	10 to 20	5 to 10	10 to 20
Agriculture as a source of income	Main	Supplementary	Main	Main	Main
IT1	2.87	3.71	2.49	1.77	4.57
IT2	2.28	1.95	2.72	1.92	2.43
IT3	2.63	3.71	2.43	1.38	4.09
IT4	2.23	3.33	1.74	1.02	4.09
IT5	2.27	3.00	2.67	1.08	2.96
IT6	4.70	5.48	4.43	4.05	5.57
IT7	2.97	3.81	2.82	1.79	4.43
IT8	2.11	3.19	1.87	0.85	3.70
IT9	0.90	1.33	0.87	0.07	1.96
IT10	2.87	3.76	2.41	1.87	4.52
<b>Mean</b>	<b>2.58</b>	<b>3.33</b>	<b>2.54</b>	<b>1.58</b>	<b>3.83</b>

Concerning the IT skills, we arrived at some unexpected results, as the highest value was achieved in Cluster 3 (men, 51 – 60 age range, secondary education) and Cluster 0 (women, 31 – 40 age range, secondary education). Cluster 2 showed the worst results (men, 31 – 40 age range, primary education). In those cases, the farmers' level of education played an important role. The lower (primary) education level therefore opens good opportunities for further essential training and education.

**Table 8.** Results of cluster analysis. Indicators of further development of the entrepreneur and his co-workers

Attribute	Full Data 100%	Cluster 0 (18 %)	Cluster 1 (32 %)	Cluster 2 (30 %)	Cluster 3 (20 %)
Gender	Male	Female	Male	Male	Male
Age	31 - 40	31 - 40	41 – 50	31 - 40	51 - 60
Education	Primary	Secondary	Primary	Primary	Secondary
Number of employees	10 to 20	5 to 10	10 to 20	5 to 10	10 to 20
Agriculture as a source of income	Main	Supplementary	Main	Main	Main

VZ1	3.74	4.82	3.38	2.64	4.92
VZ2	2.93	4.09	2.95	1.67	3.68
VZ3	1.05	1.59	0.88	0.53	1.56
VZ4	1.03	2.00	0.87	0.19	1.64
VZ5	1.43	1.77	0.95	1.28	2.08
VZ6	1.84	3.05	1.41	0.94	2.76
<b>Mean</b>	<b>2.00</b>	<b>2.89</b>	<b>1.74</b>	<b>1.21</b>	<b>2.77</b>
VZ7	4.48	4.59	4.67	3.58	5.40
VZ8	3.48	3.45	3.97	2.41	4.28
VZ9	3.57	2.95	4.72	2.69	3.56
VZ10	0.66	0.50	1.10	0.22	0.72
VZ11	0.71	1.04	0.05	1.11	0.88
VZ12	1.83	2.50	1.85	1.36	1.92
VZ13	2.11	2.77	2.38	1.47	2.00
VZ14	2.38	1.90	2.87	1.92	2.68
<b>Mean</b>	<b>2.40</b>	<b>2.46</b>	<b>2.70</b>	<b>1.85</b>	<b>2.68</b>

Similarly, as with the IT skills, the level of education plays an important role in the evaluation of further self-development of farmers because the highest values were reached in Clusters 0 and 3 where the farmers with secondary education were aware of the necessity of further education and implemented it within their resources. The lowest values were achieved in Cluster 2 (30% men, 31 – 40 age range, primary education, 5 – 10 employees, the main source of income).

As for the indicators concerning the co-workers training, Clusters 0, 1 and 4 were on the same level (mean 2.46 – 2.70). Again, cluster 2 markedly differs from them.

## 5 Conclusion

The aim of the article was to identify based on empirical research the problems in the area of entrepreneurial, managerial and IT skills together with the approach towards education and training necessary for private enterprise in agriculture. We can affirm based on the results, that the farmers in Slovakia still lack a lot of additional skills (to their professional ones) as their self-assessment does not even reach the middle of the set scale. Thus, various educational institutions (Ministry of Education, science, and Sports of the SR, Agroinstitút Nitra, Agricultural Paying Agency) have an opportunity to develop training activities in the area of agricultural management (enterprise), and IT.

Using cluster analysis, we identified some surprising results (e.g., the highest assessment of managerial skills among women in the 31 - 40 age range, low evaluation



of IT skills among men in the 31 – 40 age range). In those cases, the educational level and the limited size of the sample may have influenced the results.

The studied attitude of the Slovak farmers towards education and training has confirmed their interest in further education and that training usually fails due to lack of both time for training outside their workplace and availability of training opportunities. This finding offers possibilities to local authorities in the villages (municipal offices) to help the young, small, and family farmers with multispectral and interdisciplinary education which can, besides their professional, agricultural knowledge, develop the necessary key competencies for better employability in agriculture.

We can expect improvements within the next few years due to the latest programming period after 2020 represented by the proposal of Programs for Rural Development of the SR which are strongly supported by Directorate-General of the European Commission for Agriculture and Rural Development in Brussels. Supporting the young, small, and family farmers could lead to the achievement of two main goals: increase of employment opportunities in the rural areas and ensuring the availability of agricultural products for the population. The two could become the subjects for further research.

In conclusion, it is important to mention that the chosen method of data collection (questionnaire survey) as well as the methods used for analysis of data (statistical methods, data mining) have certain limitations. In our research, they were manifested in the size of the research sample. Therefore, the results can be generalized only in the agricultural environment of the Slovak Republic.

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## Impact of Internet Advertising to potential Customers

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**Abstract.** New opportunities in Internet marketing, a sharp increase in the popularity of social networks and new services available all make it necessary to constantly follow new and modern trends in the field. Internet or online marketing is no longer a marginal issue, but becomes part of the corporate identity of organizations and gains a dominant position. Internet space opens the possibilities of less expensive and at the same time more efficient marketing production, offers a new direction in the area of direct contact with potential customers. Based on the set goals, the basic issues of the use of programs for blocking advertising on the Internet and the preference for direct marketing tools were formulated.

**Keywords:** company, marketing, advertising, internet, marketing communication, marketing tools

**JEL classification:** M31, M37, M38

### 1 Introduction

The term marketing currently covers a number of specific activities. They support the creation of products, services and their communication to the target groups. Kotler writes that good marketing is not a coincidence, but rather the result of rigorous planning and execution using the latest tools and techniques (Kotler, Keller, 2013). Marketing consists of four basic processes that are closely interrelated - product or service development, pricing, distribution to target groups, and product or service information through various communication channels (Clemente, 2004). Marketing

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principles, methods and tools help businesses interact with the dynamic relationship between supply and demand. (Zamazalová, 2010).

Several authors agree that marketing has long been misinterpreted as a process of selling and promoting. (see Kotler, Bačuvčík, Foret, Tajtáková, Lesáková, etc.) This misunderstanding is understandable because it is the contact and communication activities that are most prominent from the consumer's point of view. Making sales is just one of many marketing features and tools. This fact is pointed out by P. Kotler, according to which sales are only the imaginary peak of the "marketing glacier". (Kotler, 2009) The customer does not see behind the curtain covering the whole spectrum of marketing activities. However, marketing should not be exclusively the responsibility of specialized marketing companies, marketing departments or senior managers, but should be understood by other employees of the company (Beránek, 2013). Pajtinková and Gubíniová (2012) describe in their publication that a key issue in building a sustainable marketing communications strategy using personal selling is that sales staff understand the range of issues that are related to sustainable aspects of the product. It is important to be able to answer all questions about the product being sold. This requires the constant training of employees. Vysekalová (2012) considers personal offer as one of the most effective means of communication mix, which uses elements of verbal and non-verbal communication.

Marketing can be defined as a business policy based on market requirements, which is aimed at achieving maximum economic effect in market relations. In terms of time, marketing has gone through phases that we can define as:

*Historical marketing* - characterized mainly by any lack of business management based on customer needs. Production is not derived from the needs of customers and companies looking for their products ex post. The price of products is most often cost-based and does not reflect the actual value of the product to the customer.

*Classical marketing* - the essence of this developmental stage of marketing is already a deeper focus on the market environment. As companies strive to satisfy customers' needs, customers are often seen as an opponent in the market to use to deliver a product using marketing tools. Using the tools of this period is called. known as "4P". The aim of optimizing the above elements of the marketing mix is to achieve and maintain market share.

*Modern marketing* - is based on the pillars of classical marketing. Its essence is customer orientation. As with traditional marketing, the tool was the marketing mix ("4P"), modern marketing uses the "3C" concept, ie:

1. Customer Benefits
2. Total Customer Cost, and
3. Convenience (Kašparovská, 2006).

According to Kotler, marketing means the social and management process by which individuals and groups acquire what they need and demand through the creation, supply and exchange of products and values with others (Kotler, 1991). Another author (Korauš, 2011) defines marketing as a complex of internal and external processes that pursue a profit-making goal, in line with the business philosophy of meeting both business and customer needs today and with a view to meeting these needs in the future.

The American Marketing Association describes marketing as a process of planning and implementing concepts, pricing, promotion, distribution of ideas, goods and services to create change that meets the goals of individuals and organizations (Kotler, 2001). Marketing is concerned with identifying and meeting human and social needs. It is based primarily on customer relations. A customer is a person, household, or organization that pays some form of banking services in order to obtain some of the expected benefits for their ownership or consumption. For each company, he is the most important person and dependent on it (Jakubíková, 2008).

Today, marketing is trying to meet the needs of customers. If a marketing specialist can understand the customer's needs well, develop products that bring new value to customers at a reasonable price, distribute them efficiently and promote sales, then these products are easy to sell. Sales and advertising are therefore only part of a broader marketing mix, a set of marketing tools that work together to influence the market (Kotler, 2004). Traditional marketing communications include advertising, sales promotion, personal selling, public relations and direct marketing. The brand also plays a very important role in marketing. The trade mark of the goods as well as the trade mark are of great promotional, guarantee and informational significance and help to commercialize the marked products. Established brands and trademarks represent certain privileges, which is also reflected in the price area (Hyránek, Ďurínová, 2016).

*Direct marketing, or direct marketing*, is aimed at reaching customers who are carefully selected on the basis of individual communication relationships with direct response and the possibility of building long-term relationships with customers. It is a specific marketing tool based on direct and individual addressing of a selected group of customers by different methods of direct marketing in order to satisfy their needs and wishes (Nízka, 2002). We meet him in postal offers, telephone marketing or communication via the Internet, or delivery of orders through catalogs, television, advertisements or advertising attachments. Direct marketing is sometimes referred to as mail marketing, which is intended for certain types of customers. Usually these are customers who have previously contacted a company that has them registered in their databases and communicates with it on the basis of orders via mail or mail order organizations. By addressing customers directly, their response is evident after just a few days, the main difference from traditional marketing and advertising.

Effective and meaningful marketing management is not possible without the collection and analysis of information relating to specific market situations or specific problems. Marketing market research and market research play an irreplaceable role as they relate to information collection and analysis processes. These are important for strategic decision making in a cultural institution. As in other areas of business, culture marketing focuses on examining existing market factors within the marketing environment. Their knowledge is important for effective strategic planning and implementation of individual marketing mix tools. Thanks to the Internet, marketing communication is significantly shifting and unilateral communication results in two-way communication. Businesses have a variety of customer information available, but the opposite is true, so the customer can get different information about the business and its products. (Janouch, 2014).

Based on the application of marketing in practice, P. Kotler and G. Armstrong distinguish two fundamental approaches to marketing, which also derive its definitions - social and managerial. A social approach points to the role of marketing in society; it is a way of achieving a higher standard of living. In this context, marketing is defined as a social process by which individuals and groups satisfy their wishes and needs, based on the creation or supply or exchange of products and services among themselves. The second approach to the definition of marketing is the managerial approach, which defines marketing as the art of selling products. Under this definition, marketing is a process of planning and implementing the concepts, pricing, promotion and distribution of certain goods. (Kotler, Armstrong, 2004).

Over the past decades, mass communication techniques have dominated communication strategies. Gradually, however, the principles of direct marketing, which consisted of an individual approach to individuals of a specific target group, began to be put into practice. One further development phase is the interactive trend, which means that not only the seller has access to the customer, but also the client can have an individual approach to the seller. And it is this approach that allows the Internet, which is fundamentally different from the previously used, traditional and direct marketing tools (De Pelsmacker, Geuens, Van Der Berg, 2003). Kotler argues that direct marketing is a common means of communication in terms of the communication mix and attributes to it the same hierarchical level as advertising, sales promotion, personal selling or public relations. Thus, direct marketing tends to be described as another component of the communication mix (Kotler, 2000). The oldest forms of promotion include direct addressing of the customer. Originally, the manufacturer sold its products to the final consumer through a sales representative or had its outlets. Over the years this concept has taken on a new meaning. Various media, including the phone, began to be used for direct promotion, changing its definition. Direct marketing is an interactive marketing system that uses one or more advertising media to generate measurable feedback or transactions at any location. One of the most significant changes in recent years is the development of the Internet, which has changed its way of doing business with its possibilities. It adapts its business plans and marketing strategies, creating business plans that are based on the fact of its existence. Social media and Internet marketing tools have revolutionized the use of marketing tools in the online environment as tools to promote and support the sale of the products and services.

## **2 Methodology**

This paper presents a survey of the impact of online advertising on young people and the use of online advertising blocking programs. To obtain the necessary information and data, an exploratory method was used, through an on-line panel, the principle of which is based on obtaining data through subjective answers of individual respondents. Based on the set goals of the analysis and survey, the basic possible reasons for the use of programs for blocking advertising on the Internet and their percentage confirmation in the survey were formulated:

- Internet advertising hurts me, disturbs me,
- Internet advertising too much,
- Internet advertising disturbs me at work,
- Ads popping up on the Internet,
- Silly and pointless ads on the Internet

At the same time, a survey of the preference of direct marketing tools is presented.

In this survey, respondents answered what tools they would prefer in marketing:

- E-mailing
- Online marketing
- Direct mailing
- Database marketing
- Mobile, resp. SMS marketing
- Telemarketing
- Loyalty programs
- Unaddressed distribution (flyers)

The panel consisted of a total of 400 respondents who are university students. The survey on direct marketing involved 350 respondents. The survey was conducted in the period 1-4 / 2019 on a representative sample of respondents aged from 18 years. The young generation is the primary target group for the many brands and products targeted by internet advertising. During the research of this issue was used method of analysis of survey results, method of comparison of individual results and their graphical representation

### **3 Current State, Nature and Development of Internet Advertising**

Advertising has found its place in marketing communications not only in commercial terms but also in other areas. It means sophisticated influencing or conspicuous forcing the customer to buy some goods, services, commodities. According to Kotler, it is any paid form of presentation and support of ideas, goods or services carried out by an identified sponsor. (Kotler, 1990). In particular, Pelsmacker accentuates her information and persuasion function by calling it a good marketing communication tool for informing and persuading people, regardless of whether a product, service or idea is promoted (Pelsmacker, Geuens, Bergh, 2003). Smith draws attention to her unique ability to compact, simplify complex facts or phenomena: Advertising has the unique ability to simplify and compact complex information about the product offered. (Smith, 2000,) The most concise definition of advertising was offered by Foret, who, in addition to indicating its broad-spectrum use and purpose, also pointed out its weaker and even negative aspects: Advertising has many forms and uses - product, idea, image , through



mass media it can reach the general public, but it is less convincing due to impersonality; (Foret, 2006).

Until the 1990s, the Internet was mainly used in the military, research and university campuses. Today, it is widespread worldwide, connecting millions of computers and offering invaluable services to its users. The Internet and its involvement in the overall marketing strategy is inevitable today. It does not always have to be direct sales, it is also important to contact with customers and customer service. It is through the Internet that most companies build (build) a database of their potential clients and on the other hand the Internet forces users to search for sites, so the company knows that they are active customers, ie those who are interested in the company. These company databases can be used for further communication via direct mail, e-mail or telemarketing (Foret, 2003).

The Internet provides various kinds of advertising. Banner advertising is the most important type of advertising. Furthermore, text, bar, or less pleasant pop-up advertising and also mass distribution of mostly commercially oriented e-mails, so-called. spam. Nowadays, PPC advertising, which achieves the best results, comes to the forefront because it is planned in advance. The Pay Per Click (PPC) principle is that the advertiser pays for the ad only when it can be assumed that it has performed, that is, when the prospective client clicked on it. Paid advertising today is one of the fastest and easiest ways to get immediate sales and traffic results. Compared to classic banners or sites on portals, the advantage is that the customer does not pay for the impression, but only for a real visitor to their site. Another advantage of these systems is that the links usually appear on pages with relevant content. This makes the link more precisely targeted to the key client, not bothering where people are interested in something else. One of the biggest promoters of this system is Google or Yahoo. In the US, PPC investment accounts for up to 40% of online advertising investment.

In Slovakia, Google AdWords, Etarget and Facebook Ads dominate. Compared to other forms of internet marketing, PPC advertising is particularly important for its precise ad targeting. This is made possible by the different tools and settings (keywords, hobbies, placements, etc.) provided by businesses like Google AdWords. Estimates of its growth in the coming years in Europe are several times. It is often negatively perceived by users, mainly because of the widespread non-standard formats in Slovakia that overlap the text or mislead on the site. Many advertisers reflect this and are gradually moving to less aggressive forms of advertising. The trend in modern internet advertising is to take advantage of its local targeting advantage. Advertisers direct their banners to specialized websites or localized websites. Due to geographic availability, advertising is more effective, helping especially small business owners whose advertising budgets are limited. On the other hand, large companies buy space through media agencies on the largest portals with nationwide coverage.

The world's most widely used PPC systems are Google AdWords and Microsoft AdCenter and Yahoo! Search Marketing. The PPC system is also run by major social networks such as Facebook or LinkedIn. There are a number of local PPC systems in each country. PPC advertising organizations typically use their own marketing and sales specialists or outsource the services of an advertising agency. In PPC (Pay Per Click) management, advertising companies provide several types of advertising on the Internet, for example:

- Google advertising - Is not just keywords in the search engine. Adwords is a comprehensive tool that covers your back during all phases of the buying process. From brand awareness (banners) to targeted search for products and services (search) to working with your site visitors (remarketing).
- Facebook Advertising - Reaches people in the environment they spend most of their time on. More than 2.2 million Slovaks are registered on this social network and this number is constantly rising. Facebook is also aware of this and develops and improves its ad formats.
- Advertising on Instagram - is one of the newest formats, which is so far unknown. However, the providers of this ad argue that it's no easier for them than to dedicate your business to the mysterious world of images and videos on an increasingly popular network and app.
- Youtube video ad - We know that up to 80% of all information is seen by sight. Sometimes words are simply not necessary and simple images or audiovisual spots can attract attention or give information.
- Advertising on Sklik - if the business is concentrated in the Czech Republic, the largest advertising platform of our Czech neighbours - Sklik is recommended. A strong player who, through the right keywords or creative banners, will bring irreplaceable sales support and strengthen every company name on the market.
- Advertising on Etarget - if the goal is to build or strengthen brand awareness and to raise the visibility or just to increase the website traffic in the short term, use Etarget as a suitable communication mix tool. As with other PPC services, the advertiser pays this ad only if the customer clicks on their link.
- RTB Advertising - if a company wants to attract the attention of creative banners, RTB (real-time-bidding) advertising is one of the ways to buy advertising space in top online media. With RTB, your ad will appear on sites where your company won't get with traditional PPC ads.
- Managing price comparators - as the number of Internet users increases, so does the number of online purchases and of course online stores. Unlike brick-and-mortar stores, shoppers can compare prices of individual sellers very quickly. This is made possible by price comparators that provide them with all the necessary information in one place.

In terms of its duration, Internet advertising can be considered a newcomer to the advertising market. However, this does not diminish its importance. Internet advertising has brought many benefits. At relatively low cost it allows you to communicate with the masses. Another important attribute of the Internet is its interactivity. It gives the

consumer the opportunity to express their opinion on a given product, advertising or company almost immediately. In the case of extremely interesting advertising, consumers can even distribute it further among themselves, saving the company costs and the advertising message will reach even more people. Another advantage of internet advertising is the measurability of its effect. The number of clicks on a given link, or the number of times a page is viewed, makes it very easy to see how many consumers our ad has reached. Therefore, in addition to traditional electronic media (television, radio), the choice of advertising media should also consider the possibility of placing advertising on the Internet.

Internet advertising business models, or online advertising advertising payment models, are the ways in which online advertising is financed. These models determine what the advertiser is paying for, how the ad's cost is calculated, and how ad revenue for the ad agency is calculated. Internet advertising business models have specific features due to the characteristics of the website (traffic and visitor behaviour can be measured):

*Display Advertising* - In this model, an advertiser pays for the number of times an ad is displayed on a website. The number of ad impressions is derived from the number of impressions on the webpage (see impression) where the ad banner is located. The cost is calculated either for each individual impression (CPI Cost per Impression) or for every thousand impressions (CPM Cost per Mille or CPT Cost per Thousand). There are two basic ways to calculate a price for this ad model.

- PPI (Pay per Impression) - in this model you pay for the impression
- PPV (Pay per View) - in this model you pay for displaying a specific website

*Pay per activity* - In this model, an advertiser pays for some lead activity. The price for the advertiser is calculated based on the number of activities (clicks or other desired activity) of website visitors. Cost is calculated per click (CPC Cost per Click) action or commission (CPA Cost per Acquisition / Action) - the ad provider receives money as soon as the visitor clicks on the ad and performs a pre-specified action on the subsequent pages.

- PPC (Pay Per Click) - in this model you pay according to the number of clicks on its advertising banner
- PPA (Pay per Action) - in this model you pay for new user registration, order creation, comment insertion etc.

Cost Per Click (CPC) is a method of calculating the cost of an ad on a website, which sets a CPC and then pays the advertiser for their number and cost. So the advertiser only pays for actual clicks to their site. CPC pricing is used in PPC business models. In practice, CPCs use ad systems to indicate how much an advertiser pays for a single click - either a fixed amount or a bid automatically set auctions - that is, depending on how interested the word or click is. Ad systems typically allow you to set a maximum CPC (max CPC).

*Affiliate marketing* sometimes also *Affiliate programs* - in this model you pay only on the basis of an order (purchase) made by the customer, therefore not for the placement of the banner. These include the following business models:

- Pay-Per-Sale (PPS)
- Pay-per-lead (PPL)
- Pay-per-install (PPI)

Affiliate marketing is a term for bringing customers through a partner network with an intermediary's financial reward. It operates on a system of commissions that are paid from the sale of services or products by intermediaries. It is one of the business models that can earn money from running a website.

*Payment for ad publication time* - This model is used to pay for ad publication times. It is closest to the classic model of advertising space, as we know it from the real world - hiring advertising space. The price of advertising banner advertising is set for a certain time (usually a week or a month) for which the banner is published, regardless of how many visitors actually see the banner or how many times they click it. The price of renting advertising space depends on the average traffic to the website on which it is published, its attractiveness and the exact placement of the banner on the website.

The use of business models on the Internet in practice is to determine how prices are calculated. Most models depend on technical equipment - ie on the visitor's side there must be an internet browser, on the provider's side there must be some application (so-called advertising system) that can evaluate and calculate it.

Google and Facebook are the most successful and influential Internet companies in the world. While Google dominates search, email, and mapping services, and 2017 ended up with \$ 90.2 billion in revenue, Facebook, which operates a WhatsApp communicator and Instagram image network, in addition to the social network of the same name, generated revenue of \$ 27.6 billion. Both companies have one thing in common. The vast majority of their revenue comes from the advertising systems they run for advertisers. Together they cover more than half of this market (Urban, 2018).

## **4 Results and Discussion**

Online advertising has become one of the most important forms of promotion. With online advertising, large businesses increase their brand knowledge and fight less for each customer. The effectiveness of advertising also depends on the formulation of a message that provokes a reaction in the target group. It is ideal to communicate one main, clear and concise message, and to ensure that it is properly understood and interpreted by the recipient. The communicated message must overcome the communication noise, be original to attract attention in the amount of other communicated information, and must also be correctly identified with the product, brand, institution it promotes. However, knowing a business's offer doesn't mean they're in love with it. Popularity depends on the needs and wishes of the customer -

the recipient and on the ability of each marketing mix tool to satisfy them. However, in terms of marketing communication, positive publicity is also provided by well-known personalities and opinion authorities.

Advantages of using advertising include its ability to effectively reach a wide range of geographically dispersed consumers in a relatively short time. The submitter has control over the content of the advertisement, it chooses the way of presentation, media selection and number of repetitions. The cost of addressing is relatively low, but its disadvantage is the high total cost. Advertising is a form of communication that spreads through the media, less convincing than a personal form of communication. It is a one-way type of communication, feedback and the effect can take effect over a longer period of time. (Johnová, 2008) On the other hand, it is also necessary to reflect on another page that points to the disadvantages of advertising.

At present, the consumer is overwhelmed by a wide range of advertising spots, printed ads, etc., which may ultimately lead to its being ignored or even a priori rejection by the recipients. In addition, it is clear that advertising is "toothless" where it communicates with an advanced recipient, an established visitor, interested in, for example, a certain kind of art. This fact is also pointed out by Bačuvčík when he classifies advertising as an effective means of mass communication.

The role of advertising in the promotion of cultural institutions is not small, but its use is suitable for audiences other than regular visitors to cultural events where organizations can get direct contact. The use of advertising as a type of mass communication is appropriate with people who are not closely related to its product, but who are interested in the product in some sense or may be interested in certain circumstances. (Bačuvčík, 2012, p. 145) There are some lessons and principles in the assessment of advertising strategies and advertising communications by creative professionals and marketers. (See Vysekalová, Mikeš, Foret, Horňák, R. Johnová, etc.) According to them, several principles can be summarized:

- The more creative and contentious the advertising is, the more important it is to test its effects on people's thinking (perception and evaluation) in local or national conditions.
- Advertising should not have artistic ambitions, it should focus on one choice - choosing the right products, services, ideas.
- The purpose of advertising is not to create enthusiasm for the customer about the quality of the ad, but to make the ad effective, to buy or to know the product.
- The role of advertising varies, depending on the market position and objectives of the organization. When creating an ad, you need to know the product and define its important elements.
- The choice of the types of media in which the ad will be presented depends not only on the budget but also on the segment we want to reach, its quantitative and geographic scope.
- When placing advertising in the media, it is also necessary to take into account the fact that different types of media have different effects on the senses of a

person, which also affects his / her ability to remember and identify the branded product.

- Advertising is an impersonal presentation, commercial communication of information through various types of media.
- Advertising has the ability to inform and influence the emergence and change of needs, demand and even the value scale. It can create interest, habits, as well as some type of dependence on products and services.

The popularity of the Internet and its use has been steadily increasing for several years, and there is no indication that this situation will change in the near future. As the number of Internet users increases, so are advertising companies. Users are also spending more and more time online and companies realize that advertising on the Internet is no longer an option, but a necessity. However, the advantages of internet advertising are also related to its disadvantages, which are listed in the following table 1.

**Table 1 Advantages and Disadvantages of Internet advertising**

Internet Advertising	
Benefits	Disadvantages
speed and flexibility	media overflow with information
media capacity	limited structure of web visitors
low cost of production and placement	technical barriers
interactivity	ad elimination software
good targeting and efficiency evaluation	absence of historical tradition
the ability to capture the target group at any time	short lifetime - high demands on timeliness

Source: own processing

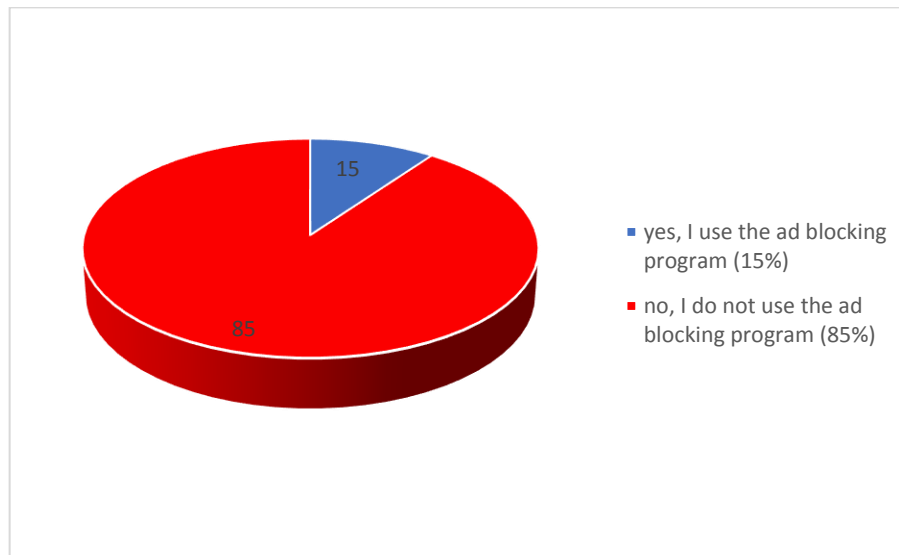
If you ask people if they like advertising, most will tell you they don't, and usually point directly to hate the internet, especially. However, the situation is not as black as it may seem at first sight. People are fully accustomed to the presence of advertising and are expecting it. Last but not least, it also fulfils the informative character of what is actually on the market. Finding her on television, radio, on billboards on the street, and in the press, it would be foolish to think that no one would expect her on the Internet. So why is online advertising so popular? Why do people hate it only by choosing to block it using different types of browser plug-ins?

Sometimes on the Internet, the alterability of advertising practically has no limits. Unlike static printing, the web is dynamic and it is possible to attack the basic biological mechanisms of man, such as the fact that it is very difficult to ignore the sudden movement in peripheral vision, and such unexpected activity immediately attracts our attention. Thus, the occurrence of ad movement and flicker was the first wave of increased intrusiveness, which was soon followed by pop-ups overlapping content (and hence the lack of opportunity to see the ad), and also by adding audio that attracts

attention even when the ad is outside . The current wave of intrusiveness is targeting, resulting from monitoring user movement across the web and profiling it for interests, gender, age, and other, often striking, features.

Banner advertising is one of the ways to reach and attract even those customers who are not specifically searching for the product or service. On the other hand, advertising is attacking us from every side, including the internet. How do people defend themselves? By using Adblock programs that block such advertising.

According to the results of the survey, 30% of respondents know such programs and half of them, ie 15% of respondents, also use them. The survey was conducted through an online panel on a representative sample of 400 respondents aged 18 and over. The survey result is shown in Fig. 1.

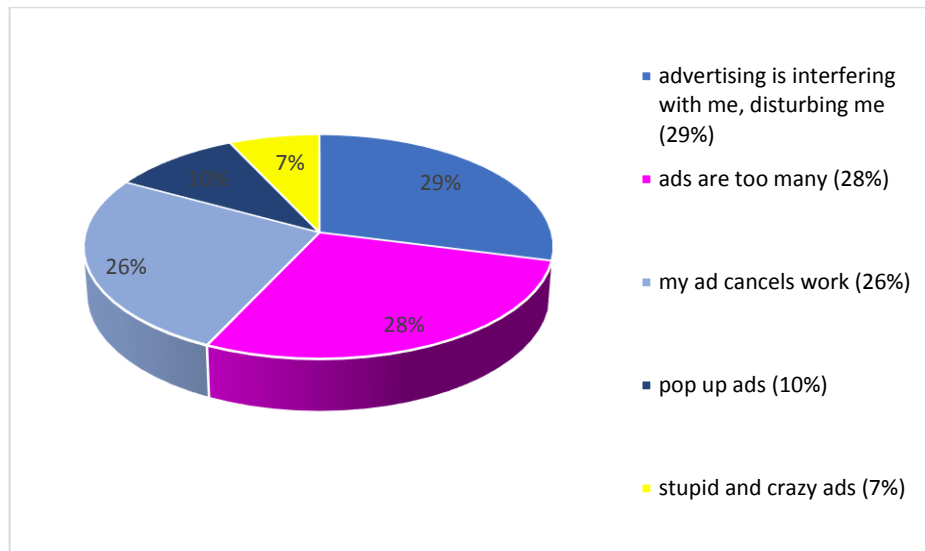


**Fig. 1 Using an Internet ad blocker Program in%**

Source: own processing

Who are these 15% of respondents who use such ad blocking programs? Women and young people under 26 are clearly above average. The young generation is the primary target group for the many brands and products targeted by internet advertising.

Based on the stated objectives of the survey, the basic hypotheses of the reasons for using ad blocking programs on the Internet were formulated: advertising hurts me, distracts me, ads are too much, advertising disturbs me at work, ads popping up, silly and pointless ads. The survey result is shown in Fig. 2.



**Fig. 2 Reasons for using an ad blocking Program**

Source: own processing

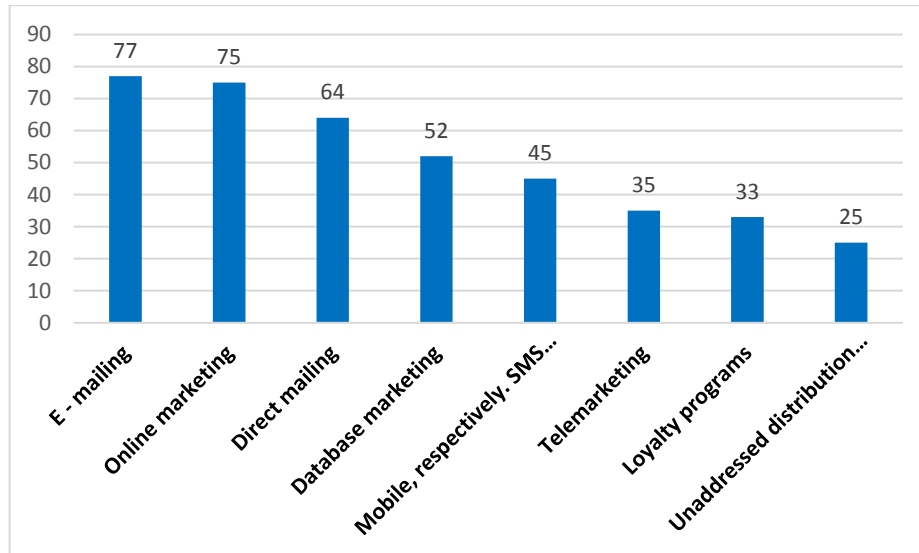
According to the results of the survey, the following percentage of reasons for using ad blocking programs on the Internet is shown in Fig. 2: Internet advertising hurts me, disturbs me (29%), Internet advertising too much (28%), Internet advertising disturbs me at work (26%), Ads popping up on the Internet (10%), Silly and pointless ads on the Internet (7%). This has forced half of the respondents who know these programs to install the ad blocker. This clearly implies that advertising is not a problem as it is, after all, a long-term presence in our society. The problem is how they are served and used on the Internet, which is unprecedented in other areas of life. It is therefore a proverbial overflow of the cup. Advertising is acceptable as long as it is advertising. It becomes intolerable when it is an obstacle and even a security risk.

The reasons why respondents decided to start using such a program are clear. Internet advertising disturbs them, obstructs them because there are too many of them. Of those respondents who know and are not yet using ad blocking programs, more than half have declared their use within 12 months. On the contrary, of those respondents who do not know such programs, 20% of respondents declared possible use in the next 12 months.

The survey also included preferences of direct marketing tools. In this survey respondents answered what tools they would prefer in marketing: E - mailing, Online marketing

Direct mailing, Database marketing, Mobile respectively. SMS marketing, Telemarketing, Loyalty programs, Unaddressed distribution (leaflets). The results of the survey are presented in Fig. 3.





**Fig. 3 Preferences of direct marketing tools**

Source: own processing

According to the survey results, this percentage of preference for direct marketing tools is shown in Fig. 3. In this survey respondents answered what tools they would prefer in marketing: E - mailing (77%), Online marketing (75%), Direct mailing (64%), Database marketing (52%), Mobile, respectively. SMS marketing (45%), Telemarketing (35%), Loyalty programs (33%), Unaddressed distribution (25%). The most preferred tools are E - mailing and Online Marketing. Unaddressed distribution (leaflets) was used for at least 25%.

The increase in ad blocking in recent years is an indisputable fact, although getting the exact numbers of how widespread this phenomenon is not easy. Long-term measurements in this respect are made by PageFair, and its statistics are among the most cited. However, the accuracy of results varies widely across countries.

How, then, is the massive growing use of ad blocking to stop and keep the Internet services ecosystem operational? The obvious answer is fair and non-annoying advertisements that are common in the offline environment.

## 5 Conclusion

In today's highly competitive times, marketing is a concept that plays a very important role in the success of individual companies. The Internet connects individual regional computer networks, networks of national academic and commercial institutions. It connects tens of millions of people in over 160 countries. Its participants are practically people of all ages and with various social backgrounds. Thus, the Internet deserves attention from a commercial point of view. The multimedia nature of the Internet makes it possible today to transmit not only text and graphic, but increasingly also audio or

video information. The offer of goods and services can be presented in a form which, as far as attractiveness is concerned, is comparable to printed materials or video presentations, but with incomparably higher timeliness. The big advantage of new media is that they can deliver data to consumers faster and more effectively perform the function of marketing communication than traditional channels (advertising, sales promotion, public relations, personal sales and direct marketing).

The Internet provides great connectivity flexibility, broad communication, data collection for marketing research, database building, customer service, new product development, internal communication, cost reduction and, above all, advertising, sales and product distribution. Using the Internet brings many new possibilities for communication with customers, e.g. availability of offers from around the world at any time or easy use for customer feedback questionnaires. The Internet as a form of marketing communication is used mainly by young, more educated and better situated people in developed countries of Europe and North America. Advantages of Internet communication include worldwide reach, continuity, speed of message transmission, feedback, low cost, comprehensive and selectivity of information, easy work with information. The disadvantages of the Internet include various technical limitations and impersonal communication

In the current marketing communication, the creation of advertising strategies and advertising itself is a highly sophisticated matter. It does not rely on intuition or experiment, but is the result of well-planned activities and processes. Online marketing communication and its direction to building a reputation show us that this form of business marketing involves a great deal of potential. Direct marketing is an interactive marketing system that uses one or more advertising media to create a measurable response, respectively, of any transaction at any place. This place is called unlimited space. The product provider and the client communicate directly (also called direct marketing).

The popularity of internet advertising and its use is constantly growing. However, the advantages of internet advertising are related to its disadvantages, which can be represented mainly by the media overloading information, limited structure of web visitors, technical barriers, the need for software to eliminate advertising, the absence of a historical tradition and more.

The survey was conducted through an on-line panel on a representative sample of 400 respondents aged 18 years and over. Based on the stated objectives of the survey, the basic hypotheses of the reasons for using ad blocking programs on the Internet were formulated: advertising hurts me, distracts me, ads are too much, advertising disturbs me at work, ads popping up, silly and pointless ads. Of the total number of respondents, 30% of respondents are aware of online advertising blocking programs and half of them, 15% of respondents, also use them. According to the survey results, the percentage of reasons for using ad blocking programs on the Internet is as follows: : Internet advertising hurts me, disturbs me (29%), Internet advertising too much (28%), Internet advertising disturbs me at work (26%), Ads popping up on the Internet (10%), Silly and pointless ads on the Internet (7%). The investigated facts forced half of the respondents who knew these programs to install the ad blocker. The survey also

included preferences of direct marketing tools, where respondents answered what tools they would prefer in marketing.

According to the survey results, the percentage of tools preference is: E - mailing (77%), Online marketing (75%), Direct mailing (64%), Database marketing (52%), Mobile respectively. SMS marketing (45%), Telemarketing (35%), Loyalty programs (33%), Unaddressed distribution (25%). The most preferred tools are E - mailing and Online Marketing and at least 25% were used by non - addressed distribution.

At present, a very embarrassing feature on the Internet is the built-in browser-based mechanism that focuses on the use of cookies. These are small text files that contain the information necessary for the page to recognize you the next time you visit and, for example, re-login you to provide information about which content or comments have been added since your last visit. It is clear from the survey that some practices of internet advertising more or less interfere with internet users and, in order to avoid them, in fact become an obstacle to the advertising itself.

## Acknowledgement

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## Strengthening the influence of local tourism on the price of recreational real estate

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**Abstract.** The current commercial form of tourism contributes to ecological devastation. The short-term slowdown in transport and industrial production has also had a very rapid effect on reducing air pollution. As travel is not a vital necessity, it responds sensitively to changes in external factors - the solvency of vacationers, political situation, the preference of specific destinations and the security risks connected to individual locations. Recently, the health risk has moved to the first place, even in localities where no preventive measures have been recommended so far.

The development of the epidemiological situation from spring of 2020 has led to the return to more limited forms of tourism with emphasis on local recreation which does not require complicated transport. The use of cottages and chalets is the typical feature of Czech recreation. This phenomenon has intensified this year. There has been a lot of speculation in the media about the increase in demand and the associated increase in the price of recreational types of real estate. These claims have been investigated for several localities in the Czech Republic with focus on summer tourism for which the requirement of stay in the vicinity of a lake, river or water reservoirs is also typical in hot summer months.

The paper also focuses on other factors that may affect the price of recreational real estate. The survey focused mainly on the distance from the public transport stop, the distance from the water body and the distance from restaurant facilities.

Not all expected relations have been confirmed. No significant increase in the number of transfers of recreational facilities for individual recreation has been recorded on two specific investigated localities near the water reservoirs.

**Keywords:** recreational facility, water reservoir, environment.

## **1 Tourism flexibility**

Not only has travel changed in history – the cultural context, social status and economic background of tourists also plays an important role. The diversity of options also results in a large variability of means of travel. Tourism is currently negatively affected by fears of possible transmission of the virus through human contact. In addition to the planned adventure situations, there is an element of uncertainty given by the restrictive measures of the governments of individual states. The way to avoid possible complications is to choose a form of domestic tourism.

### **1.1 Forms of tourism in the Czech Republic**

Thematically focused trips are the preferred way of tourism in the Czech Republic. Many cities and regions try to promote regional tourism in the form of information on the availability of tourist destinations as well as by offering various benefits.

The territory of the Czech Republic offers a wide range of recreational uses. The abundance of castles and chateaux, the number of specialized spas, mountain terrain trails for pedestrians and cyclists varying in the level of difficulty, popular wine trails and, in summer, the indispensable natural swimming water reservoirs, allow any combination of active and passive recreation. Undoubtedly, the most typical form of recreation is the stay at cottages and chalets.

### **1.2 Recreational real estate in the Czech Republic**

Properties for individual recreational use have been created in various ways. Part of the original corporate recreational facilities and hostels has been passed into the hands of private owners and part has been converted from permanent housing to family recreation facilities. Despite the current hectic times, the popularity of recreational properties has not decreased and new ones are still being built. The legal regulation allows the establishment of permanent residence in a recreational cottage or in a garden cottage.

In order to find out about the development of supply and demand of recreational real estate, the authors have focused on two specific localities, namely the immediate vicinity of Brno, the second largest city in the Czech Republic and the vicinity of the spa town of Luhačovice. The proximity of water reservoir that does not fulfill the primary function of drinking water collection is typical for both localities. They vary in size, the size of water bodies and the availability of services.

The specifics of the city of Brno are its rugged and diverse surroundings suitable for the construction of recreational facilities. [1]

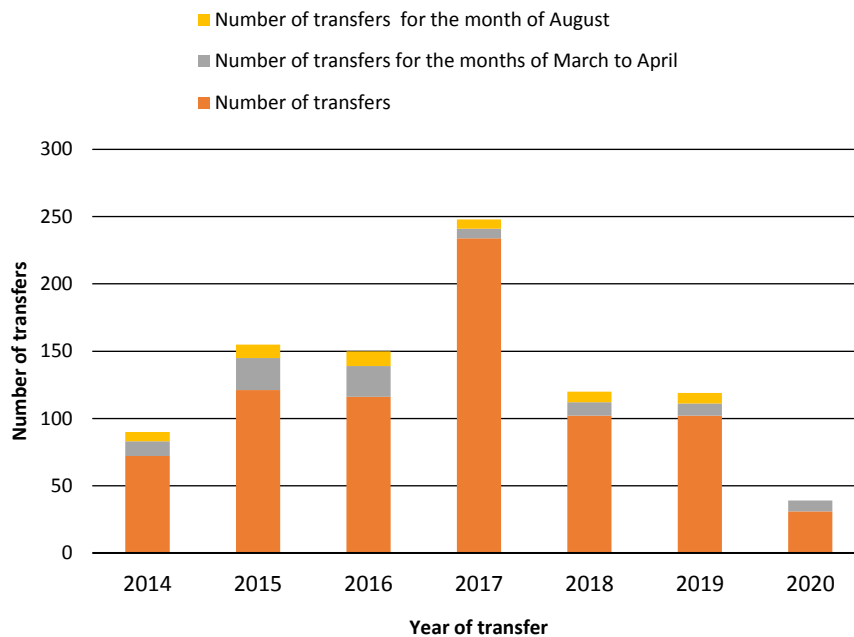
Luhačovice spa town is directly adjacent to Pozlovice water reservoir, which after a recent revitalization, including the creation of a cycle path around the entire perimeter and the establishment of a large sandy beach, has gained in attractiveness.

### 1.3 Real estate market for individual recreation

The original assumption of an increase in demand for recreational real estate in these two cases has not been confirmed. The tables show the number of transfers registered in the Real Estate Cadastre since 2014. In order to eliminate seasonal fluctuations, data on transfers from individual years for the months of March to April and for the month of August have been evaluated.

**Table 1.** Number of transfers of recreational facilities for individual recreation in the vicinity of Brno reservoir [5]

Brno	2014	2015	2016	2017	2018	2019	2020
Number of transfers	72	121	116	234	102	102	31
Number of transfers for the months of March to April	11	24	23	7	10	9	8
Number of transfers for the month of August	7	10	11	7	8	8	0

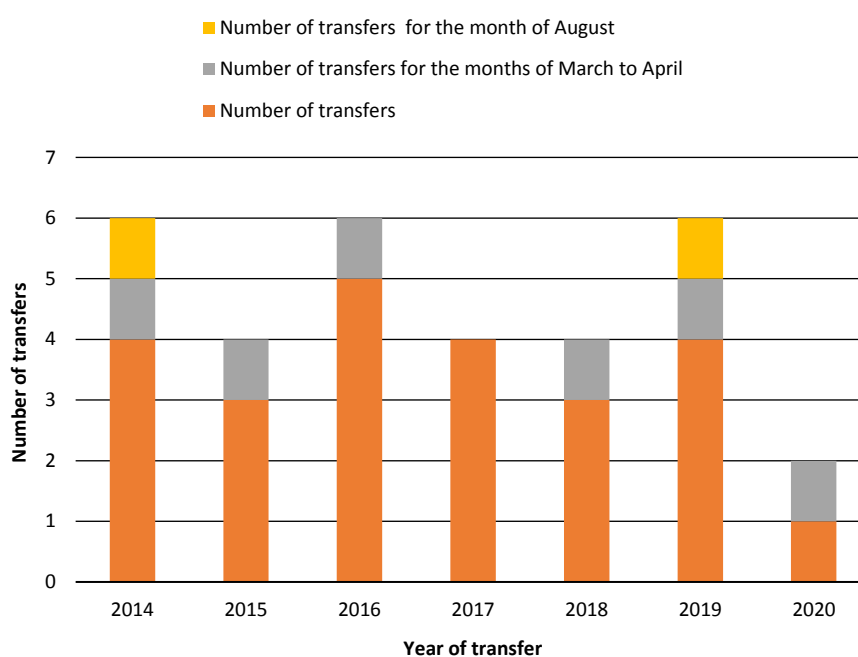


**Fig. 11.** Number of transfers of recreational facilities for individual recreation in the vicinity of Brno reservoir

No significant increase in the number of transfers of recreational facilities for individual recreation has been recorded in the vicinity of Brno reservoir.

**Table 2.** Number of transfers of recreational facilities for individual recreation in the vicinity of Pozlovice reservoir [5]

Pozlovice	2014	2015	2016	2017	2018	2019	2020
Number of transfers	4	3	5	4	3	4	1
Number of transfers for the months of March to April	1	1	1	0	1	1	1
Number of transfers for the month of August	1	0	0	0	0	1	0



**Fig. 2.** Number of transfers of recreational facilities for individual recreation in the vicinity of Pozlovice reservoir

Zero number of transfers of recreational facilities for individual recreation in the vicinity of Pozlovice reservoir in August 2020 is not surprising as it copies the development in previous years.

However, the low number of transfers of recreational facilities does not represent a decrease in interest. The reason may also be the increase in price, which may cause a decrease in the number of solvent buyers.



## **2 Possible influences on the price of recreational facilities**

### **2.1 Data sources**

The most serious source of information on real estate prices is the public list maintained by the Czech Surveying and Cadastre Office, in which recreational cottages are kept under a registration number. Prices from concluded purchase contracts from the period 2014 to 2020 have been used in the article.

The data concerning the locality of Pozlovice reservoir and its vicinity was not sufficient; therefore attention was focused only on the influences on the price of recreational real estate in the locality of Brno reservoir.

### **2.2 Influences on the price of recreational real estate**

The requirements for services and comfort of use have been increasing. The availability of good internet connection, which will enable work from home as well as distance learning, is the current trend. However, the internet connection information is sometimes not completely up-to-date and often does not take into account the morphology of the terrain.

Structural design of the building, its layout, basement availability, wheelchair access, number of floors and their accessibility as well as building orientation may be among other cost-creating factors.

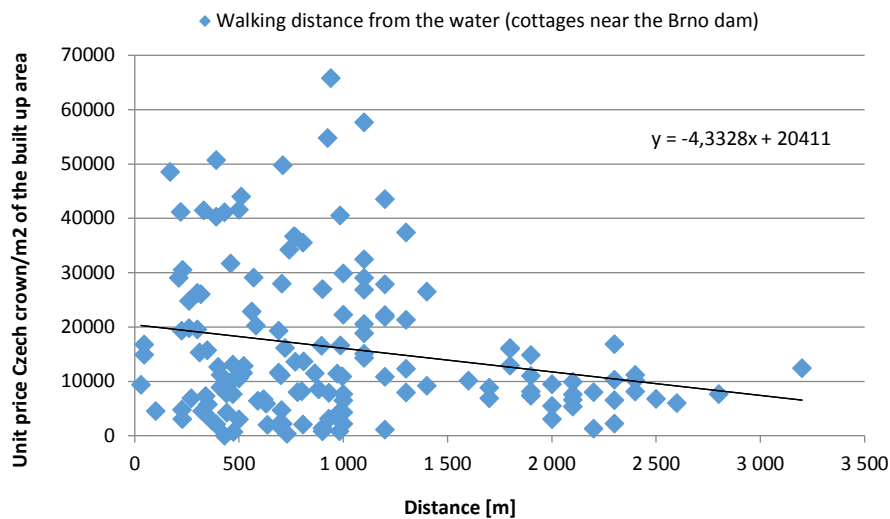
In addition to the characteristics of the building, the characteristics of the surroundings, such as the proximity of forests, roads, tourist attractions, water bodies, services, etc. are also decisive. The hierarchy of these influences is perceived subjectively.

## **3 Evaluation of the influences on the price of recreational cottages**

Only available characteristics have been evaluated. A database of sales realized from 2014 to 2020 has been compiled with 291 elements. After excluding extreme values, the percentage representation of land and buildings has been determined for 275 sales realized and the unit price of the built-up area of individual buildings has been derived. For unification, a conversion to the price level of the end of 2019 has been performed using the time series of the HB (Hypoteční Bank) index. [2] [3] [4]

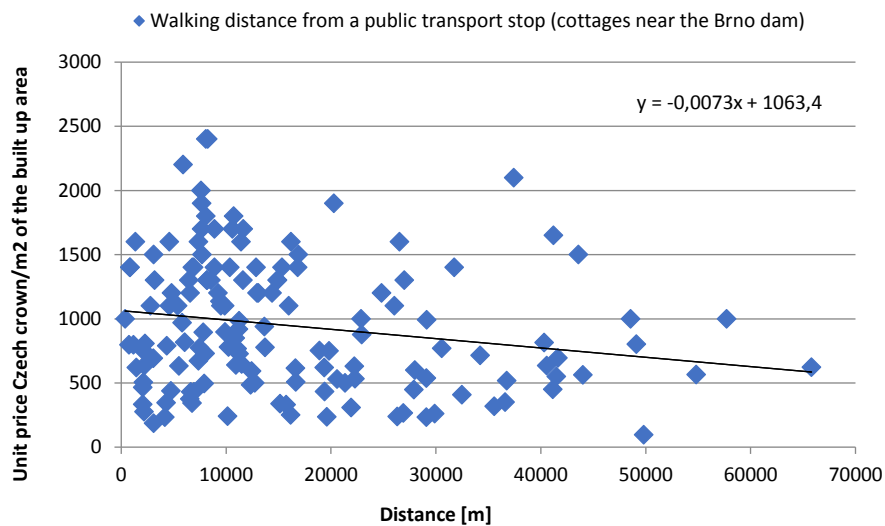
The survey focused mainly on the distance from the public transport stop, the distance from the water body and the distance from restaurant facilities. Not all expected relations have been confirmed. The most significant relations are shown in Fig. 3, Fig. 4 and Fig. 5.

The validity of the investigated influences cannot be generalized as it is necessary to respect the specifics of different localities.



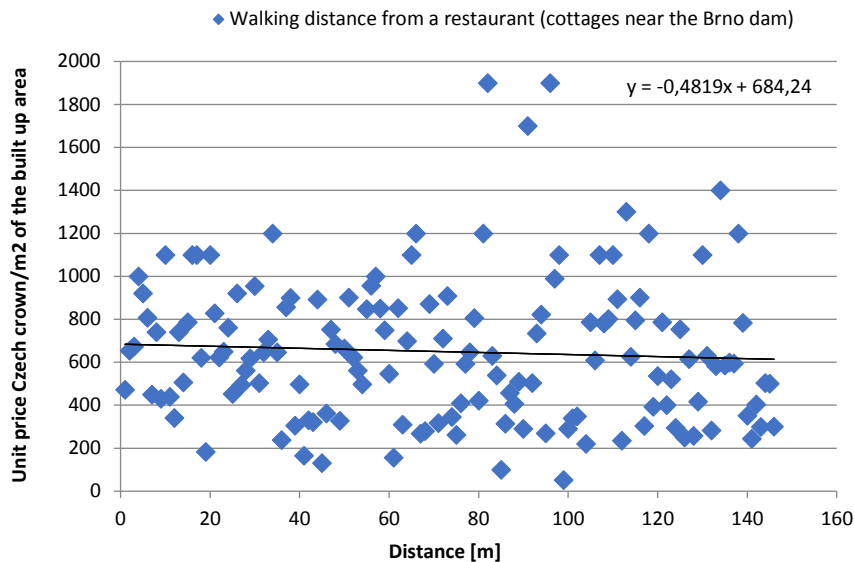
**Fig. 3.** Dependence of the unit price of a cottage in the vicinity of the Brno dam on the distance from the water surface [authors' own work]

The proximity of a water body as the most significant influence has also been documented historically. In the past, the construction of cottages was conditioned by a permit confirming the deteriorated state of health caused by the polluted working environment. This included, for example, rollers, painters, etc.



**Fig. 4.** Dependence of the unit price of a cottage in the vicinity of the Brno dam on the distance from the public transport [authors' own work]

In evaluating the factor of distance from public transport, the seasonal operation of boats has not been taken into account in this case in order to maintain the homogeneity of the data. The long distance between public transport stops is the cause of increased car traffic, which is undesirable for recreation.



**Fig. 5.** Dependence of the unit price of a cottage in the vicinity of the Brno dam on the distance from a restaurant [authors' own work]

The availability of restaurant facilities near the cottages by the reservoir has proved to be insignificant. It is possible, but not yet observed, that arriving by car leads to self-sufficiency.

#### 4 Targeted interventions to the ecosystem

Human impact on the environment is ambivalent and its consequences have shifted over time. One example is Lake Most, which has been created by flooding the former lignite mine.

Mining has had a negative impact on the landscape and the environment of the whole area, therefore both technical and biological re-cultivation was needed. The mine has been flooded with water from the river Ohře. The filling started in October 2008 and was finished after a two year break in September 2014. The total flooded area of the lake measures up to almost 311 hectares.

The lake is to be made accessible to public in September 2020. Facilities for leisure activities such as playgrounds or beach volleyball courts as well as beaches, piers, snack stalls, bike paths, pedestrian paths and even a dock for boats have been created in this area.

## 5 Conclusion

A human being is usually sociable by nature, however, due to adverse circumstances, he may be forced to resort to isolation and create his "private island". The use of a recreational cottage is a financially reasonable form of recreation for the residents of the Czech Republic. The space between recreational facilities, as opposed to dense urban development, creates at least some privacy.

There has been a lot of speculation in the media about the increase in demand of recreational types of real estate. No significant increase in the number of transfers of recreational facilities for individual recreation has been recorded on two specific investigated localities near the water reservoirs. However, the low number of transfers of recreational facilities does not represent a decrease in interest. The reason may also be the increase in price, which may cause a decrease in the number of solvent buyers. Same as with any investment, the purchase of a cottage must be carefully thought out. It is also necessary to take into account the time reserve for steps associated with the administrative burden. Therefore the analysis cannot be completely up-to-date. The trend line in graphs is more indicative.

The period from spring 2020 is so specific that the conclusions from one locality cannot be applied to other localities and the results cannot be generalized without long-term monitoring.

Another context examined should be the phenomenon caused by new social trends in leisure activities and price modifications

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## Big data as a source of information for marketing analytics

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**Abstract.** The increasing digitization of everyday life and the associated data generation has increased steadily in recent years. The important thing about this development is, that nearly every member of the society is knowingly or unknowingly generating the data, through their own interaction with the new technology. It is a byproduct of the increasing penetration of our everyday life by technologies, that have been made available to us in recent decade. This also offers companies the opportunity to receive an unprecedented amount of information about their customers and products. Information, that can be used in business intelligence or marketing analytics to support their managerial decisions. The acquisition of such information from the large amounts of standardized, as well as non-standard data sets, is known today as “Big Data”. Presented article looks at recent development in Big Data with regard to its potential to be a source of information for marketing analytics, especially its ability to provide information from non-standard data sets like social media. The article is based on a literature review of the characteristic of big data as an information source in marketing and the review of selected research problems and questions. Primary data was collected via a questionnaire as well as in semi-structured interviews with representatives of participating companies. Based on the collected information, a strong suitability of these systems to provide information for marketing analytics, as well as willingness if Slovak companies to use them was confirmed. Barriers of implementation of Big Data systems were also identified.

**Keywords:** Big Data, Marketing Analytics, Non-standard Data Set

**JEL classification:** M 31, D 81

## 1 Introduction

Thanks to the rapid development of Information and communications technologies (ICT), digitization, the universal availability of devices generating and recording data, more and more information resources are created. The annual production of data has doubled every two years on average, especially because of the massive use of mobile devices like smartphones and new sensor technologies implemented in them.

The use of big data technologies opens up new possibilities for their use in a wide variety of applications, be it technological development, sales or marketing. In the course of this development, the marketing process has started to be increasingly based on technology [1].

The reason for incorporating new IT tools and methods capable of working with Big Data into enterprise systems should not only be the new nature of data, but especially business benefits that correspond to the company's strategy [10] and are measurable using defined global and company-specific indicators. KGIs / KPIs (Key Goal Indicators / Key Performance Indicators)

Examples of possible benefits of Big data at KGI include an increase in revenues, profits, number of customers or a reduction in total costs, and in specific KPIs of individual functional units a reduction in customer churn rate, increase in sales campaign success, decrease in average customer incident resolution time, increase customer loyalty, brand awareness or improved customer satisfaction (measured by the CSI Customer Satisfaction Index).

According to the results of a survey published in 2019 by the consulting company NewVantage Partners among the board members of the largest American companies from the Fortune 1000 list, 92% of the respondents are increasing their pace of investment in big data and AI, 62% have already seen measurable results from their investments in big data and AI and 88% feel greater urgency to invest in big data and AI to stay competitive [11].

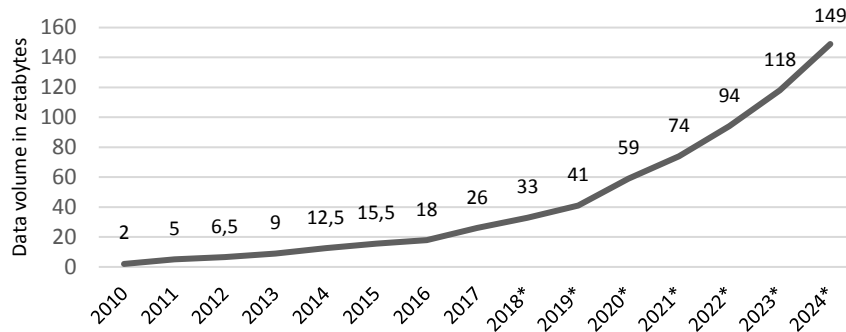
## 2 Theoretical background

Society's interest in big data has increased since 2011. Due to the ubiquity of the term and its origin in the fields of science, industry and media, there was no clear definition of the term [15].

The most common definitions contain the so-called four V's: Volume, Velocity, Variety and Veracity. [3, 5].

*Volume* - This aspect describes, as can already be seen from the term, the huge volume of data that is described in connection with Big Data. This amount of data, which is exponentially growing due to the increasing digitization of everyday life, is now measured in zettabytes, reaching 59 zettabytes in 2020 [13].

*Velocity* - According to Bachmann, Kemper and Gerzer [2], it comprises two essential properties of the big data construct. On the one hand, the processing speed, i.e. the speed at which data can be processed. Second, the dynamics of change, which describes the speed at which data and their relationships with one another change.



**Fig. 1.** Volume of data/information created worldwide from 2010 to 2024 (2018-2024 are predictions)

Source: <https://www.statista.com/statistics/871513/worldwide-data-created/>

*Variety* – means the variety of data used for analysis. Big data often has heterogeneously structured data, which makes the analysis even more difficult because the data do not have any fixed structures that relate them to one another.

*Veracity* - was added later due to the steadily growing social media data. These social media data are user-generated and therefore require a further characteristic of the term “big data” [3].

There are many different definitions of Big data, many actually contradicting each other. A concise definition of Big data is given, for example, by Gartner Inc. [6]: “Big data is generally defined as high volume, velocity and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making.”

Gartner’s definition was expanded by George, Haas and Pentland [7], who define Big data is any type of data set that, in terms of both size and complexity, can no longer be processed using traditional methods of data set analysis. In addition, data sets are often characterized in the context of big data analyzes by the fact that, in contrast to traditionally created data sets, they often have heterogeneous structures.

In the business and marketing context, the definitions of big data also emphasize their application, which is providing extensive knowledge for, among others, providing value to buyers, gaining a competitive advantage and measuring the effects of conducted activities [17, 18].

## 2.1 Marketing analytics based on big data

The big data construct has great entrepreneurial potential and offers a wide range of possible uses in almost every area and every industry. The suitability of big data for marketing purposes, especially in the areas of personalization of customer contact and market research and marketing analysis was discussed in many research papers and is nowadays universally acknowledged [12].

Particularly interesting is demographic, socio-economic and psychographic data. The aim here is to use the available data sources to gain a comprehensive picture of the

customer and the targeted markets in order to tailor products and their corresponding advertising precisely to their needs and wishes. [4].

As mentioned, one of the first and essential fields of using big data has become marketing, which is the area of activity in which the effects of data analytics are measurable, and at the same time can be achieved in the short term. “*Marketing analytics involves the collection, management, and analysis—descriptive, diagnostic, predictive, and prescriptive—of data to obtain insights into marketing performance, maximize the effectiveness of instruments of marketing control, and optimize firms’ return on investment*” [16].

Marketing studies have shown a widespread increase in the use of marketing analytics and intelligent agent technologies, and big data, even from companies such as IBM, Amazon, eBay, and Netflix, for collaborative filtering, personalization, recommendation systems, and price-comparison engines [9].

**Table 1.** The scope of big data in marketing analytics.

Internal data (mostly structured)		External data (mostly unstructured)	
<ul style="list-style-type: none"> <li>• advertising analysis</li> <li>• CRM analysis</li> <li>• sales analysis</li> <li>• marketing-mix analysis</li> <li>• segmentation</li> <li>• website testing</li> <li>•</li> </ul>		<ul style="list-style-type: none"> <li>• recommendation analysis</li> <li>• analysis of keywords in search engines</li> <li>• analysis of the effects of personalization of offers</li> <li>• profiling and behavioral targeting</li> </ul>	
		<ul style="list-style-type: none"> <li>• social media analysis</li> <li>• analysis of data from mobile devices and GPS</li> <li>• analysis of online opinions and reviews</li> <li>• competitive intelligence</li> <li>• network analysis</li> <li>• trend analysis</li> <li>• sentiment analysis</li> </ul>	

Source: M. Wedel, M., Kannan, P.K. 2016. Marketing Analytics for Data-Rich Environments. Journal of Marketing, 80 (6), 97–121.

As Petrescu and Krishen [12] formulated, for many practitioners, big data has become the norm and a way to maintain competitiveness in the marketplace. They outline, that even B2B companies see a big potential in using B2B customer analytics to help to mitigate business problems.

According to Wedel and Kannan, [16], the list of the areas, where Big data analysis can find or has already found application, at the same time bringing added value to analytics, is systematically growing. Especially when it comes to the analysis of unstructured data. The areas identified by them are shown in table 1.

Internet and social media users often provide opinions on various products, expectations for them and ideas for improving them. On the other hand, the analysis of data from customer relationship management systems and electronic devices allows for recording the time and frequency of purchase or use of products, enables the identification of users' reactions to external communication stimuli and is used to capture the so-called trigger events in the customer lifecycle, etc. [8].



It is possible to collect data on the actual use of purchased products, including, for example, its time, frequency, intensity, which may replace traditional post-purchase evaluation measures, such as the declared degree of buyer satisfaction or the degree of brand loyalty. Conclusions regarding the post-purchase evaluation can also be drawn on the basis of the analysis of online reviews of goods or services used by buyers with an intention to buy them [14].

### 3 Methodology

The aim of this paper is to identify the attitude of Slovak companies to the use of Big data as a source of information for marketing analytics, their expectations as well as barriers of implementation of Big data technology in marketing analytics.

Following the aim, three research questions have been formulated:

- RQ1: What is the attitude of Slovak companies toward the use of Big data?
- RQ2: What areas of marketing analytics are companies using or are planning to use Big data for?
- RQ3: What barriers of use of Big data are preventing Slovak companies to use it for marketing analytics?

Data collection was done by a questionnaire targeting all areas of the research, followed by semi-structured interviews with selected companies. The questionnaires data were gathered electronically between September and December 2019, followed by the interviews that took place between February and April 2020.

Purposive sampling was used to create the population for the questionnaire. Size of the companies and the area of their economic activities according to SK NACE Rev 2 was the sampling criterion (only sections G, I, J, K, L were used). The questionnaire was sent to 468 companies, returned rate of 174 (37,17%), where 17 questionnaires had to be removed because of incomplete data or other problems. Because of that, we had 157 to work with.

Three types of questions were used in the questionnaire, starting with questions with fixed answers, through open-ended questions to statements in which the respondent had to express his opinion on the basis of the Likert scale. The Likert scale consisted of 5 levels of agreement of which was as follows: 1 - strongly disagree, 2 - partially disagree, 3 - I am not sure, 4 - partially agree, 5 - strongly agree.

The gathered data was analyzed by statistical methods, looking for correlations in the Likert scale answers. Because Likert scale does not give us continuous data, we could not use Pearson's correlation. Instead, gathered data was ordinal, and because of that, Spearman's correlation test was used (non-parametric test). Spearman's correlation test uses rankings of data, rather than absolute values of the variables.

For finding correlations in standard continuous data, Pearson's correlation was used. Point biserial correlation was used when finding correlations between categorical and continuous variable. All correlation tests were done at  $\alpha = 0.05$ .

Following the questionnaire were semi-structured interviews with selected companies that participated in the research. There were 11 interviews in total, 8 with

participating companies (users of Big data) and 3 with Big data solutions providers. The interviews were focusing on barriers for Big data solutions implementation from the perspective of the participating companies, as well as from the perspective of the providers of Big data solutions.

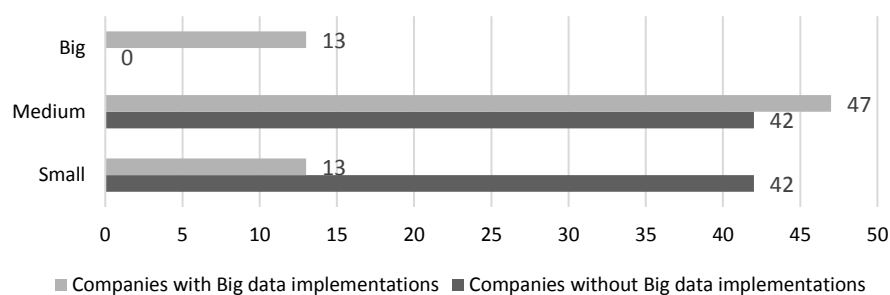
## 4 Results and discussion

Slovak companies operate on a highly competitive market. The competition extends outside the boundaries of Slovakia, as the companies compete with other EU companies. Because of that, any opportunity that grants them a competitive advantage is highly sought after.

### 4.1 Attitude of Slovak companies toward the use of Big data

The development of Big Data technology in the true sense of the word is currently only partially implemented in Slovak companies. Out of the 157 companies participating on the study there were 55 small, 89 medium and 13 big companies. A total of 73 (46,5%) companies have Big data implementations in place and 14 (8,9%) were in the process of acquiring a solution withing 6 months. As shown in Figure 2, there is a big difference in the number of companies that have Big data implementations in place, depending on the size of the companies.

As we can see, all the participating big companies have Big data implementation in place. When we look at the reason, most of these companies (12) have implemented the systems of their foreign parent company, and did not develop the solutions themselves. Only one of the participating big companies is owned by Slovak capital and uses solutions developed especially for its needs.

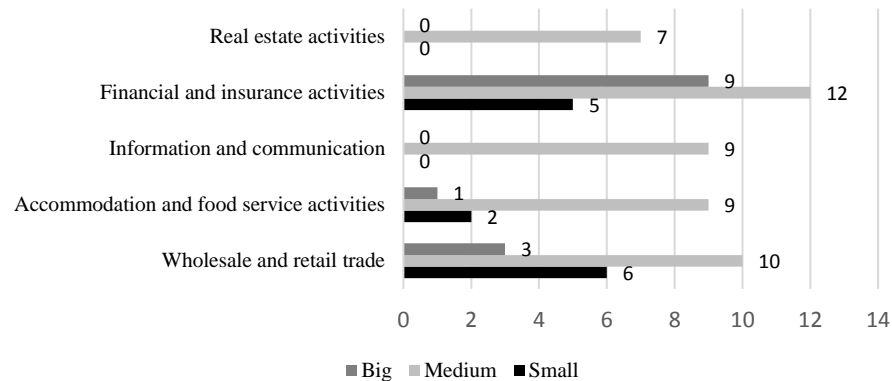


**Fig. 2.** Companies with and without Big data implementations by company size.

Source: author's research

More than half (52,8%) of medium companies have implementations of big data analytics in place and additional 11 companies are working at the implementation right now. Only 13 small companies (23,6%) have Big data analytics in place and 3 companies are working on implementation of such systems.

When taking into account the area of economic activities according to SK NACE Rev 2 (Figure 3), we can see that most companies using Big data are financial and insurance institutions (26), wholesale and retail companies (19) and accommodation and food service providers (12).



**Fig. 3.** Companies with Big data implementations by company size.  
Source: author's research

As shown in table 2, two strong correlations were identified during the questionnaires' data analysis. First was between the Big data analytics implementation in a company and foreign ownership of that company (foreign parent company or foreign investor with strong decision-making power). The higher the percentage of foreign ownership, the further along was the use of Big data. The correlation coefficient was  $r=0.746$ .

**Table 2.** Correlation coefficients for selected variables.

	Standard coefficients	p-value
Foreign investment (%) / Big data use	0.746	.026
Area of economic activity / Big data use	0.635	.039

Source: author's research

The second correlation was between Big data implementation and the area of economic activities according to SK NACE Rev 2 in Financial and insurance activities, where all the participating companies in this area had Big data implementation (even the Slovak-owned companies had it). The correlation coefficient has a value of  $r=0.635$ , which shows a strong correlation.

#### 4.2 Areas of use of Big data in marketing analytics

Due to the activity on the internet, companies are able to identify the current state of meeting specific needs by buyers, the level of satisfaction with the purchase or the

degree of readiness to make another purchase much easier than before. Our research identified 4 main decision-making areas, that Big data is used for in Slovak companies. (table 3)

**Table 3.** Areas of decision-making process and what questions does Big data have to answer.

<b>Area in the decision-making process</b>	<b>Research question</b>
Search for information	What sources of information, to what extent and for what purpose, are buyers using in the process of searching for information on specific goods or services?
	How does the internet and social media affect buyer's information search processes?
Assessment of purchase options	What criteria for the evaluation of purchase options are taken into account by buyers?
	How do the internet, social media, and mobile devices influence the buyers' product choice?
Making a purchase	Can the level of involvement in demonstrating online consumption processes be a criterion for segmentation of buyers and the basis for specific marketing activities?
	What are the marketing implications of the trend of using devices and applications to measure daily activities?
Post-purchase evaluation	Do traditional post-purchase evaluation measures, such as purchase satisfaction or brand loyalty, still apply when directly measure the degree of use of the product?
	To what extent do online reviews of goods and services affect user's attitudes towards them?
	How do the number and variability of reviews affect their readers?

Source: author's research

As shown in table 3, the research has showed, that companies were interested in Big data implementations mainly in areas of marketing communication, marketing research and customer behavior. Social media analysis playing the biggest part in those areas.

#### **4.3 Barriers to Biga data implementation in Slovak companies**

Most of the companies acknowledge the need to implement Big data analytics to increase their competitiveness. They are also aware of many of the possible benefits, that such an implementation could have, but all of them argue, that there are many barriers that are to be overcome before an implementation can be achieved.

The questionnaire data and the interviews with participating companies identified barriers in four main areas:

- Technological barriers – this group of barriers included specialized software tools and algorithms to store, manage and analyze complex data in a more efficient, reliable and fast manner.
- Human barriers – where companies fear the lack of skills (skilled workers able to do data analytics) as well as legislative barriers in form of laws protecting consumer privacy and protect individuals from misuse of data.
- Organizational barriers – management needs to be willing to embrace new ways of making decisions, they need to think differently build a business strategy that incorporates big data. These barriers include processes as well as organizational culture of a company.
- High entry cost of Big data solutions – this is the main barrier, that is acknowledged by all the respondents. This barrier is affecting many other related barriers like lack of technological infrastructure, lack of methodology, but if affects many barriers that are employee centered as well, like lack of motivation and rewards, lack of training, etc.

Semi structured interviews with Big data solutions providers showed additional Big data implementation barrier, that companies are usually not aware of:

- Lack of up-to-date knowledge about Big data solutions – many companies are not aware of cloud-based solutions, that require nearly no investment in IT infrastructure and basically no data analytics skill from employees. Not to mention reduced cost of such solutions. Considering that 2 of the previously mentioned barriers can be voided by this knowledge, we consider it the most important barrier to Big data implementation.

## 5 Conclusions

The growing number of studies devoted to the use of big data in marketing proves the growing importance of this source of information in business practice. Due to the activity of buyers on the Internet, companies are able to identify the current state of meeting specific needs much easier than before, the level of intensity of experiencing related problems and the degree of readiness to make another purchase.

According to our result, Slovak companies show positive attitude to Big data solutions implementation in marketing analytics. The number of implementations depend on the size of the company, size of foreign investment in the company (the higher the foreign investment, the higher the use of Big data), as well as the area of economic activities according to SK NACE Rev 2. Financial and insurance institutions and wholesale and retail companies show most Big data implementations across all the company sizes.

Slovak companies use Big data analytics mainly in the areas of marketing communication, marketing research and customer behavior. Social media analysis playing the biggest part in those areas.

Wider use of Big data solutions is limited by barriers to its use. Lack of up-to-date knowledge about Big data solutions together with human and organizational barriers are the most significant barriers to wide Big data implementation in Slovakia.

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## Should we give Solow another chance? Testing human capital proxies

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**Abstract.** In this paper, we tested an augmented Solow model with human capital on cross-sectional data with various proxy variables for human capital. We found that the assumed output elasticities of the production factors coincide with the real data in the periods between 1960 and 2000. In later periods, the estimated impact of physical capital was overestimated. We have identified the source of this overestimation in the imperfect selection of the proxy variable for human capital. We tested the Solow model with four different proxy variables for human capital on two samples of countries in the period 1990-2015. We found that using the proportion of people over the age of 15 with at least some tertiary education and the average length of schooling, our estimates are very close to the predicted values from the article by Mankiw, Romer, and Weil [15].

**Keywords:** Solow model, Human capital, Cross-sectional data

**JEL classification:** O47, I25

### 1 Introduction

Mankiw, Romer and Weil (hereinafter referred to as 'MRW') “show that an augmented Solow model that includes accumulation of human as well as physical capital provides an excellent description of the cross-country data“ [15]. In this paper, we have estimated the basic Solow model based on the MRW approach over a moving 25-year period between 1960-2017. We have found that the impact of physical capital is significantly overestimated and increases over time.

The abovementioned authors dealt with the problem of overestimated impact of physical capital by incorporating human capital, which they identified with an education measured by the share of enrolled students in secondary school in the working age population [15]. This choice of a proxy variable for human capital has been criticized by several authors [9], [16]. For the basic replication of the model, we

therefore chose data on the proportion of people older than 15 years who completed at least some education at a secondary school. We estimated the augmented Solow model on a moving 25-year period in the years 1960-2015. The output elasticity of human capital oscillates around the predicted value of 0.3 during all periods. The impact of physical capital is slightly lower in the first half of the period compared to the predicted values and in the second half it is slightly overestimated in both samples of countries. As a potential source of overestimation of the effect of physical capital, we identified an imperfect choice of a proxy variable for human capital. It is possible that with the increase in automation of many activities in the last two decades, the share of the secondary school population no longer captures a significant part of the human capital used in production. Based on this hypothesis, we estimated the augmented Solow model in the period 1990-2015 with various proxy variables for education. We have come to a conclusion that our estimates are closest to the MRW predictions using the proportion of people over the age of 15 with at least some tertiary education and the average length of schooling.

## 2 Review of literature

In 1956, Robert Solow introduced his theoretical model of long-term economic growth [17]. According to the Solow model, whether a country is rich or poor depends on its savings rate and population growth. The accumulation of household savings creates investments that result in new physical capital. Solow presented several possible extensions of the model, one of which was exogenous technological progress, which multiplies the influence of production factors on the output of the economy.

Mankiw, Romer, and Weil took Solow's work seriously and derived testable hypotheses from the Solow's "textbook" model, which they verified by using standard econometric techniques [15]. After the incorporation of human capital, they found out that the extended Solow model well describes the cross-sectional data in the years 1960-1985.

The MRW paper provoked a lot of discussion and was criticized mainly for the chosen econometric framework. According to Islam, the chosen approach based on cross-sectional data is inappropriate due to an omitted variable bias and due to a non-control for country specific shocks [12]. He dealt with these problems using dynamic panel data models but did not experience similarly convincing results as MRW. The issue with the endogeneity of explanatory variables was addressed by Caselli et al. [6]. Based on the GMM estimator, they estimated a "textbook" and an augmented Solow model. Likewise, as with Islam, the resulting estimates did not agree with the basic predictions of the Solow model.

Several authors have investigated the robustness of the Solow model using various samples of countries divided into groups by per capita income [4], [18]. Brumm focused exclusively on the analysis of cross-sectional data and did not confirm the robustness of the augmented Solow model. Similar conclusions were reached by Temple, who analyzed panel data in addition to cross-sectional data and showed that "estimated



technology parameters and convergence rates are highly sensitive to measurement error" [18].

Although MRW showed that the extended Solow model describes data well for large samples of countries, the results for the OECD group were not so convincing. According to MRW, this implies a greater distance from the steady state in OECD countries [15]. This problem was addressed in more detail by Nonneman and Vanhoudt, who saw the reasons for these shortcomings in the excessive similarity of the countries, or in the possible non-inclusion of an important variable in the model [16]. Based on this observation, authors added an endogenous accumulation of technological know-how to the augmented Solow model, which was then able to explain up to 3/4 of the total differences in per capita income. Another approach was taken by Canarella and Pollard [5]. For their estimates, they used a newer version of the Penn World Table database, which has undergone several methodological adjustments. They found that, compared to MRW estimates, the explanatory power of the Solow model has increased significantly in OECD countries.

The literature on the selection of a proxy variable for human capital is not as broad as the one on testing the Solow model. Knowles and Owen have shown in a wide sample of countries that human capital in the form of health has a greater impact on per capita income than human capital in the form of education has [13]. In cross-sectional data from 50 countries, Hanushek and Woessmann pointed out that the impact of quality of education (measured by international student tests) has a significantly greater impact on economic growth than variables reflecting the quantity of education (average number of years of education) [10]. Breton criticized this approach and estimated the augmented dynamic Solow model on panel data with various proxy variables for human capital [3]. Author focused mainly on comparing the variable on the quality of education from Hanushek and Woessmann's article with education expenditures. He found that improvements in student tests only increase GDP growth rates for countries with low average school attendance (less than 7.5 years) in contrast to spending on education, which, according to Breton, increases growth even in countries with longer average school attendance.

To summarize: using a cross-sectional approach, the results of the augmented Solow model are largely consistent with the basic predictions, with a significant impact of both physical and human capital. Using panel data, the results seem much more sensitive to the sample of countries used and to the econometric techniques chosen.

### **3 Methodology and data**

As already mentioned, analysis of the Solow model based on panel data does not provide results similar to the basic predictions, and the impact of human capital is rarely statistically significant. A panel approach in examining various proxy variables for human capital in the augmented Solow model has been applied in e.g. Hojdan [11]. The robust significant impact of human capital has not been confirmed in international PISA tests either.

Criticism of the MRW model estimates using OLS was largely associated with omitted variable bias. The omission of other variables is addressed by Breton, who argues that other variables such as institutions, culture, or policy variables determine the amount of national income through the accumulation of physical and human capital [2]. Several studies that have examined the robustness of determinants of economic growth confirm this hypothesis [14], [7]. Authors such as Islam, using panel data and various estimators tried to deal with other econometric issues such as assumption of homogeneity of production functions across countries [12]. Although panel data models are better able to deal with econometric problems, it should be emphasized that the Solow model is a model of long-term economic growth. The selection of the length of periods when testing the Solow model is in our view essential. The discrepancy between estimates on different types of data may be the result of the rigidity of school systems, which can only change very slowly. Based on this consideration, we therefore chose to use the cross-sectional approach with OLS estimator for our analysis.

Data on the real GDP at chained PPPs (in 2011 US \$) were obtained from the Penn World Table 9.1. For the share of investment in GDP, we used data from the United Nations on Gross fixed capital formation as % of GDP (the problem here is that they are available only since 1970). Like MRW, we divided the real GDP by data on the population aged 15-64, which we obtained from the World Development Indicators database. From these data, we also calculated a population growth. As a primary source of data on education, we used the Barro and Lee database from which we gathered data on the proportion of people older than 15 years who completed at least some secondary and tertiary attendance [1]. From the same dataset, we have drawn the data on the average length of education. The human capital index from Penn World Table 9.1 was chosen as another variable. This indicator is composed as the number of years of education and the estimates of returns for individual years of schooling.

In this paper, we used two samples of countries. Like MRW, we used groups of countries called non-oil and intermediate countries. The first sample is for countries where oil extraction is not the dominant sector. In the case of the intermediate group, countries with a population of less than 1 million were removed from the non-oil sample (referring to the period when the MRW paper was published). Some data were not available, especially for some African countries, resulting in an imperfect replication of samples from the MRW article<sup>1</sup>.

## 4 Empirical results

In the first part of this chapter, we tested the predictions of the Solow model about the output elasticities of production factors over a moving 25-year period from 1960 to the present. We found that the augmented Solow model with human capital, coincides with the basic predictions during all periods. We have found that the augmented Solow model with human capital is relatively consistent with the fundamental prediction during all periods. In the second part, we tested various proxy variables for human

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<sup>1</sup> Datasets we worked with, including .do files in the Stata, can be found at:  
<https://www.dropbox.com/s/lkm6dx5lspmqz4/Hojdan%20%282020%29%20edamba.rar?dl=0>

capital. The human capital index has the largest estimated impact on GDP per worker. In contrast, models with a share of people with tertiary education and an average number of years of schooling are closest to the predictions of the Solow model.

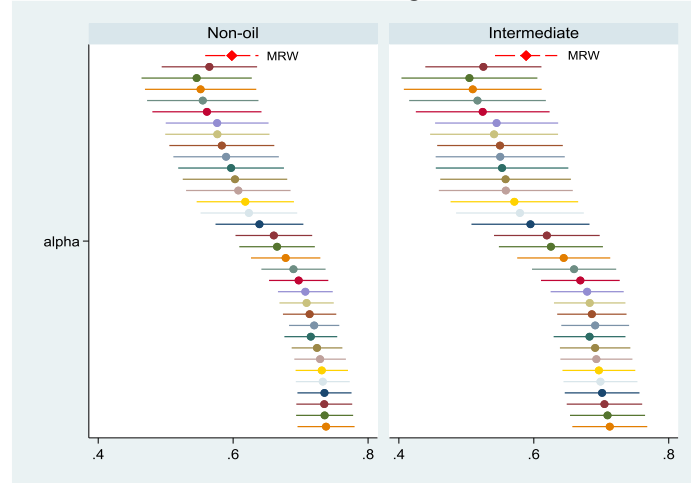
#### 4.1 Testing the Solow model over time

As a starting point for our analysis, we chose to test the basic Solow model without human capital. The main parameter on the basis of which we can verify the validity of the model is the so-called output elasticity of physical capital  $\alpha$ . Essentially, it indicates how the output of the economy will increase if we involve another unit of physical capital in the production process. The general rule and also the MRW prediction for the Solow model is a value of  $\alpha$  about 0.3.

To test the prediction of the model on real data, it is necessary to derive its econometric form according to the MRW model:

$$\ln\left(\frac{Y(t)}{L(t)}\right) = c + \frac{\alpha}{1-\alpha}(\ln(s_k) - \ln(n+g+\delta)) + \epsilon \quad (1)$$

where  $Y/L$  is GDP per worker,  $s_k$  is the savings rate (in our case the average share of gross fixed capital formation in GDP),  $n$  is population growth (an average growth of the labor force),  $g$  expresses technological progress and  $\delta$  is a depreciation of capital. Like MRW, we assume that  $g + \delta = 0.05$ . The constant  $c$  expresses the initial state of technology in the countries and  $\epsilon$  expresses the random component. We estimated this econometric model on samples of two countries using constrained regression on cross-sectional data. We then calculated the average values of the parameter  $\alpha$  and the corresponding confidence intervals. We repeated this process 34 times for both samples of countries and on all possible 25-year periods (the length of the periods was chosen according to MRW) between 1960 and 2017. The average elasticities are shown in Figure 1. First, we can notice that the estimated parameter  $\alpha$  based on our data slightly



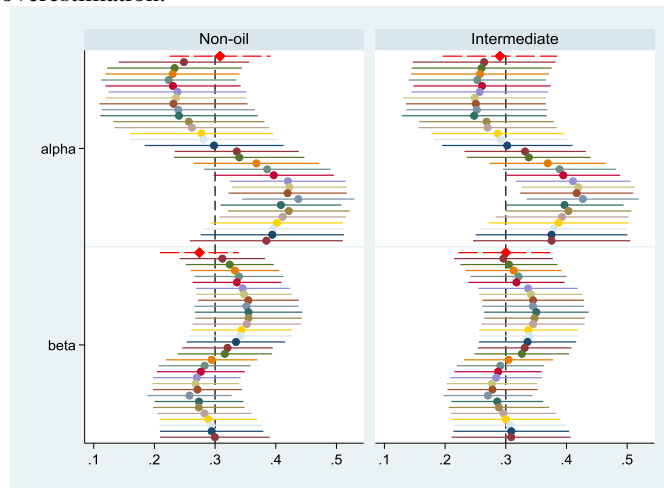
**Fig. 112:** Evolution of the estimated output elasticity of physical capital over time. The first point corresponds to the MRW estimates. Estimates are displayed from the top to the bottom in the chronological order. *Source: Author's calculations*

differs from the parameter estimated by MRW (first and second observations from above). This is mainly due to the corrections that databases have undergone over the last decades. Based on our results, we came to the same conclusion as MRW that the basic Solow model significantly overestimates the impact of physical capital. As we can see, this overestimation increased over time to a level close to 0.8. This large difference from the predicted value implies omitting an important variable in the model.

MRW have tackled this problem by extending the Solow model to another factor of production - human capital. As with the basic model, in this case we can derive an econometric equation for the extended Solow model in the form, where we can calculate the output elasticities after estimates:

$$\ln\left(\frac{Y(t)}{L(t)}\right) = c + \frac{\alpha}{1-\alpha-\beta}(\ln(s_k) - \ln(n+g+\delta)) + \frac{\beta}{1-\alpha-\beta}(\ln(s_h) - \ln(n+g+\delta)) + \epsilon \quad (2)$$

The parameter  $\beta$  symbolizes the output elasticity of human capital and the variable  $s_h$  shows the rate of investment in human capital according to the MRW model (in our case we used the share of the population older than 15 years who completed at least some secondary school attendance). We estimated the effects of individual variables using constrained regression and then we calculated the average output elasticities  $\alpha$  and  $\beta$ . In this case, we repeated this process 32 times on all possible 25-year periods between 1960 and 2015. The average elasticities and the corresponding 95% confidence intervals are shown in Figure 2. The average values of  $\beta$  oscillate very close to the value predicted by MRW in all time periods and in both samples of countries. With the output elasticity of physical capital, our estimates are slightly underestimated in the first half of the periods under review whereas in the second half we may observe a more significant overestimation.



**Fig. 2:** Evolution of the estimated output elasticities of production factors over time. The first period: 1960-1985 (top), the last period: 1990 - 2015. The reference line shows MRW predictions for elasticities of production factors. *Source: Author's calculations*

Based on these results, we may conclude that the augmented Solow model relatively well describes real data during all the examined periods and on both samples of countries. Our main hypothesis is that the overvaluation of physical capital in the second half of the study period is caused by an imperfect proxy variable for human capital. It is possible that with the increase in automation of many activities in the last two decades, the share of the secondary school population no longer captures a significant part of human capital used in production. In light of this, we assume that by using other auxiliary indicators that reflect, for example, higher education, we can explain part of the differences in GDP per worker attributed to physical capital (based on the standard assumption that physical and human capital are positively correlated).

#### 4.2 Testing Proxy Variables for Human Capital

When testing proxy variables for human capital in the augmented Solow model, we chose a standard framework based on MRW. The explained variable in the regression is the real GDP per worker in 2015. The explanatory variables are the average share of gross fixed capital in the country's GDP in the years 1990-2015 and the average growth rates of the population aged 15-64 in the same period (increased by  $g + \delta = 0.05$ ). As a proxy for human capital, we tested 4 variables:

1. Share of the population older than 15 years that completed at least some education at secondary school
2. Share of the population older than 15 years that completed at least some education at tertiary school
3. Average length of schooling (in years)
4. Human capital index (based on years of schooling and returns to education)

We estimated the augmented Solow model on a non-oil sample using OLS without restriction (in the first part of Table 1) and with restriction (in the second part of Table 1). Models 1 to 4 differ only in the proxy variable used for human capital. The largest estimated impact of the proxy variable has an index of human capital from the Penn World Table database. In this case, the calculated output elasticity  $\beta$  with a value of 0.509 is significantly overestimated compared to the predictions. This overestimation may be due to the endogeneity of this explanatory variable. It is reasonable to assume that in countries with a better institutional environment, educational returns are significantly higher. Thus, this variable appears to be highly correlated with other growth determinants that are not included in the model, which overestimates the estimated effect. In models 2 and 3, which use tertiary school and average years of schooling variables as proxies, the calculated elasticities of physical and human capital are closest to the values predicted by the augmented Solow model. These results are in line with our hypothesis that human capital over the last years needs to be measured by indicators that also reflect higher education than secondary school.

In Table 2 we can see the estimates of the extended Solow model for countries from the intermediate group. The extended Solow model in this case explains the differences in GDP per worker (based on adjusted R-squared) worse than in the previous sample. In this group of countries, small countries with less than 1 million inhabitants are absent. The Solow model can well describe large differences in per capita income

**Tab. 1:** Estimates of the augmented Solow model for non-oil countries with different proxies for human capital (1990-2015).

<i>Dep. var.:</i>	(1)	(2)	(3)	(4)
<i>Real GDP p. c. 2015 (PPP)</i>	secondary	tertiary	years	human
Observations	88	88	88	92
$\ln(I/GDP)$	1.130*** (0.279)	0.823*** (0.242)	1.010*** (0.243)	0.928*** (0.218)
$\ln(n + g + \delta)$	-3.207*** (0.495)	-2.475*** (0.436)	-2.431*** (0.457)	-1.532*** (0.457)
$\ln(school)$	0.808*** (0.126)	0.602*** (0.063)	1.329*** (0.148)	2.513*** (0.234)
<i>Constant</i>	9.647*** (1.340)	10.796*** (1.039)	8.826*** (1.162)	7.803*** (1.075)
Adjusted R-squared	0.733	0.809	0.797	0.832
<i>Restricted regression:</i>				
$\ln(I/GDP) - \ln(n + g + \delta)$	1.302*** (0.273)	0.969*** (0.238)	1.019*** (0.236)	0.885*** (0.228)
$\ln(school) - \ln(n + g + \delta)$	0.947*** (0.110)	0.667*** (0.057)	1.344*** (0.115)	1.952*** (0.153)
<i>Constant</i>	6.805*** (0.254)	8.615*** (0.273)	8.642*** (0.276)	10.893*** (0.395)
<i>Implied <math>\alpha</math></i>	0.401*** (0.060)	0.368*** (0.062)	0.303*** (0.056)	0.231*** (0.052)
<i>Implied <math>\beta</math></i>	0.292*** (0.043)	0.253*** (0.035)	0.400*** (0.044)	0.509*** (0.045)
Adjusted R-squared	0.722	0.801	0.800	0.816

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: Author's calculations

between countries. However, if we choose a sample from similarly rich countries, its success is less convincing. As in the previous case, the output elasticities came closest to the predicted values in models 2 and 3 (we consider the approximation to the value of 0.3 for physical capital to be a more important factor, as we can also compare this value with national accounts).

To summarize: the output elasticities of physical and human capital are almost identical to the predictions of MRW's extended Solow model using proxy variables for tertiary education and for the average length of schooling.

## Conclusion

In this paper, we tested the augmented Solow model with human capital on cross-sectional data at different times and with different proxy variables for human capital. We found that MRW predictions of output elasticities of production factors coincide with real data in the period between 1960-2000. In later periods, the influence of

**Tab. 2:** Estimates of the augmented Solow model for intermediate countries with different proxies for human capital (1990-2015).

<i>Dep. var.:</i>	(5)	(6)	(7)	(8)
<i>Real GDP p. c. 2015 (PPP)</i>	secondary	tertiary	years	human
Observations	70	70	70	73
$\ln(I/GDP)$	1.091*** (0.299)	0.653** (0.264)	0.988*** (0.263)	0.874*** (0.227)
$\ln(n + g + \delta)$	-2.752*** (0.502)	-2.294*** (0.427)	-2.174*** (0.458)	-1.425*** (0.440)
$\ln(school)$	0.854*** (0.166)	0.572*** (0.072)	1.345*** (0.183)	2.520*** (0.256)
<i>Constant</i>	8.824*** (1.551)	11.086*** (1.101)	8.427*** (1.300)	7.787*** (1.144)
Adjusted R-squared	0.674	0.767	0.749	0.818
<i>Restricted regression:</i>				
$\ln(I/GDP) - \ln(n + g + \delta)$	1.230*** (0.278)	0.862*** (0.252)	0.966*** (0.248)	0.737*** (0.236)
$\ln(school) - \ln(n + g + \delta)$	0.972*** (0.137)	0.637*** (0.067)	1.314*** (0.140)	1.910*** (0.167)
<i>Constant</i>	6.934*** (0.290)	8.795*** (0.289)	8.758*** (0.288)	11.063*** (0.407)
<i>Implied <math>\alpha</math></i>	0.384*** (0.064)	0.345*** (0.072)	0.295*** (0.061)	0.202*** (0.058)
<i>Implied <math>\beta</math></i>	0.304*** (0.049)	0.255*** (0.041)	0.401*** (0.049)	0.524*** (0.050)
Adjusted R-squared	0.671	0.755	0.752	0.797

Standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . *Source: Author's calculations*

physical capital is overestimated compared to the predictions of the Solow model. We have identified imperfect choice of a proxy variable for human capital as a possible source of overestimation of this impact. It is possible that with the increase in automation of a large number of tasks in the last two decades, the share of the secondary school population no longer captures a significant part of the human capital used in production. Subsequently, we estimated the augmented Solow model with four proxy variables for human capital for the period 1990-2015. We found that using the proportion of people over the age of 15 with at least some tertiary education and the average length of schooling, our estimates are very close to the predicted values from the MRW article.

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## Online education – turning challenges into opportunities

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**Abstract.** Until recently, the use of online educational methods and tools was perceived as a sign of innovativeness, usually providing educational institutions a competitive advantage. However, due to emergency state proclaimed in many countries worldwide in 2020 in relation to the coronavirus (COVID-19), the majority of educational institutions had to undergo a complete turnover towards distance education, in which the online education has played a crucial role and has become a necessity. The fact, how educational institutions cope with challenges related to the education in online environment might have a huge impact on how their quality, reputation and sustainability is perceived. Therewithal, mastering efficient online teaching practices can be considered as an essential step towards sustainable education. What solutions, technologies and tools are used worldwide to face present challenges in online education? What are the best practices or advice that could be followed and implemented by teachers to facilitate the process of online education? The aim of this paper is to identify and discuss innovative and efficient online teaching practices and recommendations stated in the corresponding literature, as well as to provide our personal experience with online teaching during the temporary university shutdown due to the COVID-19 pandemic.

**Keywords:** COVID-19, Education, Digital Technology

**JEL classification:** *I 20, I 21, O 33*

### 1 Introduction

Education has an important role in the process of developing knowledge, skills, mindset, and attitudes, which enable people to contribute to and benefit from sustainable and inclusive future (OECD, 2018). It is important to differentiate between the term education and learning. Whilst the education is considered as the acquisition of knowledge in a classroom setting, the learning signifies “the process of an ongoing, lifelong journey that may not always be clearly planned or even intentional” (Masadeh, 2012). Therefore, it can be claimed that the education is related to educational institutions where the knowledge is being imparted from teachers to the students.

Learning is then the process in which the students adopt received knowledge, values and skills and enhance them throughout their life together with other experiences.

A sudden outbreak and fast spread of the COVID-19 pandemic in 2020 has caught the world by surprise and caused significant changes, including the area of education. As a result of the coronavirus - related quarantine, many educational establishments worldwide were forced to undergo a complete turnover towards online education, within a short period. Flexibility of educational institutions and their ability to adapt to changes regarding the transition from face-to-face to online teacher-student interaction has become one of the key prerequisites predisposing them to handle the pandemic situation. The use of digital & smart technologies has proved to be a valuable tool in this process, facilitating flexible reactions for present and upcoming challenges in online education. In addition, best practices already identified and implemented by other educational institutions may serve as an inspiration for other teachers who strive to create an innovative and efficient online educational environment.

In this paper we provide teachers and educational institutions with recommendations for yielding most of the opportunities the online education provides, which would help them to contribute to the sustainable development of the online educational process in general. The discussed innovative online teaching options as well as provided recommendations and best practices also result from our own personal experience with online teaching.

It can be stated that the situation with the coronavirus has only accelerated the inevitable progress in technology and the development of online educational practices. It can be considered as a test of readiness of educational institutions to current and upcoming trends in the field of online education. In case the challenges the online education presents are identified, understood, and managed using proper strategy and tools, they have a potential to be turned into opportunities forwarding societal transition towards sustainable development.

## 2 Online education and its aspects

The **online education** is defined as the process of gaining experience and knowledge using **digital devices connected to the internet** (Kim and Bong, 2006). The online education can be considered as a subset of the **digital education**, where digital education signifies the process of education during which knowledge or skills are enhanced by means of digital technology (computers, laptops, mobile devices) (CEPS, 2019). The process of online education is frequently used in the connection with terms like e-learning, distributed learning, web/net/Internet-based learning, cyber learning, or virtual learning (Keengwe and Kidd, 2010).

It can be distinguished between **synchronous** online education which entails a real-time communication (by means of video, web conferencing, instant messaging), and **asynchronous** online education which entails the online communication which is not occurring in real-time (by means of pre-recorded lectures, Powerpoint presentations, podcasts, emails). Although the asynchronous communication provides the learner a

flexibility in time and pace for processing new information, it increases the risk that the learner misunderstands an information (Bloomberg, 2020).

The combination of online education with traditional face-to-face education is signified by the term **blended education** (Keengwe and Kidd, 2010). To sum up, online education can be efficiently combined with face-to-face education in traditional classrooms. However, the online learning plays a crucial and an irreplaceable role if the education occurs per distance.

## 2.1 Advantages of online education

The advantages of online education are principally related to its accessibility, affordability, or flexibility (Dhawan, 2020). The accessibility means that all students can attend a real-time lecture or an online educational module from any place with a solid internet connection. Online education is claimed to be a relatively affordable option, if considered that it avoids the cost of transportation or accommodation of students. Moreover, some online educational options, like online courses can be accessed anytime, which stimulates the development of students' own time management skills. However, real-time online lectures or webinars require the participation at a certain, predetermined time. Furthermore, by online education, a broader audience can be addressed than in case of traditional education. A subject for further discussion and surveys could be to determine the optimum number of students at various types of online learning activities. Teachers need to ensure that a personal attention is provided to individual participants of an online lecture, and, at the same time, the knowledge of the whole group of participants is enhanced. In addition, online education is considered as a tool which can make educational process more innovative and creative, especially in times of crises (Dhawan, 2020), which can be related to novel way of assigning homework (videorecording), to the use of supporting tools for planning the meetings and organizing the schedule (videoconferencing platforms, schedule organizing platforms), real-time online discussions, re-replaying the pre-recorded videos, the use of screen sharing, and other tools which can make the process of education more organized, transparent, understandable and efficient.

## 2.2 Challenges of online education

There are numerous challenges related to the online educational process. The online education cannot be performed in case proper technological devices embedded with required functions are lacking. Besides that, major problems with online education could be related to various technical issues, such as camera/ microphone/ installation errors, etc. The online education also requires a certain level of computer literacy and skills of the users. In case the online education is a part of the distance-education, there other potential burdens could occur in the process, such as the lack of privacy, unsuitable learning environment of students at their homes, as well as a limited cooperation among colleagues due to the remote teamwork (CEPS, 2019). Although online education is posed to numerous challenges, many researchers state the opinion that it can be at least as effective as traditional forms of education, if facing those challenges wisely.

### 2.3 Trends and modern tools in online education

Educational institutions are in demand of methods and tools for the effective implementation of strategies leading to the achievement of desired objectives in the educational process. There exist plenty of opportunities for educational institutions and teachers that the online world provides, such as e-learning systems and moodles, text messages via e-mails or various apps, podcasts or video streaming, electronic books and online libraries, blogs, movies, games, simulations, role-plays, webinars, tutorials to master a program, as well as tools for online testing and examining, videoconferencing or presentations. The increase of EdTech (Educational Technology) start-ups has also been noticed (Dhawan, 2020).

The following section offers the list of several chosen products / programs / apps/ platforms for online teaching, most of which have been used by many educational institutions and students during the pandemic COVID-19 (Štátny pedagogický ústav SR, 2020; Dhawan, 2020).

- **Online meetings and Webconferencing tools:** Microsoft Teams, Zoom, Adobe Connect, Google Hangouts, Webex, Jitsi Meet, join.me, GoToMeeting
- **Tools used for surveys:** Google Forms
- **Tools used for quizzes/ voting:** Kahoot, Sli.do, Socrative, Poll Everywhere
- **Online learning apps and platforms:** Khan Academy, Udemy, Coursera, edX, Lynda, Memrise, Duolingo, Byju's, General Assembly, TED-Ed, Amplify
- **Cloud solutions:** Google Drive, OneDrive (Microsoft), iCloud (Apple)
- **Tools for managing school assignments & providing other classroom activities:** Google Classroom, Edupage, Teemea, Edmodo, Schoology
- **Drawing/writing platforms:** Google Jamboard, Google Drawings
- **Tutoring / coaching platforms:** GuruQ, Board Infinity, ClassPlus
- **Professional connecting & networking networks:** LinkedIn
- **Online educational books:** Expol Pedagogika, cK-12
- **Creating online presentations:** Microsoft Powerpoint, Projeqt, Prezi
- **Video creating platforms (also from shared screen):** Youtube, FreeCam, Bandicam, Animoto, Adobe Spark Video (Apple), Ezvid, Vimeo, ClearSlide, Screencastify
- **Others:** Scratch (introduction to programming), SelfCAD (3D CAD software); Thinglink (interactive image and video technology), PhET (interactive simulations tool)

### 2.4 Recommendations for pedagogues teaching online

A change in the pedagogical approach has been considered crucial for the successful implementation of online educational methods, also during COVID-19 pandemic. Whilst many best practices used by face-to-face teaching can be effectively used by online teaching, the approaches and means for applying them should differ and adapt to the character of online environment (Pace, Pettit and Barker, 2020).

In the coming years, it will be expected from students to be able to formulate clear and purposeful goals, identify multiple solutions to a given problem, work on tasks individually and within a group, as well as be open to different perspectives and opinions regarding a given problem (OECD, 2018). Therefore, teachers should encourage the group work in combination with personalized approach and create such educational environment in which constructive feedback is highly appreciated. The online environment encourages and enables teachers to achieve stated objectives using more innovative and creative tools. According to Kim and Bong (2006), online lessons should be relevant, collaborative, project-based, creative, innovative, student-centered, dynamic, and interactive. The dynamics and interactivity may be also achieved by applying *flipped classroom teaching style*, for which it is typical that students are provided with pre-recorded lecture and real-time scheduled lecture is then left for discussions (Dong, Lee and Aw, 2020). By prerecording video lectures, pedagogues can increase the quality of the online educational process. It is also possible to add a narration to a created Powerpoint presentation by using the option “*Record Slide Show*” (Gill, Parker and Richardson, 2005; Bloomberg, 2020; Oranburg, 2020).

During the process of online education, teachers should give students a possibility to enhance their critical thinking skills, data analysis and interpretation abilities, as well to use the achieved information and knowledge in projects and real-life situations. Moreover, teachers should support students by providing them with effective online instructions and guiding them while accomplishing given tasks (Dhawan, 2020). In online environment, the role of a teacher shifts from being a lecturer and a controller to being rather a consultant providing necessary resources and information. Teachers should create a dynamic learning environment which encourages inquiry and discussion and is open to new ideas as well as constructive criticism (Sieber, 2005).

Furthermore, it is also advised to have several alternative plans prepared in case the attention of students decreases or some technical issues occur (CEPS, 2019). It is extremely important for teachers to structure and organize courses and lectures in advance, get familiar with technological equipment and clearly explain the rules (regarding participation, communication, use of technology, etc.) and required deliverables to the students (Gill, Parker and Richardson, 2005; Dong, Lee and Aw 2020; Dykman and Davis, 2008). Another best practice is to demonstrate to the students the characteristics of a well-completed assignment by using screen captures or short videos (Wolfe and Uribe, 2020), as well as to explain how they can benefit from provided study materials (Bloomberg, 2020). It is also extremely important for teachers and students to provide and receive a frequent feedback during any educational process, especially in terms of online educational process (Dong, Lee and Aw, 2020; Bloomberg, 2020). In addition, teachers themselves should yield benefits of a variety of online educational programs to enhance their own knowledge and, thus, increase the quality of the teaching process.

## 2.5 Innovative techniques and best practices in online education based on our personal experience

During the shutdown of the UEBA (University of Economics in Bratislava) due to the COVID-19 pandemic in 2020, the educational process at PHF (Faculty of Business Economy with seat in Košice, University of Economics in Bratislava) was carried out at a distance for about two months, generally through the platform **Microsoft Teams** which has proved to be useful in many aspects when providing online lessons. It encompasses the online chat option through which students can pose questions to the teacher or inform the teacher about technical problems related to their microphone or camera preventing them from interacting through audio or video. The Microsoft Teams is interconnected with Microsoft Outlook e-mail platform. After scheduling an event in the form of an online lesson or a consultation in Microsoft Teams and assigning respective participants to the created event (which can be done manually or by creating a folder of a given study group with the list of participants and adding the name of this folder when creating an event in the calendar), the notification to the upcoming event will be received by participants in the corner of the Microsoft Outlook window. The Microsoft Teams also allows to upload documents and files related to a study topic, as well as to share a computer screen with students online. However, a full list of participants of a meeting is not accessible after the meeting finishes, and, therefore, it is recommended to download the attendee list during the meeting.

In addition to Microsoft Teams, the **E-learning system** is commonly used for several courses at the PHF Faculty, including the course Statistics. It provides the option to upload study material, announce news regarding upcoming tests, as well as to create, carry out and validate tests and exams. It is possible to insert many test questions and then let several random questions for each individual student to be selected. This practice increases the variety of possible tasks received by a student at the test, and, thus, the probability that students would treat their studying process as a more complex and would make a considerable effort to prepare to pass a test or an exam successfully. During the whole semester, the students were encouraged to discuss given tasks, as well as to state proposals and tricks to facilitate the learning process, through the **online forum** within the mentioned E-learning platform. Throughout the whole teaching process, we have tried to apply a positive motivation, which we highly recommend for any other courses as well. It has also been observed that the engagement level of some students in the educational process tends to rise in case they are motivated by the recognition of a teacher or higher authority of the university, or by a possibility to earn some bonus points during the course or to have a competitive advantage at an exam.

During the distant teaching of the course Statistics, within the study groups “A” and “D”, to support the teaching process running through Microsoft Teams and the E-learning platform, other tools and innovative solutions were used, which we describe in the following section.

Firstly, it should be emphasized that a constant self-education of teachers is the prerequisite for efficient and innovative education of their students. Before and during the course, the teacher enhanced own knowledge through the portal *Udemy* (the online course “Statistics for Data Science and Business Analytics”). This portal provides the

variety of courses, either for free or for a relatively low fee. However, there exist many other similar portals and platforms for online education, as listed in the chapter 2.3 of this paper.

At the end of each semester, the students of the UEBA university have an opportunity to fill in the questionnaire, in which they can state their opinions on attended courses and respective teachers. In addition to that, we asked students to fill in *a short questionnaire after the first lesson of the Statistics course*, which contained one open question: “Dear students, we kindly ask you to evaluate the first lesson in terms of approach, activities, overall organization, etc. (with each opinion provide an explanation why you think so), as well as to provide your recommendations and ideas for other lectures.” From 49 students, in this brief survey 31 students participated, which is more than 63%. Students were asked to join this survey the same time the study materials were sent to them, and this fact could have psychologically motivated them to participate. It can be summarized that the students positively evaluated especially two aspects of the educational process - the atmosphere during the lesson and the fact that specific practical examples were provided to support theoretical aspects of the study topic. The students highlighted the following aspects related to the atmosphere: addressing students and teacher by first name (based on the name cards on the desks), the mix of individual and group work supplemented by a willing help of the teacher, clear communication, teacher’s enthusiasm, as well as interactive and dynamic environment (the teacher asking students many questions and frequently changing the tone of voice and location in the classroom). The students also positively responded to the fact that study materials were sent to them after the lesson, which unburdened them from making excess notes and that way they could stay more focused during the lecture instead. In addition to Microsoft Excel files containing specific tasks and solutions regarding the topic which was the subject of a given lesson (using embedded formulas, graphs, comments inserted to a text, statistical functions), the students also received the summary in the form of Powerpoint slides, which contained theory as well as practical implications and tasks.

However, the students also stated some suggestions for improvement, such as to decrease the pace of the learning process during the lecture (8 students), display the steps (2 students) and results (2 students) of a given task on the data projector (which was related to the technical issues with data projector during the first lesson), as well as to devote more time to explain the toughest parts of the study topic (1 student). All given suggestions were taken into the consideration when designing and planning the following face-to-face and later online lectures. In addition, based on the aspects in which the students saw a space for the improvement, a “Pareto chart” was created and explained to the students during the next lesson (i.e. most of the problems identified by the students would be solved if the pace of the lecture was decreased). This way, the students could understand the meaning of Pareto chart based on the input they provided which made the learning process more interactive and understandable.

We recommend providing students with the possibility to fill in such a short feedback anytime during the whole course. Moreover, we also suggest discussing with students the options they propose so they feel engaged in the design of learning process. Another alternative is to use a tool like *Slido* by which the students can express their

own opinion on a certain learning activity or vote for opinions of their colleagues. This tool can be also used for a quiz purpose.

The distant education was also conducted using the *videos* with the customized learning content created at *Youtube*. On the videos, the steps for conducting specific tasks in Excel are explained by the teacher, using the *screen sharing* function. First videos were created by means of smartphone. However, we experienced much better quality when the videos were created by means of the screen-recording program *Free Cam* (version 8). Moreover, the speed of uploading the videos on Youtube was much higher if the videos were created through Free Cam than in case they were created through smartphone. Therefore, for recording other videos, the program Free Cam (version 8) was selected. It is a free of charge program, allowing to create videos of a user's PC screen without the need to record the screen by means of external recorders. For the course Statistics, 27 videos with the overall length of around 5,6 hours were created. Uploading the videos through Youtube is convenient in terms of providing the analytical information to the author of the video regarding the watching activity of its viewers (most frequently watched videos, average length of watching, number of views at certain times of the day, etc.).

Another tool which was used in the distant-teaching process was the "game" created through the *platform Duolingo* (commonly known mainly for learning languages), within the subplatform "*Tinycards*" (Flashcards by Duolingo). It is a free tool, accessible from a computer or a mobile phone (after downloading a corresponding app). Based on the specific topics and terms discussed during the course Statistics, 250 cards were created in the platform Duolingo Tinycards. Each card has two sides, and, thus, could represent either a pair of question & answer, or a pair of two terms which are logically interconnected. The designed "game" can be used as an addition to either online teaching or face-to-face teaching process<sup>1</sup>. By clicking at the option "CARDS", it is possible to see the overview of created cards from both sides (can be used in the process of learning). By clicking at the option "LESSONS", the game starts, which works on the principle of gradually allowing the access to other parts after passing the previous parts successfully (can be used in the process of self-testing). The game combines the way it requires the answers for given questions, either inserting a question manually or choosing from different options. However, answers are required in the same form as they were primarily designed on the cards. This training tool also repeatedly generates questions answered wrong before, which allows for a faster improvement. The game can be considered as a training tool, which can be accessed anytime. Since the game progress vanishes gradually in time, it can be renewed by repetitive use. The above-described solution was primarily created to make the students familiar with statistical functions and other options provided by *Microsoft Excel*, through which the course Statistics was practically conducted. For the future, we also propose the use of other statistical software solutions, such as SPSS, SAS, or R, as well as to enhance the *collaboration of the university with the business sphere* and adopt

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<sup>1</sup> The designed game can be accessed through the following links (in Slovak language):  
<https://tiny.cards/decks/YHVeFsDm/statistika-mirka-1-cast>;  
<https://tiny.cards/decks/YHXLHUQM/statistika-mirka-2-cast>.



learning objectives accordingly. Another practice which proved to be efficient in our teaching process was to ask students to deliver a homework in an unconventional way – by **creating** their own ***videos of the completed homework and commenting the steps and decisions*** they conducted throughout the process. Above 80% (by estimation) of the students were identified to have a deeper understanding of the topic when delivering the homework by means of video. This way, misunderstandings of the students experienced during the learning process are revealed much more easily, and thus, the teacher is provided a more efficient feedback in a much shorter time, than by the case when a homework is delivered by a traditional way, i.e. by completing Excel file and sending it to the teacher's email. Based on the findings the "video homework" revealed, the word file was created to help the students to memorize the most important aspects of the course by using efficient ***mnemotechnic aids***. We recommended to use such mnemotechnic aids that would ease the process of remembering, classifying and interconnecting received information, no matter the aspect of the life they refer to (for instance: The statistical characteristics *Modus* represents the most frequent value in a range of values; students can remember this fact according to the former music group *Modus* in Slovakia – at the time this group was at the peak of its fame, its appearance on TV/in newspapers was most frequent). Similarly, the ***file containing the most frequent mistakes*** the students made at the first test can be created and shared among students to avoid repeating same mistakes in further tests. The ***students*** were also ***encouraged to ask questions*** and immediately ***report potential discrepancies or mistakes*** they find ***in the learning materials***. It is important to positively motivate students (for instance by bonus points) to report such cases. In order to find out if the students studied the study materials, we inserted some "secret code" inside (for instance, in the notes in the Powerpoint presentation, between the study text we inserted a sentence: "*The first one of you who discovered this secret code, is asked to write an email to teacher and will be rewarded at the following lecture*").

Based on our experience with online teaching, we can provide the following conclusion. Since the distance makes the interactions between teachers and students "invisible", we recommend teachers to work on solutions which would provide the opposite – i.e. the visibility of the work of students, so teachers can receive a relevant and efficient feedback, based on which the teaching process can be improved. Therein, it is extremely important to create the environment and atmosphere which encourages students to keep providing the active feedback to the teacher, and, at the same time, the tools should be created through which a valuable feedback could be provided to the teacher, even though in the passive form (e.g. through video homework).

### 3 Discussion

In this paper, we provided an overview of methods and tools used in online educational processes worldwide and the best practices in online education identified in the available literature as well as based on our personal experience with online teaching. Despite the fact, that there exists a variety of available online educational platforms and tools, many of them either charge a fee, or are not popular enough to be widely

recognized by the public and educational institutions. Although on the web, it is possible to find several lists of online educational platforms and apps, a common site containing the systematically arranged majority of available solutions as well as their pros and cons, could be a proposal for future research.

Among the best online teaching practices described in the available literature, the emphasis was given especially to the interactivity and dynamism. Based on our experience with online teaching, we can confirm that the use of interactive and dynamic solutions, such as games, videos, or online discussions is highly effective for the transfer of a desired knowledge. For further research, we also recommend the teachers to evaluate the efficiency of the teaching method they decide to use, by means of qualitative and quantitative methods. Other recommendations and tips for online teaching proposed in this paper can serve as an inspiration for other teachers who aim to increase the innovativeness and the quality of the education process.

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## **Synergy of the educational process and the labour market in the context of current societal changes for a selected sector in the Slovak Republic**

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**Abstract.** The presented paper analyzes the disparities on the labour market in the sector of transport, logistics, postal services in the Slovak Republic. For these purposes, the paper evaluated the original results of the national project of Sector-Driven Innovations to an Effective Labour Market within the Sectoral Council for Transport, Logistics, Postal Services, including the quantification of expected labour needs in the 2024 horizon. The education system in Slovak Republic must be considered the engine of the development of the knowledge society. In the short term, we will witness the most turbulent period on the labour market in the Slovak Republic. However, the impact of the pandemic will be short-term, and, in the long term, the economy will cope with the negative effects. We must be prepared to seize this opportunity and attach high importance to the transfer of knowledge gained in the education system into practice. It is one of the key tools to secure an emerging economy in the long term.

**Keywords:** Forecasting, innovation, labour market.

**JEL classification:** J 01, O 33

### **1 Introduction**

The transport, logistics and postal services sector accounts for 6,75 % of total employment in the national economy of the Slovak Republic, making it one of the medium-sized sectors. In numerical terms, this share represents more than 137 000 employees. Despite the strong representation of education in the group of departments 37 (Transport, Post, Telecommunications), this sector is unable to capture even half of

its graduates and thus ensure their application in practice. Therefore, not only in the Slovak Republic, but also in the European area, there is a public debate about the future of work and about the education and training of students. We are currently facing unprecedented challenges - pandemic, social, economic, environmental, and we are also surrounded by digitization, globalization, migration, and adverse demographics. It is therefore necessary to ask the question, what theoretical, professional knowledge, skills, attitudes and values will today's students need to shape to make their world to prosper in 2030? How to ensure the transfer of knowledge gained during the study into economic practice? How important is to link the education system with the needs of the labour market so that disparities on the labour market are reduced not only in the transport, logistics and postal services sectors? Do the labour market forecasts show the justification of this sector in the future in terms of the number of employees? The present paper points out the forthcoming impact of innovative and technological changes in the field of transport and other related services. It also examines the employment of graduates from the relevant fields of education and in conclusion, it suggests the necessary steps for better application of the knowledge gained from the study into practice. The contribution was created within the solution of the national project SRI, which in 24 sector councils brings together representatives of employers, employees, high schools and universities, employment services, public administration, research organizations into a system of describing and predicting job requirements (professions) in jobs today. and the expected future. The author, as secretary of the Sector Council for Transport, Logistics, Postal Services, presents the results of original research conducted from April 2019 to August 2020 in the field of innovation in transport, logistics and postal services and their impact on the expertise and skills of employees in this sector. The main contribution of the paper is the presentation of the results of the professional work of the Sector Council for Transport, Logistics, Postal Services in terms of their application in education and preparation for the labour market based on knowledge of the impacts of future innovation trends in the sector, combined with databases of the structure of future graduates of transport education, logistics and postal services. The results of this activity are already applied in the creation of a description of the minimum requirements for the performance of employment in national standards of employment with direct use in employers' organizations in cooperation with schools and in human resource management.

### **1.1 Methodology**

The present paper is based on the results of two national projects implemented in the Slovak Republic under the authority of the Ministry of Labour, Social Affairs and Family of the Slovak Republic.

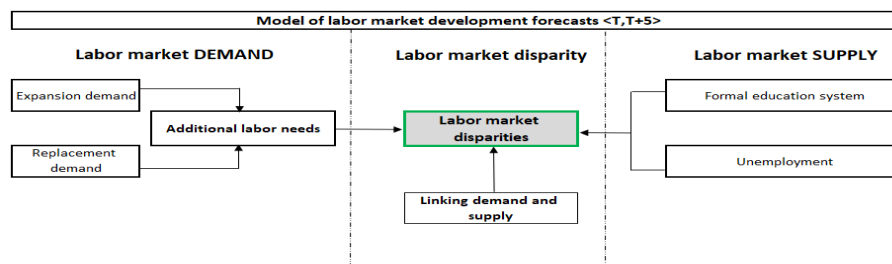
The starting point for the creation of the presented contribution is the National Project of Sector-Driven Innovations to an Effective Labour Market. The urgency of solving the problem of low flexibility of the education system, the absence of an objective and comprehensive description of labour market requirements usable for shaping the composition of suitable educational programs resulted in the

implementation of the National Project National System of Occupations (NSP). In Act no. 5/2004 Coll. on employment services and on the amendment of certain laws as amended, the NSP is defined as the basic systemic framework for the creation of a systemic solution for the transfer of labour market needs to the lifelong learning system.

The National Project Forecasts of Labour Market Development in the Slovak Republic II under the authority of the Ministry of Labour, Social Affairs and Family of the Slovak Republic in accordance with the National Reform Program of the Slovak Republic 2019 implements short-term and medium-term labour market forecasts in close cooperation with employers from all sectors of the national economy and declining job opportunities, quantification of short-term and medium-term mismatch in the labour market and the resulting recommendations for the labour market in the Slovak Republic and its individual regions.<sup>1</sup>

Combining the findings of both above national projects creates a comprehensive picture of the sector in terms of the education system and the labour market. Labour market forecasts in comparison with the preparation of graduates in each sector can accurately assess the state in which the sector is now and in which it will be in the short term 5 years. This important information must clearly be the most important basis for changes in the education system.

**Table 1.** Methodology for forecasting labour market developments



Source: national project Labour market development forecast, Trexima Bratislava, author's processing

The additional labour force needs consist of two basic parts:

**Labour market needs due to replacement demand**

- Stochastic models
- An estimate of the probability of leaving the labour market in individual occupations, sectors, regions by sex and age

**Labour market needs due to economic development (expansion demand)**

<sup>1</sup> European Commission, January 14<sup>th</sup>, 2020. A strong social Europe for just transitions - requiring national and regional authorities in each Member State to EU Member States for the purposes of credible characteristics of the expected needs and requirements of the labour market to work intensively with those who, on the basis of their own economic activity, can credibly anticipate future developments, especially with representatives of employers, employees, as well as with employment service workers and their partners in the field education and training for the labour market.

- International input-output model
- Econometric models (development since 2001)
- Field surveys on expected developments in companies; for self-employed persons; investments; for students
- Official macroeconomic forecasts of the Ministry of Finance of the Slovak Republic
- Soft data from sector experts

## 2 Labour market in the transport sector now and in the future

The most employees in the transport, logistics and postal services sector had the department of education graduated in 2019 2466 Mechanic repairman<sup>2</sup>. In the school year 2018/2019, 224 full-time students studied in this field. In the Slovak Republic, a total of 205 - 305 full-time graduates from this field of education will enter the labour market in the period 2020 - 2025, while approximately 19 % of graduates work in the transport, logistics and postal services sector. Most graduates of this field of education will enter the labour market in 2020. Approximately 8 % of employees in this sector have a degree in education 2466 Mechanic repairman.

The second key department of education in terms of the number of employees is department 7902 Grammar School. In the school year 2018/2019, 70 427 full-time students studied in this field. In the period 2020 - 2025, a total of 33 879 – 35 879 full-time graduates from this field of education will enter the labour market, while approximately 8 % of them are expected to work in the transport, logistics, postal services sector. Most graduates will enter the labour market in 2025. Approximately 4 % of employees in this sector have a degree in education 7902 Gymnasium.

**Table 2.** Number of graduates entering the labour market from key fields of education in the sector in the period 2019 - 2024 in the Slovak Republic

Code and name of the field of education	ISCED <sup>3</sup> level of education	Number of students in the field in 2018/2019	Number of graduates entering the labour market in years 2020 - 2025	Proportion of graduates working in the sector in 2019 out of the total number of graduates in the department	Proportion of employees with a completed department of education out of the total number of employees in the sector <sup>3</sup> in 2019
2466 Mechanic	355	224	205 - 305	19,30 %	7,60 %
7902 Grammar school	344	70 427	33 879 - 35 879	8,20 %	4,40 %

<sup>2</sup> Unified numeric code of a specific department

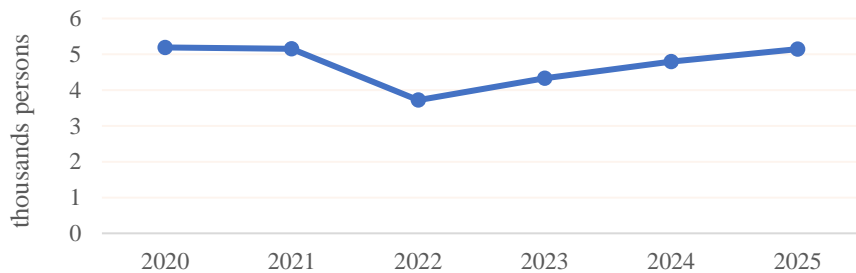
<sup>3</sup> Sector of transport, logistics and postal services

Code and name of the field of education	ISCED <sup>3</sup> level of education	Number of students in the field in 2018/2019	Number of graduates entering the labour market in years 2020 - 2025	Proportion of graduates working in the sector in 2019 out of the total number of graduates in the department	Proportion of employees with a completed department of education out of the total number of employees in the sector <sup>3</sup> in 2019
6317 Business Academy	354	10 632	5 546 - 6 546	6,70 %	3,60 %
2683 Electrical Engineer	352	966	1 174 - 1 374	12,50 %	2,20 %
2672 Electronics Mechanic	354	0	0	9,40 %	2,10 %
2414 Engineering	354	553	1 389 - 1 589	10,90 %	1,80 %
2413 Mechanic of machines and equipment	354	1 185	1 389 - 1 589	10,70 %	1,80 %

Source: national project Labour market development forecast, Trexima Bratislava, author's processing

The total additional need in the transport, logistics, postal services sector will be at the level of approximately 28 thousand people by 2025, of which most in 2020 and at least in 2022. When analyzing the additional labour force needs, it is important to know how additional job opportunities arise in the labour market. The largest number of vacancies due to the exit of the labour market (especially into old-age pensions) will have to be filled in 2025. The highest expansion demand is expected in 2020.

**Table 3.** Development of the total additional labour force needs in the sector of transport, logistics, postal services in the period 2020 - 2025



Source: national project Labour market development forecast, Trexima Bratislava, author's processing

The additional labour force demand is the sum of the expansion demand for labour and the replacement demand of labour. The additional need for employees in the future represents a requirement to supplement the workforce with jobs that will not be possible to fill from currently employed persons.

**Table 4.** Total additional manpower needs and replacement demand according to occupation SK ISCO-08 with the highest additional manpower need in the sector transport, logistics, postal services

Employment SK ISCO-08 <sup>4</sup>	Additional labour force needs in the Slovak Republic in the period 2020-2025	The share of replacement demand in the Slovak Republic in the period 2020-2025	Additional labour force needs in the sector in the period 2020-2025
8332001 Lorry drivers	11 718 - 13 718	44 %	7 233 - 8 233
8331001 Bus drivers	2 699 - 2 899	73 %	2 582 - 2 782
8332005 Truck drivers	1 742 - 1 942	44 %	1 503 - 1 703
4321001 Warehouse worker (warehouseman)	7 333 - 8 333	40 %	1 300 - 1 500
8311001 Driver in railway transport	911 - 1011	73 %	859 - 959

Source: national project Labour market development forecast, Trexima Bratislava, author's processing

## 2.1 Where are graduates of departments focused on transport, logistics, postal services employed?

Disparities on the labour market can also be monitored in detail in the transport, logistics and postal services sectors. Of the total number of graduates in the corresponding fields of education, only about 28 % are employed in this sector. The remaining graduates find their employment in other sectors, which can be explained, for example, by better salary conditions. However, the employment of graduates outside this sector causes a significant shortage of the necessary qualified workforce, which has long been reflected in selected positions.

<sup>4</sup> SK ISCO-08 represents the national classification of occupations based on the international classification ISCO-08



**Table 5.** Proportion of graduates working in the sector out of the total number of graduates in selected fields

Code, name of department, level of education	Sector name	Proportion of graduates working in the sector out of the total number of graduates in the field
3744 Road transport - complete secondary vocational education	Business, marketing, gastronomy and tourism	36 %
	Automotive and mechanical engineering	16 %
	<b>Transport, logistics, postal services</b>	<b>12 %</b>
	Construction, geodesy and cartography	11 %
	Public services and administration	10 %
3702 Transport services – 2nd. university degree	Information technology and telecommunications	20 %
	Automotive and mechanical engineering	16 %
	<b>Transport, logistics, postal services</b>	<b>13 %</b>
	Public services and administration	9 %
	Business, marketing, gastronomy and tourism	9 %
3704 Postal services – 2 <sup>nd</sup> . university degree	Business, marketing, gastronomy and tourism	60 %
	Automotive and mechanical engineering	8 %
	<b>Transport, logistics, postal services</b>	<b>7 %</b>
	Construction, geodesy and cartography	7 %
	Science, research, education, training and sport	4 %
3730 Railway transport – 2nd. university degree	<b>Transport, logistics, postal services</b>	<b>43 %</b>
	Public services and administration	15 %
	Automotive and mechanical engineering	10 %
	Science, research, education, training and sport	6 %
	Business, marketing, gastronomy and tourism	6 %

Source: national project Labour market development forecast, Trexima Bratislava, author's processing

### 3 Key innovation trends for the future of the sector

To define the direction of the sector based on technological and innovative changes, the contribution is based on the so-called basic premises, which are explained in the strategy-making process as "a general idea of where the sector is heading and what it wants to achieve in the specified strategic horizon - the year 2030."<sup>5</sup> It is a proposal for such changes, which, according to experts involved in the creation of the strategy, will have a significant impact on the nature of human work. In order to generalize the

<sup>5</sup> National project team: Methodological manual for the elaboration of sectoral strategies for human resources development.

individual opinions of experts to the whole sector, including all three mentioned parts of the sector - transport, logistics, postal services, it is necessary to define a general wording that expresses the same ideological basis of technological innovation, but space for its application in itself.

Trends that will be key to the future of the sector include the following:

- **Gradual automation, robotics, electronization, and modernization in the sector with an impact on the structure of human resources until 2030 and a long-term perspective until 2050**
- **Transport, logistics system and postal services, respecting the environmental development and challenges of the future**

These two basic ideas of the impact of new technologies and innovations on the whole sector are elaborated for individual parts of the sector for the purposes of the presented contribution.

Transport and innovation-based changes are often linked to a specific mode of transport. However, this part is at the end of the chain of all changes, which are preceded by, for example, the maintenance of vehicles, mechanisms, and infrastructure. New information and communication technologies open unexplored possibilities, especially in knowing the actual technical condition of components and their immediate evaluation. Innovative approaches, methods and tools will significantly help to obtain the basic input factors so that the regular maintenance of the technical infrastructure can be set up correctly and efficiently. The goal is to move from preventive maintenance (where the maintenance plan is usually determined by average or expected life statistics) to a more flexible predictive method of maintenance, based on current online data and actual condition measurements. The flexible provision of spare parts logistics is closely related to the faster and more accurate evaluation of faulty elements of technical equipment in transport. In this area, the use of new elements, such as 3D printing. A large part of maintenance work in the railway transport itself will be performed by staff who do not have to be located, e.g. in depots, but in centralized service centers. Certain maintenance work may be performed remotely from these centers, e.g. software updates or maintenance interventions by highly specialized crews, which are sent to the required location where maintenance service is required.

The big topic is the automation of vehicles, infrastructure and means of public passenger transport. This trend, given the state of the transport market infrastructure in the Slovak Republic and the lack of resources for investment, will have an impact on the transport sector in the longer term than expected on a global scale.

Automation will primarily be deployed for activities related to the operation of vehicles and related infrastructure. It is planned to replace tasks that are complex and demanding for employees or they are recurring, which often leads to accidents caused by human error. The objectives of implementing automation include helping vehicle operators and infrastructure owners to perform tasks that could be prone to error if performed by humans. In the future, the automated system will take control of the vehicle throughout the resp. only for a certain stage of the journey (with or without human supervision). With the advent of these trends in transport, there will be a demand

for new types of tasks, in areas such as traffic management, maintenance and mobility. As a result, the demand for labour will not disappear completely, but the necessary requirements and skills for individual jobs will change. The concentration of employees will be moved to specialized centers. Among the areas with a possible reduction in jobs we can include e.g. operational-maintenance professions. On the contrary, among the areas with the potential to increase employment we can include:

- data analysis,
- diagnostics and evaluation,
- virtual/augmented reality,
- artificial intelligence,
- control of robots and drones

### **3.1 Selection of employers' recommendations for a better connection between the labour market and the education system**

This section presents the proposals of employers based on the defined strategy of human resources development, which should ensure significantly higher cooperation between employers and schools.

- Support for the development of innovative skills of secondary school teachers in accordance with the requirements of the labour market.
- Checking the content of accredited and retraining courses in the field of transport, in accordance with current innovation and technological trends in the sector.
- Elaboration of extended content of the state educational program for the group of departments 37 - Transport, post, telecommunications in the following areas:
  - *Management and coordination of information systems*
  - *Data analysis and processing*
  - *Data diagnosis and evaluation*
  - *Virtual / augmented reality*
  - *Artificial intelligence*
  - *Electronization, automation, new technologies*
  - *Efficient organization of the transport process*

- Support for experimental verification of new teaching and study fields created based on the needs of employers.
- Ensuring more intensive cooperation between the college / university and partners from practice in the field of commissioning joint semester or final theses focused on the application of theoretical knowledge acquired during the study in practice.

## 4 Conclusions and policy implications

The presented paper confirmed the threat to the transport sector in the medium term for two reasons. The first is the shortage of skilled workforce, which will cause significant disparities in the labour market in the future. Graduates coming from sectoral fields of education in many cases find employment outside their field. The reasons may be higher salaries in a competitive industry, lack of internships during studies, which would ensure an easier transition to practice to employers, reluctance to work in uninteresting positions and others. The second reason that may cause problems for the sector soon is innovation and technological change, which we can be already seen today. The strong impact of automation, robotics, new technologies and INDUSTRY 4.0 in general will have a significant impact on changing the professional knowledge and skills of the workforce. The labour market must respond as soon as possible and prepare future employees for these changes.

Forecasts of labour market developments have clearly demonstrated the trend of labour market disparities up to 2025. Special attention needs to be paid to jobs that are and will continue to be scarce in terms of missing workers.

The key skills needed to further the sector, which have been identified in the research as new requirements for education and training graduates, are: digital literacy, elements of artificial intelligence, control of autonomous means of transport, use of robotic elements in transport, logistics, postal services, service automated systems, processing of energy renewable sources and more.

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## Impact of Globalization on Arms Trade – Case Study of Germany

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**Abstract.** Globalization, as a worldwide persistent phenomenon, has affected the defence industry and the trade in conventional weapons at the international and national level. The degree of influence on individual states varies depending on the development of their defence industry, the structure and volumes of the arms trade, geographical location, and other variables. In the article, the author focuses on areas related to conventional weapons in the case of Germany, as one of the leading economies of the European Union, while examining the country in terms of the features defining the concept of globalization. These features include, in particular, the internationalization of Germany's conventional arms trade, the international interdependency of the defence industry and the existence of confirmed illicit arms transfers to countries with imposed arms embargo. All obtained data are compared with the situation in other major European arms exporting countries, namely France and the United Kingdom, in order to determine the extent of the impact of globalization and its positive and negative consequences.

**Key words:** conventional arms, international trade, globalization, Germany.

**JEL:** F19, F52

### 1 Introduction

The concept of globalization is a highly debated issue, whether in terms of its origins, positive and negative impact or its definition. Although there is no common definition of globalization, all definitions contain similar elements. The author relies on the definition of the Organization for Economic Cooperation and Development, according to which *'the term globalisation is generally used to describe an increasing internationalisation of markets for goods and services, the means of production, financial systems, competition, corporations, technology and industries (OECD, 2013).'* This definition covers important areas examined in relation to conventional weapons, namely their transfers and trade, whether legal or illicit, the development of the defence industry and advanced military technologies. Closely related to the phenomenon of globalization is the increase in the number of international conventions

and treaties in the field of control and trade in conventional arms. The expansion of globalization, and the associated interconnection of the national markets, has increased the number of manufacturers and end customers of conventional weapons, accelerated the exchange of military equipment and components needed to produce it, and strengthened countries' overall capacity to produce larger amounts of weapons. Defence companies have become interconnected, and in many cases, final-produced weapons contain components from around the world.

In addition to the positive effects on international trade and the production of conventional weapons, globalization has put pressure on international security. At present, it is becoming increasingly easy for terrorist organizations and individuals to obtain conventional weapons illegally, as well as to transport these weapons to countries that are subjects to an arms embargo. Even some *'defence companies therefore relocate their production abroad in order to avoid relatively strict controls on direct arms exports in their home countries (Oxfam Deutschland, 2006)*. 'As a result of simpler transfers, conventional weapons are thus found in the hands of terrorists or countries with armed conflicts that violate human rights, and become the target of media scandals that worsen the reputation of the countries of origin. The financial profitability of the arms trade also attracts countries around the world to take part in the development of regional armed conflicts through arms exports, which in many cases prolongs their duration.

The interdependency of the phenomenon of globalization and the trade in conventional arms reinforces the need to examine this issue. The author focuses on the analysis of Germany's foreign arms trade, as one of the top European Union exporting countries, from the point of view of the commodity and territorial structure, within which she tries to identify the features defining the concept of globalization. These features include, in particular, the internationalization of Germany's conventional arms trade, the international interdependency of the defence industry and the existence of confirmed illicit arms transfers to countries with an imposed arms embargo. The author uses mainly the method of descriptive analysis, which is based on the quantitative synthesis of data from the world databases of conventional weapons, namely Stockholm International Peace Research Institute (hereinafter SIPRI) and the United Nations Register on Conventional Arms (hereinafter UNROCA). In addition the method of comparison is used in order to compare the data of Germany with other major European arms exporters, namely France and United Kingdom, in an effort to determine whether similar developments and results have taken place in the countries.

The topic of the impact of globalization on the defence industry and the trade in conventional weapons is a highly researched topic, which is addressed by several authors in their publications. T. R. Guay (2007), K. Hartley (2006) or K. Hayward (2000) research the impact of globalization and its implications on the defence industry. The author Y. Kiss (2014) focuses on the analysis of the transformation and position of the defence industry in East Central European countries, both from an economic and political point of view. The issue of national security and conventional weapons in the context of globalization is being explored by B. Mabee (2009), who also highlights the position of the defence industry in the era of globalization. Another of the authors is T. Mirković (2015), who in his publication focuses on the connection between globalization and world militarization.

Among German experts, Jürgen Turek (2017) addresses the topic of globalization, analyzing the effects of globalization on arms development and its associated impact on international security, at the global level. In his publication, Hartmut Küchle (2003) focuses on the impact of globalization on the development of the German defence industry and outlines the new opportunities for cooperation that globalization brings, especially with the United States. Joachim Krausse (2018) focuses on the position of Germany in the context of world arms trade, mainly exports, and their impact on certain regions of the world. In his publication the concept of globalization is described in a small extent from the point of view of its impact on the internationalization of the German defence industry.

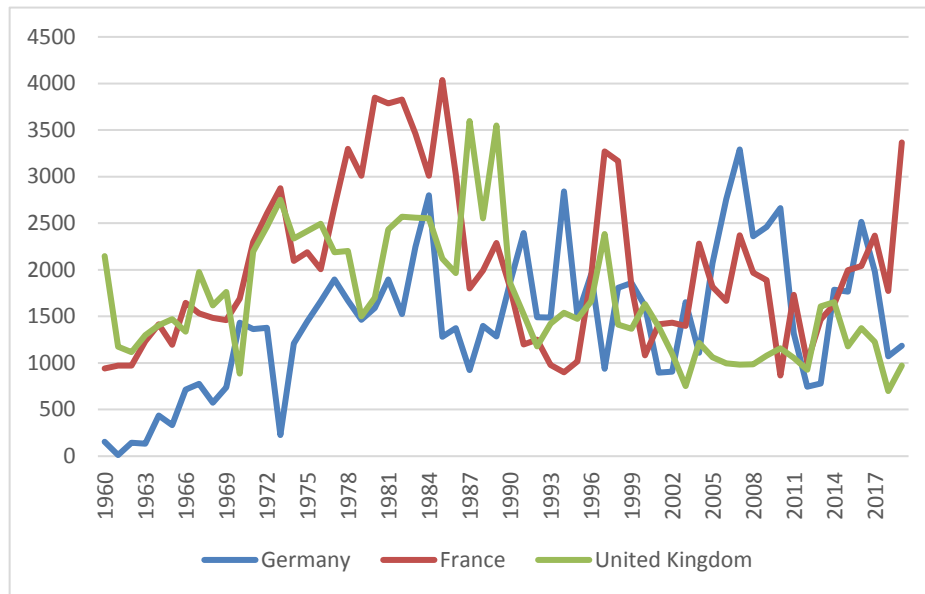
As the issue of the impact of globalization on the conventional arms trade in Germany is given less research than the impact of globalization on the defence industry and trade in its goods and services on a global scale, the author decided to focus her analysis exclusively on this country.

## **2 Analysis of the development of the conventional arms trade of Germany since 1960**

World trade in conventional weapons in the form of their exports is developing relatively irregularly. It reached its highest volumes in the early 1980s, followed by a recession phase until the beginning of the 21st century, when the arms trade revived and re-grew (Statista, 2017). Based on Chart 1, we observe that the development of Germany's conventional arms exports has not copied the overall development of trade. The post-war recovery in connection with the opening of markets had a positive effect on the development of trade of the country with the highest values achieved in the period 1983-1984, 1996, 2007-2011 and 2015, it means mainly years of recent times, when we can talk about the boom of globalization. The baseline value of the arms exports in the 1960s more than tripled compared to exports in 2019 over the period under review. However, as the overall view of Germany's arms trade does not provide a reliable view of the impact of globalization, it is necessary to examine its development from the view of commodity and territorial structure of the country.

When we compare the development of German conventional arms exports with other major arms exporters in Europe, namely France and the United Kingdom, we observe that, although Germany had a weaker starting position (6 times lower export values than France, almost 14 times lower than United Kingdom), it has managed to balance its position since the 1990s and later to overcome these countries in several periods. In the case of the United Kingdom, there is a declining trend in conventional arms exports, especially since the beginning of the 21st century, which is the opposite of development in Germany. The observed data shows that Germany has managed to deal with its obstacle in the form of the outcome of the war, the subsequent unfavorable economic situation in the country and has renewed its defence industry. It even managed for the first time in the 1990s to become the most important exporter among the countries of the European Union and to repeat this phenomenon again in the period 2005-2010, 2014 and 2016.



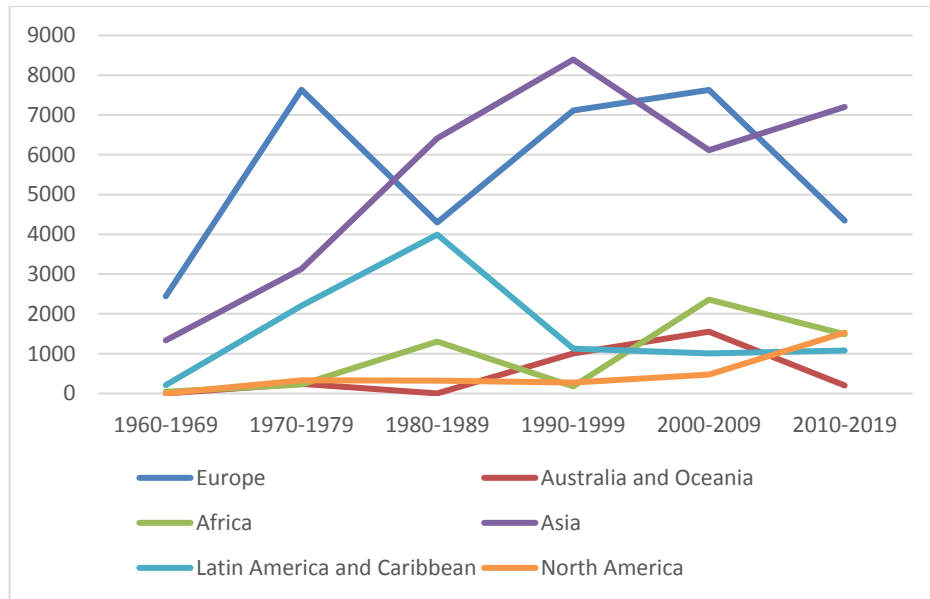


**Chart 1** Development of German conventional arms exports between 1960-2019 in million TIV in comparison to France and United Kingdom

Source: Author's own processing based on Stockholm International Peace Research Institute. *IMPORTER/EXPORTER TIV TABLES*. Accessible from: <http://armstrade.sipri.org/armstrade/page/values.php> [cited September 22, 2020]

The variable that is largely influenced by globalization, or rather by the opening and internationalization of markets, is the territorial structure of the arms trade of individual countries. According to the SIPRI database, Germany exports conventional weapons to all continents, with the largest volumes going to Asia and Europe, and in the 1980s to Latin America and the Caribbean (Chart 2). Since 1960, we have seen a positive increase in arms exports to countries of Asia, Africa, North America and Australia and Oceania, where the starting position increased several times during period 1960-2010. The largest increase occurred in the case of the total value of exports to Asian countries, where the starting position increased more than fivefold since 1960-1969. In the case of the Asian countries, we observe not only an increase in the total volume of arms exported, but also in the number of countries with which Germany traded. Between 1960 and 1969, there were 8 Asian countries, in the period 2010-2019 it was already 25 Asian countries. These countries are mainly from the region of Southeast Asia (Indonesia, South Korea and Singapore), the Middle East (Israel, Saudi Arabia, the United Arab Emirates) and India has also achieved high values. In the case of the Asian countries, the main reasons were the economic development of the eastern and southeastern part of the continent, the efforts of countries to increase their technological base combined with the effort to compete with Western countries, as well as the collapse of the Soviet Union in case of trade with Central Asian countries. The number

of arms trading partners in Europe and Latin America has increased too. The exception is the region of Africa, where the number of trading partners fluctuated at similar values during the period under review, except for the period 1970-1979, when Germany traded with the largest number of African countries, and so with 16 countries.



**Chart 2** Development of German conventional arms exports across the regions between 1960-2019 in million TIV

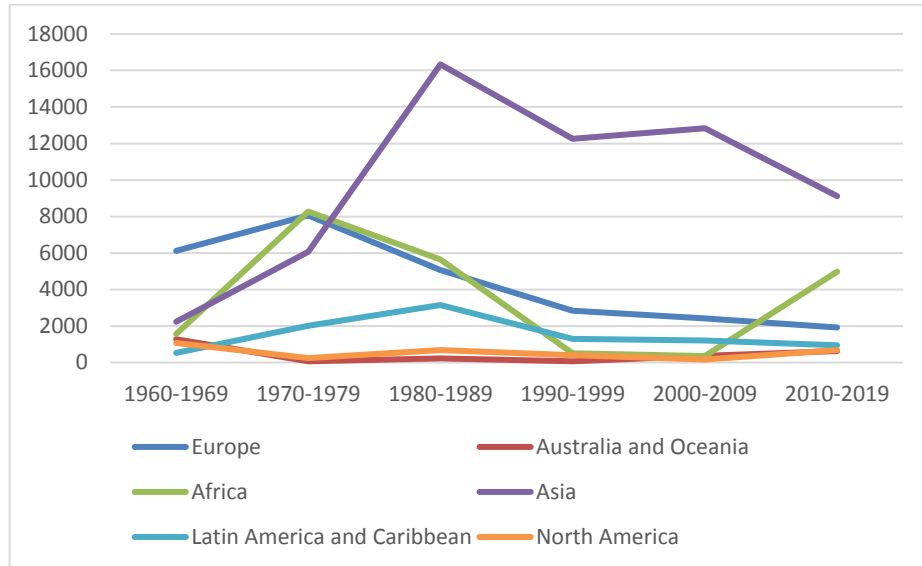
Source: Author's own processing based on Stockholm International Peace Research Institute.

*IMPORTER/EXPORTER TIV TABLES*. Accessible from:

<http://armstrade.sipri.org/armstrade/page/values.php> [cited June 18, 2020]

When comparing the territorial structure of the conventional arms trade of Germany and France, we observe several similar and different features in development. The author chose to compare the territorial structure of Germany with France due to their similar development of the total values of arms exports described in Chart 1. Data shows (Chart 3) that a different feature is the declining or stable trend of trade in almost all monitored regions, except in Asia, where trade values have increased rapidly in both countries, especially since the 1980s. As in the case of Germany, the most important trading partners for France are the countries of Asia, especially the region of Southeast Asia and the Middle East, and Europe. In the case of the Asian countries, their number increased from 17 partner countries in 1960-1969 to 32 partner countries in 2010-2019. In the case of other regions, we observe irregular fluctuations in the development of a number of trading partners. An almost identical development of trade volumes was achieved with the region of Latin America and the Caribbean, where Germany and

France reached the highest cumulative value in the 1980s and subsequently recorded a decline in trade with this region.



**Chart 3** Development of French conventional arms exports across the regions between 1960-2019 in million TIV

Source: Author's own processing based on Stockholm International Peace Research Institute. *IMPORTER/EXPORTER TIV TABLES*. Accessible from: <http://armstrade.sipri.org/armstrade/page/values.php> [cited September 24, 2020]

In addition to changes in the territorial structure of the conventional arms trade since the end of World War II, significant changes can be seen in the development of the commodity structure and the production of defence technology. Until the second half of the 20th century, the armed forces in the states relied on large armies armed with small arms and light weapons (SALW), and combat vehicles, fights taking place exclusively on the battlefield and at sea, with the support of the air force and with armies separated by the front battle line. On the contrary, the armed conflicts of the 21st century do not rely on quantity, but on the quality of military technology and the rapidly spreading progressive military technology. Examples of modern progressive weapons are laser guided small arms, guided mortar munitions, cannon-launched guided projectiles, guided rockets and bomb fired from artillery pieces (T. Mirković, 2015, p. 13), autonomous lethal weapons or unmanned aerial vehicles.

The change in the commodity structure in favor of advanced technologies can be seen partly in data reported in the SIPRI database, which added sensors, artillery and anti-missile systems and strengthened exports of missiles and missile launchers to Germany's arms exports in the early 1980s. (Stockholm International Peace Research

Institute, 2020), which until then accounted for the country's arms imports. A similar development in the commodity structure towards progressive technologies is observed in the case of France, where exports of sensors, satellites increased in the second half of the period under review and, conversely, exports of armored combat vehicles and naval weapons gradually decreased. In the United Kingdom, the trend in commodity development is not exactly the same, as sensors, rockets and rocket systems have been involved in the country's exports throughout the whole period. Like the other countries monitored, the United Kingdom is seeing declining developments in classical conventional weapons, such as exports of armored combat vehicles and naval weapons.

In the case of progressive autonomous lethal weapons, Germany is one of the countries that is heavily involved in its discussions, has allowed several workshops and conferences on the subject to take place in the country, and is also the author of a virtual forum on the regulation of lethal autonomous weapons, in which 63 countries are participating. Germany has taken a negative stance on this type of weapon, mainly due to the determination of responsibility for the conduct of this type of weapon, which was also interpreted by the Federal Minister of Foreign Affairs at the UN General Assembly with the words: *'We need to ban fully autonomous weapons – before it is too late!'* (Human Rights Watch, 2019) The same position was taken by France, which, together with Germany, proposed to CCW the adoption of non-legally binding political declaration regarding the LAWS. The opposite is the case of the United Kingdom, which is one of a small group of countries producing LAWS, and has opposed to support the introduction of an international ban on this type of weapons.

For other advanced technologies, such as unmanned aerial vehicles (UAVs), Germany has, for example, partnered with American company Raytheon and in 2018 with Israel, when the Bundeswehr requested EUR 900 million to lease five Heron TP drones over the next nine years, to be used not only for the purchase of drones but also for their adaptation to the German army, related training, technical and logistic service (DW, 2018). All of the three monitored countries are among the top 10 drone importers, with United Kingdom imports reaching between 2010 and 2014 almost 34%, Germany imports 7.3% and France imports 3.7% of total UAVs imports (Statista, 2015). Based on available data, the United Kingdom is a leader in this advanced technology compared to Germany and France, possesses also armed drones and was the first country in Europe to acquire UAVs.

The internationalization of national markets and the entry of new players into the world market have affected not only the volumes and structure of the German arms trade, but also its defence industry in the form of the country's most important companies. Based on the SIPRI Arms Industry Database (2020), the number of German defence companies in the Top 100 changed from 8 in 2002 to 4 in 2018. The reason was the entry of new entities, which removed the German company MTU Aero Engines from the rankings in 2010 and Diehl in 2014, as well as the creation of the transnational European Aeronautic Defense and Space Company (EADS), which *'was formed in 2000 from the merger of three leading European aerospace firms: Aerospatiale Matra of France, DaimlerChrysler Aerospace (Dasa) of Germany, and Construcciones Aeronáuticas S.A. (CASA) of Spain'* (Britannica, n.d.). It is the creation of EADS, a company uniting several national entities from European Union countries that can be described as a significant impact of globalization on the defence industry. The lowest number of companies in the Top 100 was achieved by Germany in 2014-2016 with the

number of three. In 2017, company Hensoldt was founded, which became one of the most important companies in the country with a focus on the production of advanced technologies, such as customer-specific solutions in the fields of radar, optronics, electronic warfare and avionics. By comparison, the number of companies in the top 100 developed relatively steadily in France and the United Kingdom between 2002-2013, with France ranking 9-10 companies and the United Kingdom 13-15. The decline for these two countries occurred in 2014, similarly to Germany, when the number of French companies fell to 6 and the number of United Kingdom companies fell to 12 and in 2017 even to 9. The observed development points to the favorable impact of globalization on the development of the defence industry in the countries of Asia and, conversely, to the relatively unfavorable development for developed market economies, which in the past were among the most important armaments powers.

One of the other consequences of the interconnection of national markets is the expansion of the network of subsidiaries of the defence industry. In addition to the positive consequences such as cost savings and convergence with the final consumer, this expansion also has negative consequences in the form of companies trying to circumvent national regulations and export arms to countries where the European Union prohibits exports. There were several cases where weapons made by German companies have been found in hands of terrorist groups or armies of rebel groups. Findings of these weapons were most publicized during the Arab Spring in Libya or the civil war in Yemen. In Libya, it was the discovery of "Milan 3" anti-tank missiles and Mercedes-Benz vehicles, which were used by Gadhafi's troops and were transferred to the country via Qatar (V. Jacobsen, 2019). The problem of illegal acquisition of conventional weapons by terrorist organizations or individuals is characteristic for all states listed as leading arms exporters. However, it needs to be mentioned that Germany is one of the countries, which is heavily involved in the fight against illicit proliferation of weapons, in the form of entry into international legislation, the creation of programs and workshops, or the provision of funding to affected states. Involvement in international legislation is a common feature of European Union countries in particular, while leading exporters such as the United States, the Russian Federation and China are less involved in significant conventions and treaties in the field of conventional weapons.

### **3 Conclusion and Discussion**

Germany's conventional arms trade is an ever-evolving variable that is affected by various factors. Based on the definition of globalization in the introductory part of the work, this variable can be attributed with an enormous impact on the commodity and territorial structure of the trade, while it is necessary to take into account the link with variables such as foreign policy, foreign policy of partner country, development of leading, developing economies and emerging markets, the emergence of armed conflicts, and others. As a result of the internationalization of national markets, Germany's volumes of traded conventional arms in the form of exports to all regions increased, and in some regions the number of trading partners also expanded, especially in Asia, Europe and North America. Despite the fact that the global development of conventional arms exports has not been on the rise throughout the whole researched period, in the case of Germany was observed positive impact of globalization in

connection with the country's pro-exporting policy on its development. In comparison with the other monitored countries, France and the United Kingdom, we can speak of the most positive development in the volumes of arms exports.

There have also been changes in the analysis of the commodity structure of the arms trade, in the form of a focus on production and trade in advanced technologies, such as sensors, missiles and missile launchers, drones or artillery systems, especially since the 1980s. However, Germany did not take a positive stance towards all progressive technologies. In particular, lethal autonomous weapons met with negative responses, for which the country is seeking restrictions on international level. The focus on new progressive technologies is a hallmark of all leading exporters, the difference being access to some debatable technologies and weapons, and related legislation.

The internationalization aspect was also present in the development of the country's defence industry, where the leading company DaimlerChrysler Aerospace merged into an international entity with French and Spanish companies, thus creating a transnational European company. Also, the strengthening of the number of companies from Asian countries in the ranking of the most important defence industry companies and the displacement of European companies, including German, French, British and American companies, can be attributed marginally to the consequences of globalization.

Among the negative consequences of globalization, it is necessary to point out the facilitation of the illicit trade in conventional weapons and their spread to countries limited by an arms embargo and terrorist organizations. As Germany is known for its highly developed defence industry, its network of parent companies and subsidiaries and its high volumes of arms exports, it is logical that the internationalization of markets has also led to the illicit smuggling of German weapons. This phenomenon affects all major arms exporters, and tackling it presents one of the challenges of globalization.

In conclusion, the author states that globalization is an irreversible and persistent phenomenon, which includes both positive and negative consequences, not only for the defence industry and the trade in conventional weapons, while each state is influenced in different extent. In the case of Germany, the author favors the positive development or impact of globalization in the form of economic benefits of growing arms trade for the country's economy (in volumes of total trade and diversity of territorial structure), increasing the competitiveness of German weapons throughout the acquisition and manufacturing of progressive technologies, strengthening its position as top European arms exporter, and spreading the German position on combating illicit arms trade and promoting anti-LAWS policy.

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## The impact of the Common Agricultural Policy on environmental investments - The case of European Union agriculture

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**Abstract.** Environmental protection is one of Europe's key values. The importance of agriculture has evolved over the years. Factors that impact agriculture primarily include natural, socioeconomic and institutional conditions. In rural areas, agriculture determines the key functions and uses of land while also affecting the natural environment and landscape. Investment decisions made by farmers result from the combined impacts of exogenous and endogenous factors. The Common Agricultural Policy (CAP) through 1st and 2nd Pillars supports the entities that operate on its territory. The aim of this paper is to identify the relationship between economic, environmental, institutional and social indicators of European Union agriculture sector in two time periods 2009 and 2018 based on the Farm Accountancy Data Network (FADN). The structure of EU's Rural Development Policy was also identified across EU Member States, based on rural development subsidies. The results of the correlation analysis identified the relationship between social indicator – innovation and cycle agricultural life and environmental indicators as strong in 2009. Strong positive correlation was identified mainly between environmental indicators and economic indicator ec1- investment capacity. The relationship between economic, environmental, institutional and social indicators changed in 2018. The relationship between social indicator s1 – innovation and cycle agricultural life and economic indicator ec1- investment capacity was identified as strong. On the other hand, the relationship between environmental indicators and economic indicators was weaker than in year 2009. The second part of the analysis dealt with the hierarchical clustering.

**Keywords:** common agricultural policy, dendrogram, investment capacity, rural development, subsidies.

**JEL classification:** Q 15, Q 18, Q 56.

## 1 Introduction

Two of the main challenges underlying the current Common Agricultural Policy (CAP) reforms are 'greening' the agriculture sector, reducing environmental impacts, and viable food production with a view to ensure food security.

After an elaborate process, a decision on the CAP for the 2014-2020 period was reached in 2013. The new policy continues along this reform path, moving from product to producer support and now to a more land-based approach. This is in response to the challenges facing the sector, many of which are driven by factors that are external to agriculture. These have been identified as economic, environmental and territorial.

The current CAP reform proposals up to 2020 address environmental challenges by coupling agricultural subsidies to stricter cross-compliance with environmental legislation and 'greening measures': compulsory crop diversification and maintenance of permanent grassland and ecological landscape elements. These measures would cover approximately 7 % of the farmland ('ecological focus areas') and would be financed under the first pillar (production-oriented). This general regime could be flanked by specific agri-environment measures under the second pillar (rural development).

Further improvements in the ecological infrastructure of the farmed landscape would result from measures already included in the CAP reform proposals, such as small-scale set-aside, conservation headlands and hedgerow maintenance. Long-term benefits regarding, for example, pollination and biological disease control may also outweigh the immediate overall productivity loss of such measures.

As the second pillar of the Common Agricultural Policy, the EU's rural development policy is designed to support rural areas of the Union and meet the wide range of economic, environmental and societal challenges of the 21st century. A higher degree of flexibility (in comparison with the first pillar) enables regional, national and local authorities to formulate their individual seven-year rural development programmes based on a European 'menu of measures'. Contrary to the first pillar, which is entirely financed by the EU, the second pillar programmes are co-financed by EU funds and regional or national funds.

## 2 Literature review

When assessing the importance of agriculture to local development, especially in rural areas, bidirectional interactions must be considered: on the one hand, agriculture can transform rural areas by having an impact on landscape or by developing one of its functions which is food production. It also creates jobs, not only in the agricultural sector itself but also in its business and institutional environment (Poczta et al., 2012; Mantino, 2017; Pepliński, 2020). This includes the development of other links of the agribusiness chain, primarily the agri-food processing sector which serves the local market while increasing its role as an exporter (Kamińska, 2013; Rowiński, 2019).

The existence of a relationship between a favorable agrarian structure and farm-level investment activity is confirmed in research conducted in Poland and in other European

countries. Upite (2009) indicated that Latvian investment support measures are focused on large farms, especially including those specializing in cereal cropping. In turn, Olsen and Lund (2009, 2011) used the example of Danish agriculture to demonstrate that investment decision-making is impacted by factors such as farm size and number of years of agricultural activity. They also found that younger farmers invest to create an attractive workplace whereas older farmers do so due to environmental aspects or regulations. When conducting the research in eight EU countries, Viaggi et al. (2011) noted that the following factors emerge as the determinants of farm-level investment growth: specialization, having a successor, farmer's age, labor management, single farm payment per hectare, and location. Andrade et al. (2019) emphasized that investment implementation is mainly determined by a production technology designed to increase productivity.

Supported with Union funds, the farms' investment activity is intense in regions with a dominant share of eligible operators which are large enough to cost-efficiently absorb support funds and use them for farm modernization purposes.

Investment decisions made by farmers result from the combined impacts of exogenous and endogenous factors (Rosner, 2011; Minviel and Latruffe, 2016). The first group includes supply conditions; availability and cost of productive inputs; economic policy, mainly including agricultural, monetary and fiscal policy; inflation rate; interest rate; legal regulation; and demand for raw materials produced. In a more general sense, agricultural development (and the resulting investment capacity) also depends on the development level of a country.

Minviel and Latruffe (2014) point that public subsidies may improve technical efficiency if they are used to update the farm's productive capacity through replacement investment or net investment in advanced technologies. Also, public subsidies may enable farmers to achieve scale economies through investments. However, it should be also taken into account, that the effects of public investments may not accrue immediately as there is a lag connected with adjustment costs.

Beyond environmental goals, investments in nature and landscape are increasingly understood in a more integrative way as resources for the ecological modernisation of the rural economy (Kitchen and Marsden, 2009) and as contributions to rural development in a socioeconomic sense by improving rural competitiveness and human wellbeing (Manrique et al., 2015). In this sense, various narratives and rural development options have been distinguished, mainly around ecological conservation, agriculture-based development and post-productive commodification, including tourism, diversification and quality production (Ghazoul et al., 2009; Lange et al., 2013). In addition, for the farming activity itself, natur capital investments and improvements to environmental sustainability, e.g., through agri-environmental measures or afforestation, represent a value. The European Union has acknowledged the importance of natur capital as a territorial asset and public good, as it represents a major objective of the EU's Rural Development Policy. The EU regulation on support for rural development requires at least 25% of the budget at the programming level to be spent on agri-environmental schemes. Despite the primary environmental targets to improve landscape and natural conditions, these investments may have additional

socio-economic second-order effects, which are usually not considered in the policies' objectives.

From a sustainability perspective, the existence of multifunctional agriculture that responds to the needs of society by providing non-market goods and services justifies government intervention in a market economy through agricultural and sectoral policies (Dos-Santos, 2016; Dos-Santos et al., 2018). In the European Member States, the agricultural policy that directly supports and contribute with funds to the agriculture among the European Member States, comes from the Common Agricultural Policy (CAP), through its 1st and 2nd Pillars. In the first Pillar, the Single Farm Payments (CAP 2007–2014) have been replaced in the 2014–2020 CAP by a Multifunctional seven-component payment system: (1) a 'basic payment' per hectare, (2) an 'ecological and environmental component, (3) an additional payment to young farmers; (4) a 'redistributive payment' to strengthen support for the first hectares of a farm; (5) additional income in areas with natural handicaps; (6) undifferentiated production aid for certain areas or types of agriculture, (7) a simplified and voluntary scheme for small farmers with payments up to 1250 euros. The first three elements are mandatory for EMS, and the last four are optional (European Parliament, 2015).

At the same time, great efforts have been made in the Second Pillar to achieve a more effective environmental function of the CAP with agri-environmental measures and multiple programs, based instead on a contractual and voluntary approach. The objective of greening direct payments is not new in the CAP (Dos-Santos et al., 2019).

### 3 Methodology

The main research question was addressed to investigate the relationship between agricultural indicators selected according the literature review, which represents the economic, environmental, institutional and social areas of European Union agriculture sector in two time periods 2009 and 2018 based on the Farm Accountancy Data Network (FADN). The structure of EU's Rural Development Policy was also identified across EU Member States, based on rural development subsidies.

Farm accountancy data are collected on a yearly basis by each Member State for a sample of EU farms in a harmonised manner to provide a homogeneous EU database. The selection methodology of FADN farms aims to provide representative data along three dimensions: region, economic size and type of farming, resulting in standardised aggregate data collected across the EU. The use of FADN data overcomes difficulties generally encountered in cross-country comparisons, which include the heterogeneity of farm systems, differences in exchange rates, accounting methods, definitions of technical terms, and guarantees the coherence and homogeneity necessary for this type of approach.

The correlation coefficient is a statistical measure that calculates the strenght of the relationship between the relative movements of two variables. The value range between -1.0 and 1.0. A calculated number greater than 1.0 or less than -1.0 means that there was an error in the correlation measurement. A correlation of -1.0 shows a perfect negative correlation, while a correlation of 1.0 shows a perfect positive correlation. A correlation of 0.0 shows no relationship between the movement of the two variables.

The second part of the analysis was clustering based on the Ward's Hierarchical Agglomerative Clustering Method. The clusters were identified according the same agricultural indicators as correlation analysis. Ward's is the only one among the agglomerative clustering methods that is based on a classical sum-of-squares criterion, producing groups that minimize within-group dispersion at each binary fusion. In addition, Ward's method is interesting because it looks for clusters in multivariate Euclidean space.

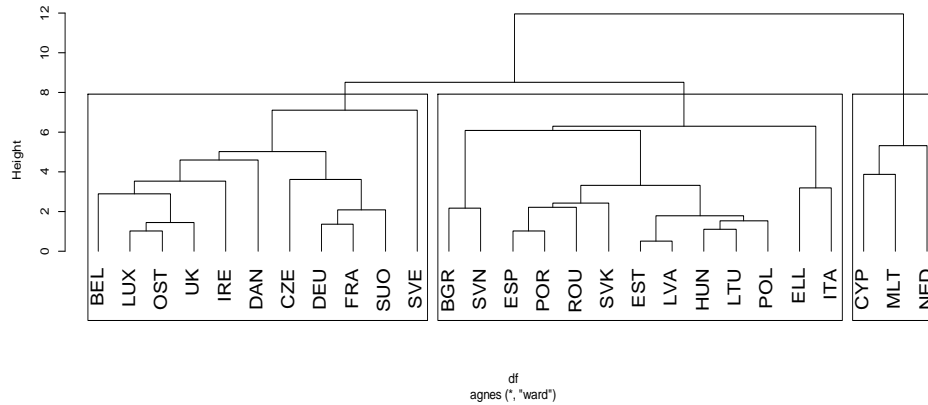
**Table 1.** European union agriculture set of indicators.

<b>Economic indicators</b>	<b>Formulas</b>
ec1 (investment capacity)	Investment/ Utilized agricultural area
ec2 (solvency)	Total assets/ Total liabilities
ec3 (labour productivity)	Farm net value added/ Annual work unit
<b>Environmental indicators</b>	<b>Formulas</b>
env1 (fertilizer input)	Fertilizer used/ Utilized agricultural area
env2 (energy use)	Cost of electricity, fuel, oil, heating/ Utilized agricultural area
env3 (meadows and pastures)	Total of meadows and pastures/ Utilized agricultural area
env4 (livestock density)	Total livestock units/ Utilized agricultural area
<b>Institutional indicators</b>	<b>Formulas</b>
i1 (dependence on direct subsidies)	Total direct subsidies/ Net farm income
i2 (dependence on rural development subsidies)	Total rural development subsidies/ Net farm income
<b>Social indicator</b>	<b>Formula</b>
s1 (innovation and cycle agricultural life)	Net investment defined as (Investment-depreciation)/Utilized agricultural area

Source: own processing.

## 4 Results

Although multifunctional rural development is in progress, agriculture continues to be an important part of the economy which is decisive for the standards of living and for socioeconomic development at local level. Hence, agriculture affects economic development while having a considerable impact on natural and environmental conditions. Figure 1. defines clusters of European union Member States agriculture sector. In 2009 were identified 3 clusters. First cluster had 11 members, second cluster was defined by 13 members and third cluster was the smallest with 3 members.



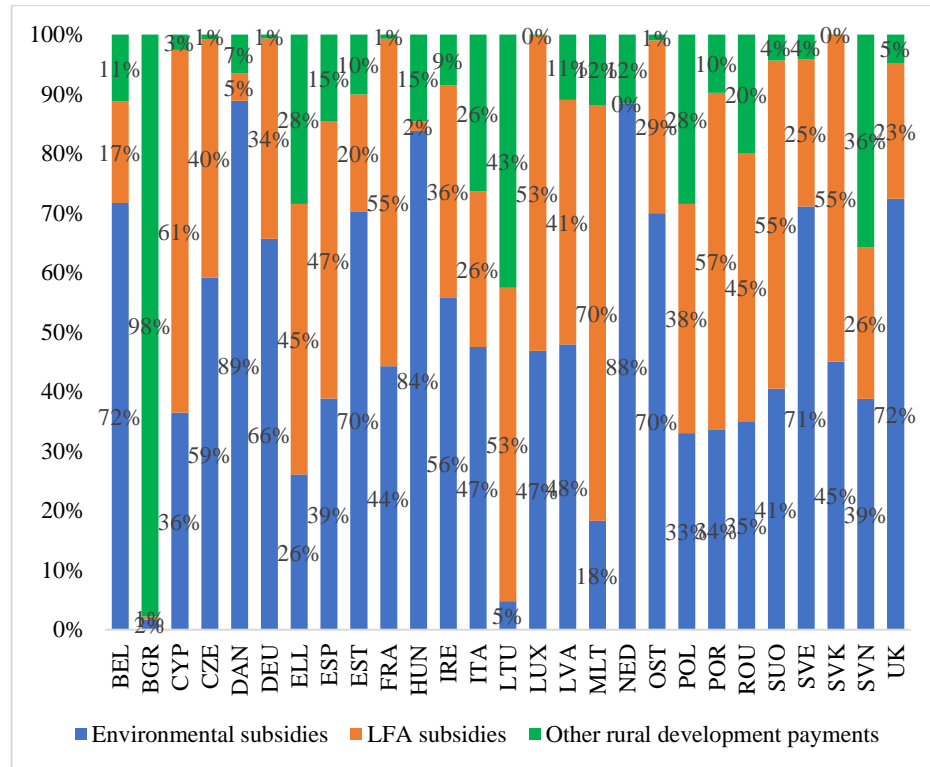
**Fig. 13.** European union agriculture 2009 dendrogram. Source: author's own elaboration from R-program.

The correlation analysis of EU agriculture (Table 2.) time period 2009 identified the relationship between the economic, environmental, institutional and social indicators. Strong positive correlation was identified mainly between environmental indicators and economic indicator ec1- investment capacity. The relationship between social indicator s1 – innovation and cycle agricultural life and environmental indicators env2, env4 was identified as strong.

**Table 2.** Correlation analysis results of EU 2009 agriculture.

2009	<i>ec1</i>	<i>ec2</i>	<i>ec3</i>	<i>env1</i>	<i>env2</i>	<i>env3</i>	<i>env4</i>	<i>i1</i>	<i>i2</i>	<i>s1</i>
<i>ec1</i>	1,00									
<i>ec2</i>	-0,17	1,00								
<i>ec3</i>	0,45	-0,17	1,00							
<i>env1</i>	<b>0,61</b>	-0,26	0,39	1,00						
<i>env2</i>	<b>0,83</b>	-0,13	0,24	0,79	1,00					
<i>env3</i>	0,11	-0,24	0,35	0,02	0,01	1,00				
<i>env4</i>	<b>0,85</b>	-0,15	0,39	0,84	0,95	0,05	1,00			
<i>i1</i>	-0,15	-0,24	-0,02	0,00	-0,07	0,03	-0,16	1,00		
<i>i2</i>	-0,07	0,01	-0,40	-0,32	-0,21	-0,30	-0,30	0,14	1,00	
<i>s1</i>	<b>0,89</b>	-0,45	0,34	0,62	<b>0,77</b>	0,13	<b>0,80</b>	-0,07	-0,01	1,00

Source: author's own elaboration.

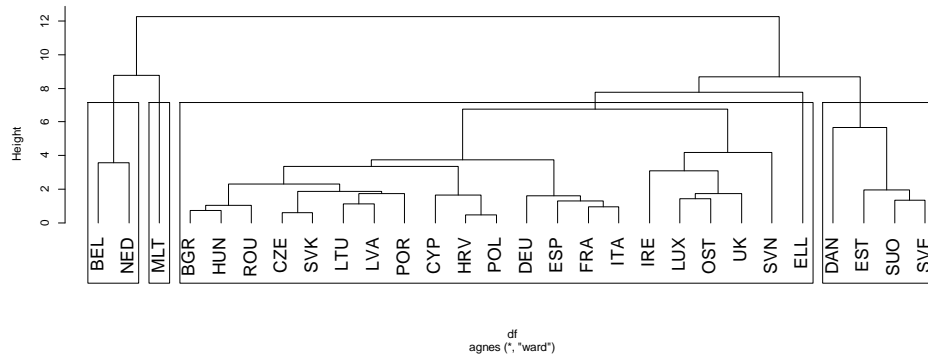


**Fig. 2.** Structure of EU agriculture 2009 Second Pillar. Source: author's own elaboration according FADN database.

The structure of Common Agricultural Policy Second Pillar is defined in Fig.2. Rural development consists of environmental subsidies, less favoured areas subsidies and other rural development payments.

At the EU level, the Common Agricultural Policy is one of the only policies for which periodic evaluations are required by the European Commission. Since its inception in the 1960s, the CAP has undergone several reforms. The 1999 reform ('Agenda 2000') split the policy into two different pillars as policy measures devoted to agricultural production were gathered under Pillar I, while rural development was dealt with under Pillar II through the Rural Development Policy. The 2003 reform introduced three compulsory RDP evaluations per 7-year programming period with a consequent increase in the demand for suitable data and relevant indicators.

Cluster analysis of EU agriculture 2018 (Fig.3) investigated 4 clusters. The position of agricultural sector across EU Member States has changed. The national institutions through the support systems influenced the financial situation of agricultural sector. The Second Pillar of Common Agricultural Policy is financed by European and national funds, in order to support selected production. Cluster 3 was the biggest with 21 members.



**Fig. 3.** European union agriculture 2018 dendrogram. Source: author's own elaboration from R-program.

The relationship between economic, environmental, institutional and social indicators (Table 3.) changed in 2018. The Common Agricultural Policy was reformed in 2013 for 7 years period. In the first Pillar, the Single Farm Payments (CAP 2007–2014) have been replaced in the 2014–2020 CAP by a multifunctional seven-component payment system. The relationship between social indicator *s1* – innovation and cycle agricultural life and economic indicator *ec1*- investment capacity was identified as strong. On the other hand, the relationship between environmental indicators *env1*, *env3* and economic indicators was weaker than in year 2009.

**Table 3.** Correlation analysis results of EU 2018 agriculture.

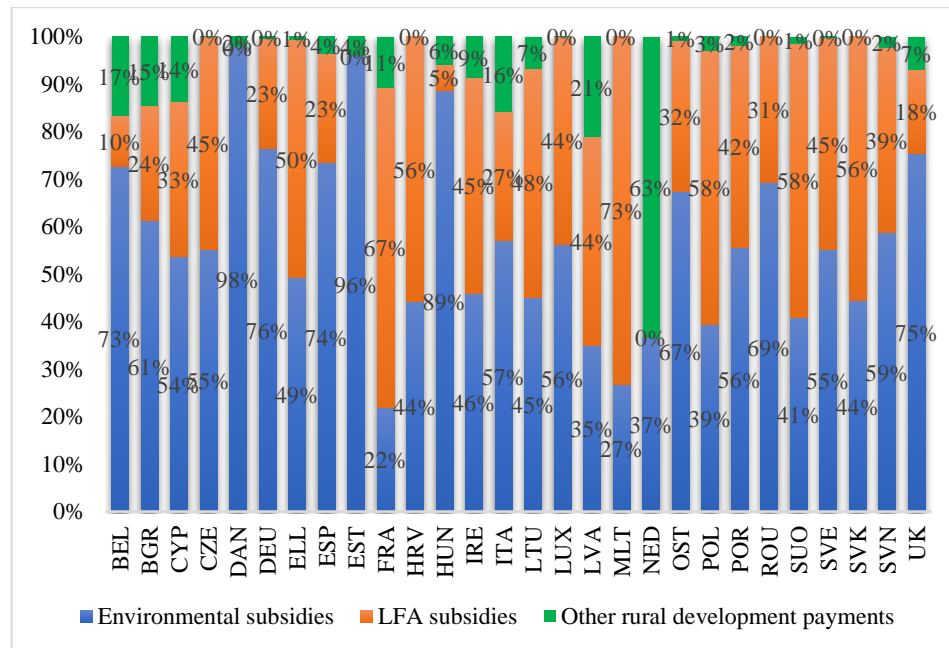
2018	<i>ec1</i>	<i>ec2</i>	<i>ec3</i>	<i>env1</i>	<i>env2</i>	<i>env3</i>	<i>env4</i>	<i>i1</i>	<i>i2</i>	<i>s1</i>
<i>ec1</i>	1,00									
<i>ec2</i>	-0,16	1,00								
<i>ec3</i>	0,47	-0,17	1,00							
<i>env1</i>	<b>0,29</b>	0,13	0,06	1,00						
<i>env2</i>	0,55	0,00	0,09	0,86	1,00					
<i>env3</i>	<b>0,31</b>	-0,07	0,19	-0,26	-0,22	1,00				
<i>env4</i>	0,64	-0,08	0,31	0,85	0,92	0,01	1,00			
<i>i1</i>	-0,12	-0,08	0,34	-0,18	-0,19	-0,26	-0,15	1,00		
<i>i2</i>	-0,09	-0,11	0,08	-0,33	-0,19	-0,16	-0,30	0,54	1,00	
<i>s1</i>	<b>0,76</b>	-0,30	0,42	-0,24	-0,02	0,49	0,13	-0,05	0,01	1,00

Source: author's own elaboration.

CAP instruments relevant to improving productivity and adding value are available mainly through Rural development policy – e.g. support for investment, training and advice, innovation, new business models, supply chain organisation etc. These instruments are not always used to their maximum effect and have to compete with



other measures for financial resources. Fig.4 describes the structure of EU Second Pillar in 2018 across Member States.



**Fig. 4.** Structure of EU agriculture 2018 Second Pillar. Source: author's own elaboration according FADN database.

## 5 Conclusion

The community of farmers is not homogeneous and consists of the rich and the poor, large and small scale, young and old farmers that are prone to applying new ideas and keeping the old methods. Beyond environmental goals, investments in nature and landscape are increasingly understood in a more integrative way as resources for the ecological modernisation of the rural economy

The results of correlation analysis of EU agriculture time period 2009 identified the relationship between the economic, environmental, institutional and social indicators. Strong positive correlation was identified mainly between environmental indicators and economic indicator ec1- investment capacity. The relationship between economic, environmental, institutional and social indicators changed in 2018. The relationship between social indicator s1 – innovation and cycle agricultural life and economic indicator ec1- investment capacity was identified as strong. On the other hand, the relationship between environmental indicators env1, env3 and economic indicators was weaker than in year 2009. The position of agricultural sector across EU Member States has changed. The national institutions through the support systems influenced the financial situation of agricultural sector.

Rural development allows the improvement of the population's quality of life. Economic stability can be achieved through actions within the rural areas. In this sense, agriculture is fundamental for the growth of a nation. Thus, it is extremely important to improve the efficiency of resource use, promote R&D in the sector, and reduce the environmental impact. New technologies are needed to increase the productivity levels. Moreover, agriculture and rural development can be used to fight the abandonment and depopulation of certain areas.

The outbreak of the coronavirus is having an unparalleled effect on society and economy. Farmers and every actor of the EU food supply chain are working hard to keep feeding Europe, despite the difficulties they face. The European Commission will continue to support farmers and food producers, collaborate with EU Member States, and take whatever measures are necessary to ensure the health and well-being of the people of Europe.

The future step of research could be the identification and quantification of the statistically significant indicators on the income items.

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## Interregional Migration from Latin America to the European Union and its Motivation

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**Abstract.** The number of Latin American and Caribbean migrants residing in the European Union has more than quadrupled since 1990. It implies that the EU has become a more attractive area of destination for Latin American migrants. The aim of this paper is to describe the current interregional migratory patterns of migration from Latin America and the Caribbean to the EU and to identify the general motives behind them. Regarding methodology, we use general methods such as analysis, comparison and synthesis. The stock of Latin American migrants is highly concentrated in a few EU Member States, while Spain hosts about half of immigrants from this region. The migratory flows from South America to Southern and Western Europe constitute predominant interregional migration pattern. Therefore, historical and (post)colonial ties as well as cultural and linguistic affinities play an important role in interregional migratory flows. However, migration from Latin America to the EU is motivated by many other push-pull and external factors summarized in this paper. After analyzing the factors of migration and with regard to the ongoing socio-economic and political crises in several LAC countries, more restrictive immigration policies in the US, secondary movements within the EU and relatively large Latin American diaspora in the EU, we can expect the growing trend in Latin America-EU migratory flows to continue.

**Keywords:** European Union, Latin America and the Caribbean, Migration

**JEL classification:** *F 22, O 15*

### 1 Introduction

International migration from Latin America and the Caribbean (LAC) to Europe, or vice versa, is not a new phenomenon. From a historical point of view, there are several interregional (LAC – Europe) international migration patterns. In general, we can divide them into colonial, post-colonial and modern (contemporary) interregional

migratory flows. It is estimated that initially some 330,000 Spaniards and Portuguese emigrated from Iberian Peninsula to Latin America in the sixteenth century (Munck, 2012). Thus, the establishment of Spanish and Portuguese colonies in Latin America and the Caribbean can be considered as a cornerstone of the interregional migratory flows. Over the time and for many reasons, the Americas became an attractive continent for millions of European immigrants. In the early post-colonial era, from the mid-nineteenth century until 1930, approximately 13 million Europeans migrated to Latin America, especially to Southern Cone countries and Brazil (Sánchez-Alonso, 2007). Europeans, mainly those from Southern European countries, immigrated to the Americas in search of a better life and new opportunities.

In the second half of the twentieth century, the patterns and trends in migratory flows within Latin America and the Caribbean started to change. The latest trends indicate that Latin America is no longer the region of immigration. Most region's countries, especially those with relatively poor economic or political performance, have experienced higher level of emigration than immigration and thus, they have become net emigration countries. Despite the US dominance as the principal country of destination, the European Union Member States, such as Spain, Portugal, Italy and others, also represent important destination countries for Latin American and Caribbean emigrants. Since the end of the twentieth century, we can observe a growing trend in migration flows from Latin America to the European Union. It should be noted that contemporary migration patterns are strongly influenced by the previous ones, especially with regard to the so-called *return migration* or *reversed migration relationship*, discussed in this paper.

The aim of this paper is to describe the current interregional migratory patterns of migration from Latin America and the Caribbean to the EU and to identify the general motives behind them. Having regard to a gap in the literature on migration from Latin America and the Caribbean to the EU, this paper seeks to contribute to the current literature concerning interregional migration patterns. To reach the aim of this paper, we use general methods of research such as analysis, comparison and synthesis. This paper is organized as follows. Section 2 briefly presents the patterns in migratory flows from interregional, subregional and territorial point of view. In this section, we analyze and compare the data obtained from statistics of the United Nations Department of Economic and Social Affairs (UN DESA), which provides comprehensive data on migrant stock by country of origin and destination between 1990 – 2019. Section 3 focuses on push and pull factors and some other special features of interregional Latin America-EU migration patterns. In order to identify the most relevant push and pull factors of migration, we employ secondary data collection and analysis of the principal migration corridors. Section 4 concludes the main findings.

## **2 Migration from Latin America to the European Union**

The share as well as the total number of Latin American and Caribbean migrants situated in Europe has increased in recent decades. In 1990, 7% of the total Latin American and Caribbean emigrants lived in Europe, while in 2017 this share reached

12% (Noe-Bustamante and Lopez, 2019). According to International Organization for Migration (2019), the number of migrants from Latin America and the Caribbean residing in Europe, particularly in the European Union, has more than quadrupled since 1990. Table 1 shows that the stock of Latin American and Caribbean migrants in the European Union, including the United Kingdom, was more than 4.8 million in 2019. Compared to 1990, the current EU member states, including the United Kingdom, hosted together less than 1.1 million immigrants from Latin America and the Caribbean (UN DESA, 2019). Thus, there has been a significant increase in the stock of Latin American migrants residing in the EU over the past thirty years, with the exemption of a five-year period (2010 – 2015) when the number of LAC migrants decreased. It was brought about by the effects of economic crisis in Southern European countries such as Spain, Italy, Portugal that represent the main destination countries (Bayona-i-Carrasco et al., 2018).

**Table 1.** Stock of Latin American and Caribbean migrants by destination country in 2019.

<i>Destination country</i>	<i>Number of LAC migrants</i>	<i>Percentage of total</i>	<i>Destination country</i>	<i>Number of LAC migrants</i>	<i>Percentage of total</i>
Austria	24,649	0.51%	Italy	641,792	13.36%
Belgium	60,200	1.25%	Latvia	154	0.00%
Bulgaria	1,219	0.03%	Lithuania	119	0.00%
Croatia	713	0.01%	Luxembourg	6,579	0.14%
Cyprus	629	0.01%	Malta	324	0.01%
Czechia	3,712	0.08%	Netherlands	378,924	7.89%
Denmark	20,140	0.42%	Poland	1,722	0.04%
Estonia	452	0.01%	Portugal	166,773	3.47%
Finland	9,392	0.20%	Romania	1,056	0.02%
France	312,866	6.51%	Slovakia	709	0.01%
Germany	210,982	4.39%	Slovenia	1,075	0.02%
Greece	7,079	0.15%	Spain	2,371,291	49.37%
Hungary	3,790	0.08%	Sweden	87,641	1.82%
Ireland	13,322	0.28%	United Kingdom	476,055	9.91%
Total		4,803,359 (4,327,304 excluding the United Kingdom)			

*Source: Author's calculations based on data from UN DESA Population Division (2019).*

With the stock of 4.8 (or 4.3 excluding the United Kingdom) million LAC migrants, the European Union constitutes the second largest area of destination for migrants from Latin America and the Caribbean. However, the migrant stock is highly concentrated in few states of the European Union. Table 1 shows that the largest European Union's host countries for LAC migrants are Spain (2.37 million), Italy (0.64 million), the Netherlands (0.38 million), France (0.31 million), Germany (0.21 million) and Portugal (0.17 million). Therefore, Southern European countries followed by Western European countries are the most attractive for Latin American emigrants, while Spain accounts for about 50% of the total number of LAC migrants living in the EU. The migratory flows from Latin America to Southern or Western Europe constitute predominant

contemporary interregional migration pattern. On the other side, Central and Eastern European countries host only 14,721 Latin American and Caribbean migrants, approximately 0.34% of the total immigrants from LAC residing in the EU (Table 1). In Northern EU countries, there are 117,173 Latin American and Caribbean migrants representing 2.71% of the overall LAC migrant stock in the European Union.

The majority of Latin American and Caribbean migrants comes to the EU from South American countries such as Brazil, Colombia, Ecuador, Peru, Argentina and Venezuela (Figure 1). On the other side, Figure 1 shows that Central American states and Mexico experience a relatively small number of emigrants leaving for the European Union. This suggests that territorial location and geographical proximity influence interregional migration patterns in Latin America and the Caribbean.



**Fig. 1.** Countries of origin by the number of migrants residing in the EU in 2019 (a darker color indicates a higher number of emigrants). *Source: own processing based on data of UN DESA Population Division (2019).*

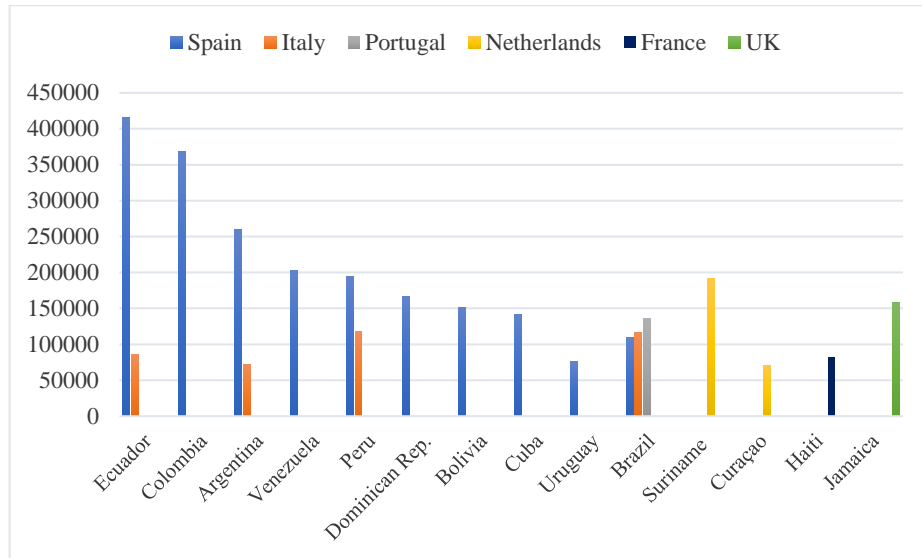
### 3 Factors of Migration from Latin America to the EU

In general, emigration from Latin America and the Caribbean to the European Union is motivated by several factors. We can divide them into push factors related to the area of origin (Latin America and the Caribbean), pull factors given by area of destination (the European Union), as well as some external and personal factors. The European Commission (2020) defines the push-pull factors of migration as *the factors which initiate and influence the decision to migrate, either by attracting a migrant to another country (pull factors) or by impelling or stimulating emigration (push factors)*. The factors are usually of economic, political, security, demographic, social, cultural, historical and environmental nature.

#### 3.1 Pull Factors

The principal European destination countries such as Spain, Italy, Portugal, the Netherlands, France and the United Kingdom have cultural, (post)colonial and historical migratory linkages with Latin American and Caribbean countries, where most immigrants come from. This is supported by Figure 2 which depicts the principal migration corridors from Latin America and the Caribbean to the European Union. Most of these corridors consist of linguistically homogeneous or at least historically and culturally interconnected countries, such as Ecuador–Spain, Colombia–Spain, Argentina–Spain, Brazil–Portugal, Jamaica–the United Kingdom, Suriname–the Netherlands, Curaçao–the Netherlands, Argentina–Italy and Haiti–France. Therefore, the interregional migration flows are strongly influenced by historical and (post)colonial ties, as well as cultural and linguistic affinities. The most relevant argument consists in the assumption that these affinities tend to facilitate the integration of migrants from the LAC in European destination countries. Figure 2 also indicates some other important interregional migratory patterns. Firstly, most of the main migration corridors are directed to Spain as the largest former colonial power of the LAC region. Secondly, the principal migration corridors are made up of South American and Caribbean countries, excluding Central American states and Mexico, which supports our previous findings. Thirdly, the Andean countries (Ecuador, Colombia, Venezuela, Peru and Bolivia) form part of the largest bi-regional migration corridors. According to IOM (2012), the traditional flows from Andean states started in the 1990s and were economically motivated but today, migration from these countries is primarily due to family reasons. It indicates the presence of social motives behind emigration to the EU.





**Fig. 2.** The main migration corridors (accumulation of more than 70 thousand immigrants in particular EU country) from Latin America and the Caribbean to the European Union in 2019. *Source: UN DESA Population Division (2019).*

Spain is currently the second most important destination country for Latin American emigrants, following the United States of America. Between 1990 and 2019, the stock of Latin American and Caribbean migrants in Spain increased almost twelvefold (UN DESA, 2019). It was driven by favorable immigration policy towards Latin Americans, accession of Spain to the EU in the 1980s and economic expansion in Spain that was accompanied by a strong labor demand (Prieto Rosas and López-Gay, 2015). Likewise, Portugal became an attractive destination country for LAC immigrants since joining the EU in 1986, mostly due to the increasing employment opportunities (Teixeira, 2020). Between 1990 and 2019, the migrant stock of Latin Americans and Caribbean living in Portugal more than quadrupled. Historical, colonial and cultural ties seem to play an important role in Latin American migration to Portugal, since the stock of Brazilian migrants in Portugal represents 82% of the total number of immigrants from the LAC (UN DESA, 2019).

In the period after the global financial crisis of 2008, migration flows to Spain decreased considerably. Between 2010 – 2015, the number of Latin Americans residing in Spain fell by more than 200,000 as a consequence of the Spanish economic crisis (UN DESA, 2019). At the same time, the unemployment rate in Spain rose sharply. This trend was similar in Italy, where the stock of Latin American migrants decreased by about 23,000 between 2010 and 2015 during the economic crisis and growing unemployment. Therefore, the migratory flows from the LAC to the European Union depend on the economic performance and labor market situation in main European destination countries.

Another important phenomenon belonging to one of the main features of economic migration from Latin America and the Caribbean to the EU is the transfer of

remittances. Spain continues to be the second largest sending country of personal remittances received by Latin American countries (CEMLA, 2018). Migration corridors are usually closely linked to remittance corridors. The Dialogue (2019) finds that Spain–Ecuador, Spain–Colombia or France–Haiti constitute important corridors of remittance flows to Latin America and the Caribbean. The Netherlands–Suriname remittance corridor has a specific position since Suriname is the only Latin American country that relies primarily on the European Union (the Netherlands) in terms of received remittances (IFAD, 2015). It is important to note that workers' remittances are one of the impacts of migration but in many cases, they represent a decisive reason for emigration. For this reason, remittances may constitute push as well as pull factor of international migration.

Nationals of Ibero-American countries may acquire Spanish nationality after the reduced period of legal residence in Spain that represents two years (Ministry of Foreign Affairs, 2020). In comparative terms, Latin American immigrants together with some other immigrants, especially those from former Spanish colonies, enjoy preferential legal treatment compared to other nationalities. Latin Americans may acquire Spanish citizenship in relatively short period of time and they automatically obtain citizenship of the EU with extra rights, such as the right to work, live and move within the EU. It takes significantly less time for Latin Americans to acquire citizenship in Spain than in other EU countries, where the average residency requirement accounts for 6.4 years (González Enríquez, 2014). In this regard, Spain can be considered as a *bridge* for Latin American and Caribbean immigrants coming to the entire European Union. There is some evidence of the secondary migration movements of Latin Americans within the European Union. McIlwaine (2011) finds that secondary migration from Spain is an important route for Latin Americans arriving in the United Kingdom. For instance, almost three-quarters of Ecuadorians and half of Colombians who had resided elsewhere before coming to the UK in the 2000s had previously lived in Spain (McIlwaine, 2011). The motives behind secondary movements from Spain to other EU countries are the economic recession in Spain and the search of higher paid jobs.

From the mid-nineteenth century until 1930, several Latin American and Caribbean countries experienced large migratory inflows of Spaniards, Italians and Portuguese. In this context, contemporary migration flows from Latin America and the Caribbean to Southern Europe are in many cases referred to as *return migration* or *reversed relationship* (Martín-Díaz et al., 2012). It is important to note that a return migration may take various forms. Tsuda (2010) distinguishes the return migration of first-generation diasporic peoples who move back to homeland and the ethnic return migration of later-generation descendants of diasporic peoples who return to the countries of ancestral origin. McIlwaine (2011) argues that return migration to the country of ancestors, existing family ties, as well as religious factor, the Catholic Church, have become important pull factors of Latin American migration to Italy. The reverse relationship of migration can thus effectively explain the fact that Italy is the EU's second largest destination country for Latin American migrants (Table 1), despite non-existing colonial relationship with the LAC. Argentinians represent the predominant ethnic return migrants to Spain and Italy (Tsuda, 2010). Since the late

1980s, the ethnic return migration of many Argentinians of Italian descent back to Italy has been spurred by high unemployment rates, political and economic instability in Argentina, as well as preferential nationality policy in Italy, where the legislation from 1992 facilitates an access to Italian citizenship for ethnic Italians abroad (Prontera, 2019). Likewise, Portugal grants to Brazilians an advantage in the acquisition of Portuguese citizenship (Bayona-i-Carrasco and Avila-Tàpies, 2019). Therefore, a contemporary reverse migration pattern between Latin America and European Union Member States has been motivated by the mixture of social, cultural, economic, legal and political factors.

Higher education represents another pull factor of migration from the LAC to the European Union. According to OECD (2020), the largest European Union destination countries for Latin American and Caribbean higher education students were Spain (approximately 31,900 LAC students), Germany (15,700), France (14,300), Portugal (11,900), the United Kingdom (10,200) and Italy (9,800) in 2018. Therefore, Southern and Western European countries have predominant position in terms of the number of international university students from Latin America and the Caribbean. Education-related migration patterns are also strongly influenced by cultural and historical ties, as well as linguistic affinities. Brazilians represent about 92% of all Latin American and Caribbean students in Portugal, while Spanish-speaking students predominate in Spain, where 40% of LAC students are made up of Colombians and Ecuadorians (OECD, 2020). The number of international higher education students originating in Latin America and the Caribbean has growing tendency in the European Union Member States over the last decades.

### **3.2 Push Factors**

Push factors of migration can be divided into general regional factors and country-specific factors. Latin America and the Caribbean is one of the world's developing regions with its specific problems and thus, migratory flows from the LAC to the North belong to the global socio-economic phenomenon. The general push factors are related to Latin America and the Caribbean as a whole. High level of socio-economic inequalities, lack of economic opportunities, food insecurity, political instability, poor governance, authoritarianism, criminal violence, corruption and political repression are traditionally the most relevant push factors of migration from Latin American and Caribbean countries. From a long-term perspective, Pellegrino (2004) argues that inequalities and violence have been the two main characteristics of the region that most affect emigration to developed countries. It is important to emphasize drug-trafficking and organized crime in Latin America which lead to high murder rates, kidnappings, undermining of the state authority and increasing levels of corruption (Munck, 2012). Since the late twentieth century, environmental factors induced by natural disasters and climate change have become increasingly important push factors of migration, especially in terms of Central American and Caribbean countries.

The country-specific push factors are provoked by the internal social, economic, political and humanitarian situation in a particular country of origin. The migratory flows from the LAC region to the European Union depend strongly on the economic

performance, not only in the countries of destination, as we mentioned earlier, but also in the countries of origin. This is supported by several Latin American economic and financial crises that have fueled large outflows of migrants from the region. For instance, the late 1990s financial crisis in Ecuador provoked the extensive emigration of Ecuadorians to Europe, mostly Spain, but also to France, Italy and the Netherlands (Jokisch and Pribilsky, 2002). According to UN DESA (2019), the stock of Ecuadorian migrants in Spain increased by more than 430,000 between 1995 and 2005. Currently, it makes Ecuadorians the largest Latin American immigrant group in Spain. Pellegrino (2004) asserts that Argentina's 2001 economic crisis with its spill-over effects in some neighboring countries resulted in rising number of migrants and returnees to EU countries, especially to Spain and Italy. Following UN DESA (2019) data, the stock of Argentinians residing in Spain and Italy increased by 160,000 and 26,000, respectively, between 2000 and 2005. Therefore, the economic and financial crises in Latin American economies are important push factors of migration.

More recently, the economic, political and humanitarian crisis in the Bolivarian Republic of Venezuela affects the growing number of immigrants and asylum seekers in the European Union. It has been driven by deteriorating living standard, food and medicine shortages, restricted access to water and healthcare, hyperinflation, violence, repression of the opposition and other determinants. The stock of Venezuelan migrants in the EU has increased by 51,000 between 2015 and 2019 (UN DESA, 2019). Spain has experienced the highest growth of Venezuelan immigrants within the EU, while many of them are return migrants or ethnic return migrants (EPRS, 2018). In the same period of time, the number of asylum applications from Venezuelan as well as other Latin American nationals (e.g. Colombians) rose sharply. As a result of the displacement crisis, Venezuela has become the third largest country of origin of asylum applicants in the European Union in 2019 (EASO, 2020). According to European Asylum Support Office (2020), the number of asylum seekers from other LAC countries, such as Colombia, El Salvador, Honduras, Nicaragua and Peru, has also increased in 2019.

Many studies found that migration from LAC countries such as Argentina, Chile, Uruguay, Peru, Cuba and others, from the 1960s to the 1980s, was triggered by political instability and oppressive dictatorships (Bayona-i-Carrasco and Avila-Tàpies, 2019). Long-standing internal armed conflict in Colombia has resulted in the large displacement of its population. Bermudez (2011) argues that violence, human rights violations, security and other conflict-related reasons were important motives for emigrating from Colombia, apart from economically motivated factors. Politically and security motivated migration has its relevance even today.

There are some external factors that affect interregional patterns of migration from Latin America and the Caribbean to the European Union. As we have already mentioned, the United States is the main and traditional host country for Latin American migrants. The most relevant reasons consist in the economic size of the US, higher standards of living and geographical proximity between these two regions. Therefore, it is clear that the changes in US immigration policy may result in increased migration flows to other destination countries. The adoption of more restrictive US immigration policies, such as stricter visa requirements and border controls in the

United States after 11 September 2001, have made the European Union more attractive area of destination for LAC migrants (Pellegrino, 2004; Bayona-i-Carrasco and Avila-Tàpies, 2019). Currently, the tightening of immigration and asylum policies and anti-immigrant rhetoric of the Trump administration may also contribute to increasing attractiveness of the EU as the area of destination.

#### **4 Conclusions and policy implications**

The aim of this paper was to describe the current interregional migratory patterns of migration from Latin America and the Caribbean to the EU and to identify the general motives behind them. By analyzing the stock of Latin American and Caribbean migrants residing in the EU, the territorial distribution of immigrants within the EU and the principal migration corridors, we found the following special features of bi-regional migratory patterns. The number of migrants from the LAC countries in the EU has more than quadrupled since 1990. The migrant stock is highly concentrated in few EU Member States, while Spain hosts for about 50% of the total LAC immigrants. The migratory flows from South America to Southern and Western Europe constitute predominant interregional migration pattern. There is some evidence (especially in terms of Spain and Italy) of the so-called return migration or ethnic return migration which consist in the return of migrants or their descendants to the country of origin. Linguistic homogeneity, cultural as well as historical interconnections are important characteristics of the principal migration corridors from the LAC to the EU. The Andean countries such as Ecuador, Colombia, Venezuela, Peru and Bolivia form part of the largest bi-regional migration corridors.

In accordance with existing literature, the most relevant determinants behind interregional Latin America-EU migration can be divided into push, pull and external factors. Historical, (post)colonial and cultural ties, linguistic affinities, preferential immigration and citizenship policies, economic performance and labor demand, education, family reunification, free movement within the EU and transfer of remittances seem to be the most robust pull factors of migration. We find that push factors may be divided into general regional factors (inequalities, political instability, corruption, drug-trafficking, violence and others) and country-specific factors that are derived from deteriorating social, economic, political and security situation in a particular country. Furthermore, there are some external factors such as US immigration and asylum policies or global financial and economic crises. In this regard, the ongoing socio-economic and political crises in several LAC countries, more restrictive immigration policies in the US, secondary movements within the European Union and relatively large Latin American diaspora in the EU may stimulate further migratory flows to European Union Member States.

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## The Place-based Approach and the 2013 EU Cohesion Reform. Mission Impossible

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**Abstract.** This paper examines emergence of the place-based approach in cohesion policy from early debates up until the outcomes of negotiations on the 2013 Cohesion Reform Package. I am making three arguments in this respect. First, the place-based narrative showed to be of critical importance in shaping high-level policy debates prior the reform due to its comprehensive and convincing language at discourse level addressing key issues. Second, for the final reform outcome, the place-based approach appeared to be less urgent compared to a need for a strong EU governance. Third, the EU interinstitutional compromise showed that, there were different also conflicting anticipations with regard to benefits from the place-based approach. Particularly, the European Parliament, despite initial clear support for the place-based narrative, eventually could get by with much more modest translation of the place-based elements into the Cohesion Reform Package.

**Keywords:** place-based, conditionalities, Barca Report, European Commission, European Parliament, Council

**JEL classification:** F02, N44, O18, R10

### Introduction

Cohesion policy as the major investment and development vehicle in the European Union is shaped from its birth in 1988 by contesting political ideas. Then, cohesion policy was on one hand, a compromise outcome of the creation of the single European market underpinning the neoclassical idea of unfettered markets. On the other, there was an urgent need to balance negative effects of boosting economic competition on the single European market through devising a policy mechanism aimed at reducing disparities between the various regions and the backwardness of the least-favoured regions (SEA art. 130). This underpinned the Keynesian interventionist logic. Rivalling ideas shaping cohesion policy at its birth stemmed from two competing objectives jointly pursued under the cohesion policy flag, economic (efficiency) and social (equity) cohesion. It became even more so after adding the third objective, territorial



cohesion, introduced by the Lisbon Treaty, which offered a completely new conceptual discourse. The most fundamental question in this respect relates to relevance of place/territory for economic-driven regional development in general and nature and role of cohesion policy in particular.

Cohesion policy has been consistently subject to ambitious goals of the EU framework policy goals, notably those of the Lisbon strategy and Europe 2020 encompassing quantitative targets and timeframes for their achievements. A mission of implementing these grand EU-wide strategies with no explicit territorial articulation naturally raises questions of cohesion policy's key responsibility which initially begun as regional policy aiming at reducing regional disparities.

Place-based approach demonstrates a bold ambition to provide a new reformed course for cohesion policy addressing the above-mentioned challenges - feasibility of reconciled pursuance of efficiency and equity, relevance of place/territory for regional development and room for reforming cohesion policy.

Timing for addressing those challenges could not be more convenient. Thus unsurprisingly, preparations of the current programming perspective were markedly shaped by the place-based narrative which showed its remarkable influence in informing high-level policy debates. Even though the prominence of the place-based narrative may give an impression of novelty, it is a classic policy dilemma contrasting distressed geographical areas against individuals as subjects to policy interventions (Mendez 2011b). At the same time, some commentators observe that the place-based approach is a middle range solution between two harms, government interventions and unfettered markets (Avdikos and Chardas, 2016).

The present paper presents ideational background of the 2013 Reform Package with regard to the place-based approach as a guiding principle in preparing the 2013 reform which brought the most fundamental transformation in cohesion policy in its entire existence. In the first section, I will briefly discuss the place-based approach in the light of an increasing importance of space/territory. In the second section, I will deal with the Barca Report as a straightforward response to needs for new policy arrangements, which address existing deficiencies and significance of the notion of place. The third section concerns responses of the EU institutional actors as ideational entrepreneurs to the Barca Report seeking to address the most challenging issues at high-level policy debates in the eve of releasing the draft 2013 Cohesion Reform Package. These debates formed conceptual discourse for the place-based narrative. In the fourth section, I examine in detail how or if the place-based elements, outlined in the second part on the Barca Report, were translated into the draft 2013 Cohesion Reform Package along with the responses of the EU institutional actors to the draft. This part is structured into subsections each dedicated to the specific reform element. Before concluding the paper, I draw specific implications on the basis of the previous sections in the fifth sections on the transformation of cohesion policy and an effect of the place-based approach on the 2013 reform of cohesion policy.

The subject of the paper is covered also in scholarly accounts (Mendez 2011b and 2013, Avdikos and Chardas 2016) or by practitioners (Zuber 2013). My conclusions are close to those of Mendez even though I am deriving them from more in-depth analysis of

individual reform elements as well as I am providing more examples of responses from the individual EU institutional actors.

## **1 The Place-based Approach**

Though the place-based discourse begun to receive a great attention and recognition in the end of the first decade of 2000s, it is actually quite an old concept, as mentioned earlier, related to the development of new economic geography in the US. Origins are associated with the phrase ‘place prosperity’ vs ‘people prosperity’ coined by Louis Winnick (Mendez 2011b). Major stimulus for the spread of discourse’s influence came, however, decades later with reconsiderations of relevance of space for economic development. With impacts of globalisation, significance of space increased as it became more “slippery” (Barca et al. 2012) meaning that flow of capital, people and goods is not as mobile as envisaged and they rather tend to concentrate in large agglomerations. A central question within the discourse of new economic geography is why some territories are perceived more favourable for economic activities than others. The question is even more relevant as compensation policies in the form of financial redistribution from well-off regions towards lagging regions are no longer seen viable. This means that there must be other policies enabling the less prosperous or the backward to develop. These policies are by nature place-based in order to adequately tackle development asymmetries resulting from agglomeration asymmetries. A suitable design to these policies spurred an interest among scholars pointing their criticism at one-size-fits-all solutions (Barca et al., 2012, Farole et al. 2011).

## **2 Barca Report**

Barca report represents the most influential account underpinning place-based principles in EU policy making prepared in the EU institutional environment. In fact, the Barca report introduced place-based discourse into cohesion policy. Commissioner Danuta Hübner assigned preparations of the Report to Fabrizio Barca, distinguished Italian economist who was then Director-General of the Italy’s Ministry of Finance, previously acting also as the first President of OECD’s Territorial Policies Committee.

Barca defined a place-based policy as “a long-term strategy aimed at tackling persistent underutilisation of potential and reducing persistent social exclusion in specific places through external interventions and multilevel governance. It promotes the supply of integrated goods and services tailored to contexts, and it triggers institutional changes” (Barca 2009). It is a complex definition centred on the notion of place. It addressed three issues representing deficiencies in programming and implementation of cohesion policy. The first is a lacking strategic approach aimed at filling existing policy’s gaps in strategic orientation, identifying room for improvement as well tackling the issue of equity with respect to a given territory. The second is a need for governance architecture which encompasses involvement of different functional levels in policy making preconditioned by a strategic role of exogenous institutions and their principles on shaping local institutional milieu and multi-level governance. Thirdly, the Report points to external institutional assistance which comes up with generation of a tailor-made solutions simultaneously bringing about improvements in functioning of local institutions and fostering participatory foundations of policy making. From a broader

perspective, these three issues did not only share alignment with the notion of place. They in fact represented a strategic approach to recognition of the relevance of place meaning detection of inadequacies, a holistic solution and structural improvement. In other words, unlike the case of the cohesion policy convergence objective, striven up until 2013, a place-based orientation implied that “spatial boundaries of interventions should be open-ended and respond to the functional needs of places” (Mendez 2013) in order to tackle an untapped potential of different territories.

Barca report thus made a case for cohesion policy as an EU place-based development policy. Barca highlighted that cohesion policy built its credibility on capacity to pursue two, traditional cohesion framework objectives, efficiency (growth) and equity (inclusion). The former concerned “full utilisation of the potential of every place or region” the latter ensured “equal opportunities for individuals irrespective of where they live” (Barca 2009). Both required different means to achieve, though admittedly, advancements towards efficiency objective might have contributed to progress in the equity objective.

Both objectives are present from the inception of the policy under the Single European Act establishing the single European market. They became omnipresent through buzz words such as ‘competitiveness’ so that any attempt towards their achievement became self-evident and self-explanatory in anything conducted under the flag of cohesion policy. Reality was obviously more complex. Failure of the Lisbon Agenda to deliver its objectives was, according to the Barca Report, specifically attributed to the failure to deliver on efficiency, meaning inability of the European regions to fully exploit their potential and overcome development constraints as well as to the failure to deliver on equity meaning inability to tackle properly income inequality, deprivation and gaps in living standards across the European Union. These failures made the case for applying the place-based principles in cohesion policy as development policy and to deliver on the principal objectives of economic and social cohesion originated the Single European Act of 1987.

Criticism of cohesion policy for failure to deliver on the principal objectives of efficiency and equity stems from systemic deficiencies. Given the focus and limiting scope of this paper, these are the most relevant as depicted in the Barca Report:

- lacking strategic focus, specifically clear-cut policy objectives demonstrating an explicit progress towards efficiency and equity
- lacking strategic planning which would provide rationale and justification for selected policy objectives
- mobilisation of spatial representation to fully exploit spatial assets and governance opportunities
- lacking an element of broader binding mandate

At the same time, these deficiencies, when translated into corrective actions, represent some of the building elements for the place-based approach and reformed cohesion policy as a new paradigm for regional policy introduced in the Barca Report, namely:

- policy objectives are EU-wide relevant demonstrating all-European consent and concerted endeavour in meeting them while at the same time acknowledging territorial cohesion as the third pillar introduced by the Lisbon Treaty;

- introducing set of conditionalities to provide strategic reasoning and planning for actions strengthening of partnership and multi-level governance across European, national and subnational levels;
- explicit territorial focus and architecture including multi-level governance;
- Contractual relationship between member states and the European Commission essentially levels up a nature of commitment to pursue selected objectives and evaluate performance in achieving them.

Cohesion policy reform elements envisioned in the Barca Report should be viewed as a ‘package’ meaning as a coherent set of interrelated and mutually reinforcing issues representing “new paradigm of regional policy”. As the primary mission encoded in Barca’s assignment from the Commissioner Hübner was to inform policy making in setting a course for a cohesion reform, it is important to review institutional responses to the Barca Report at European level. The question examined in following section is *did the individual EU institutional actors underpin the place-based approach envisaged in the Barca Report?*

### 3 Responses to the Barca Report at European Level

First of all, it needs to be accentuated that predicaments detected in the Barca Report and some basic avenues to address them have been by and large subject to European high-level policy debates prior the Barca Report. Thus some of the key themes falling under the scope of the Barca Report and raised at different fora have included for example a policy’s focus on core priorities, improved governance and partnership, or ensuring EU’s competitiveness in the global arena while mobilising local growth resources. (Hübner 2007a, 2007b, 2008a, 2008b, 2008c, 2008d, 2009).

The Barca Report has, however, presented these issues in a far more coherent, systematic and in-depth manner. In the same year of its release, the Barca Report has been acknowledged as one of the options of a future design for the de-commitment rule (Samecki 2009). Though, ‘a place-based linguistic turn’ (Mendez 2011b: 8) has come later with the Fifth Cohesion Report which positioned a place-based approach at the heart of the cohesion reform:

*“In addition, the regional diversity in the EU, where regions have vastly different characteristics, opportunities and needs, requires going beyond ‘one-size-fits-all’ policies towards an approach that gives regions the ability to design and the means to deliver policies that meet their needs. This is what Cohesion Policy provides through its place-based approach.”* (European Commission 2010c)

It is necessary to highlight that at that time the Commission views were shaped primarily by the DG Regio, the agent in lead of cohesion policy and the main advocate of the Barca Report inside the Commission<sup>1</sup>. The released Report provided an opportunity for DG Regio to secure its leadership in competition inside the Commission as the principal agent of an upcoming cohesion reform. (Mendez 2011b: 16-17; Mendez 2013: 648-649)

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<sup>1</sup> As mentioned earlier, Barca was assigned by the Commissioner Hübner who was then in charge of DG Regio.

Shortly after, a place-based narrative settled in the high-level policy debates across the EU institutions and penetrated their policy releases. Thus for example, the European Parliament (EP) recognized cohesion policy's essential role for the EU competitive global status and for that reason, in the view of the EP, member states "must support a place-based approach to framing and implementing cohesion policy" (European Parliament 2010b: 8). Similarly, place-based policy was identified as a growth stimulating engine in the aftermath of the global financial and economic crisis (European Parliament 2010a). Equally, the Committee of Regions (CoR) has been prone to recognize swiftly a place-based course in reshaped cohesion policy, viewed as an exclusive delivery agent for the place-based practice (Committee of Regions 2009). Naturally, given its mission, the CoR has been particularly sensitive about ensuring a recognition of the territorial dimension in pursuing Europe 2020. For this, the place-based approach was, in the CoR views, a particularly suitable vehicle (Committee of Regions 2011a, 2010b). Furthermore, place-based discourse had also own intellectual outfit represented by the ESPON, the Luxembourg-based EU think-tank. It has pointed out that place-based approach was an important policy-making tool for business growth, which, if rightly employed, can positively affect location decisions of private investments or risk management. (ESPON 2010: 10).

Interestingly enough, common features of these responses to the Barca Report emphasized a twofold dimension of a place-based policy. Firstly in an EU-wide context, it has a crucial role in stabilising and overcoming aftermaths of the financial and economic crisis as well as fostering EU's role in the global context and secondly, in a more territorially focused context, a place-based policy as a facilitator of liaison processes among key territorial actors as agents in delivering cohesion objectives. Thus, the new discourse under cohesion policy showed that the place-based approach was fairly stretching, enabling the EU institutional actors to contemplate unconventionally and in broader perspectives. At the same time, the new approach also raised very diverse anticipations and interpretations of such complex issues as governance. Nevertheless, at discourse level, the Barca Report unquestionably received overwhelmingly positive responses and spurred intensive debates on the very nature of cohesion policy. The place-based narrative showed to be very powerful as a guiding conceptual principle addressing key EU maladies in a comprehensive and convincing language.

In the next section, translation of some of the essential elements of the Barca Report into the 2013 Cohesion Reform package will be more closely examined. There are two central questions scrutinized in the following part. The first is *did the 2013 Cohesion reform reflects the main principles from the Barca Report?* And the second, *did the Reform meet expectations of the EU institutional actors?*

#### **4 Alignment of the 2013 Reform Package with the Barca Report**

The Cohesion Reform Package of 2013 represented the major reform endeavour since the landmark reform in 1988 at least for the two substantial reasons. One is that for the

first time the place-based principles, as envisioned in the Barca Report, could be operationalized within cohesion policy. The other is that the objectives of cohesion policy are as explicitly linked to the wider European strategic framework, represented by Europe 2020, initiating “a radical change of paradigm” (Zuber 2013), as never before. This is due to a shift from traditional regional policy targeting underdeveloped regions to strategic EU-wide development policy seeking stretching its magnitude across the economic sectors and territories. Thus, the place-based approach became, for its advocates, a new paradigm of regional policy (Barca 2009) incorporating the EU-wide agenda while maintaining its original roots to benefit progressive agendas such as smart specialisation and pushing towards knowledge-intensive growth (McCann 2015), as opposed to the policy based on a mere financial redistribution and its compensatory nature. For others however, a new place-based fashion represented a withdrawal from the focus on supporting regional development. (Avdikos and Chardas 2016, Zuber 2013).

To provide an answer on these two evidently conflicting readings, it is, first, inevitable to examine implementation of Barca’s proposed place-based philosophy into the 2013 Cohesion Reform Package and second, to assess potential of the Package to progress in achieving regional development. Both exercises will be carried out vis-à-vis the notion of place/territoriality as the critical factor for establishing place-based policy and underpinning regional development. Moreover, a result of both exercises will also serve as a measurement tool to demonstrate an actual impact on cohesion policy by the Barca Report. As already showed in the previous part, at discourse level, the Report had a fundamental impact on shaping the debate on the upcoming cohesion policy reform package. The next part will focus on those reform elements, which represented the above-listed corrective actions responding to the identified systemic deficiencies in the part dedicated to the Barca Report.

Cohesion Reform Package consists of six regulations<sup>2</sup> released in the Official Journal of the European Union in December 2013. For the purpose of this paper, it is enough to focus primarily on the Common Provisions Regulation (CPR) and partially, also on the ERDF and ESF regulations.

#### **4.1 Thematic Concentration**

Barca Report did not make an explicit reference to the Europe 2020 Strategy. Instead, it proposed candidates for the core priorities which should have passed the test of the common EU consent<sup>3</sup>. Nevertheless, the proposed core priorities were largely in line with the Europe 2020 strategy. Thus, pursuing two major objectives, efficiency and

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<sup>2</sup> Namely these are Common Provisions Regulation laying down the common rules for five funds ((European Social Fund, European Regional Development Fund, Cohesion Fund, European Agricultural Fund for Rural Development and European Maritime and Fisheries Fund) and respective five regulations corresponding to five funds.

<sup>3</sup> These were namely innovation and climate change falling under the efficiency objective and migration, children, skills and ageing belonging to the inclusion objective.

equity, should be viewed in relation to the mission of Europe 2020. A need for detection of the EU-wide core objectives requiring EU wide approach was a self-evident unchallenged by any of the EU institutional actors.

Barca also roughly envisaged a mechanism to secure concentration of resources on the core priorities. Most importantly, a mechanism bore these key features: Member states in dialogue with the Commission determine primarily an allocation on the core priorities confirmed in the mutual legally binding contract, and the remaining allocation is upon decision of the Member state to support other development needs in line with the place-based logic of focusing on efficiency and equity. I will discussed later in this part how this mechanism was reflected in earmarking.

So far, it needs to be noted that selecting core objectives from the EU level has been already present in cohesion policy through the linkage to the Lisbon Agenda. Such a straightforward connection between cohesion policy and the EU wide-ranging strategy is called “Lisbonization” which according to Mendez (2011a) introduced the three key innovations in cohesion policy – EU level selection of common goals translated in national strategies, earmarking of financial resources and high-level political accountability for implementation through reporting to the Council of Ministers. Despite a criticism of the Lisbon agenda for failure to deliver, these innovations have been incorporated also to the Barca Report and they are building principles of renewed thematic concentration. This was also the reason for a lingering scepticism among some commentators and practitioners (Avdikos and Chardas 2016, Zuber 2013) whether a focus on the EU core objectives instead of a clear-cut orientation on territorial development did not undermine policy’s initial regional dimension with a strong focus on convergence.

As outlined above, Barca envisaged that the core European thematic priorities would be resourced upon mutual agreement of the Commission and member states and it will be governed at European, national, and subnational horizontal as well vertical levels. However, earmarking under ERDF and ESF is an unequivocally top-down architecture lacking any links to territoriality. The premise that the cohesion budget was not just a pot of money, a reference to loosely established thematic focus during the 2007-2013 period, gave a justification to a strong EU governance architecture, which did not leave much room to manoeuvre and consider regional/local specificities outside the predefined European scope.

As observed by Mendez (2011a), strengthened linkage of cohesion policy already to the Lisbon Agenda, outlined above, has stimulated some member states to pursue a more centralized approach to meet Lisbon’s objectives. This means that centralization of policy-making processes evidenced at European level evidently found its articulation also at national level. Consequently, these processes may have affected also quality of partnership and multi-level governance, which are at heart of place-based policy. If not adequately harbored in legislation, they may end up in vain. This will be elaborated more in detail later in the corresponding thematic subsection.

Evidently, thematic concentration did not possess a straightforward regional focus which was compromised to the strategic EU-wide perspective targeting the core European priorities. On the other hand, what would be an alternative governance

architecture under the remaining premise of pursuing the few EU core objectives, as also envisaged by the Barca Report and mutually consented among the EU institutional actors? Critical accounts such as those of Avdikos and Chardas (2016) clearly articulated their skepticism over the place-based policy and the Cohesion Reform Package. However, they did not present an alternative solution. During the 2007-2013 period, loosely defined governance architecture, known as Open Method of Coordination, along with arbitrary interpretations of the multiple EU objectives without evident prioritization lead to ambiguous implementation results. Simply to say, strong EU governance securing the selection and resources for the core priorities prevailed in shaping thematic concentration. As a result, that thematic concentration including earmarking was targeted with precision though admittedly, at the expense of explicitly articulating territoriality.

Strikingly enough, this approach to earmarking has not been challenged by the EU institutional actors. CoR only vaguely called for “a more flexible thematic focus built up around the Europe 2020 strategy” and that the CoR “would like there to be a more territorial approach to operational programmes, avoiding the concentration of all the funds on the thematic objectives of Europe 2020”. (Committee of Regions 2012: 16-17). EP in principle backed earmarking thresholds, only proposed an adjustment mechanism for the ERDF without changing overall values at national level. Similarly in the ESF, the EP proposed an increased number of earmarked investment priorities from 4 to 6 without challenging the substance. (European Parliament 2012b and 2013a)

In nutshell, a continuous effort to tie cohesion policy objectives to the framework EU strategies (firstly the Lisbon Agenda, then Europe 2020) had direct repercussions for a governance architecture which was stringently vertical from the EU down to national and subnational levels. This had a marked impact on logic and governance of thematic concentration. An increase in vertical architecture translated to a decrease in orientation on place-based principles and territoriality.

Yet, the prevailing translation logic from the EU core objectives designed in Europe 2020 to the thematic objectives under the CPR, then broken down to investment priorities under the structural funds along with ERD/ESF earmarking. Such EU driven governance was a major engine for implementing the core EU objectives. Taken from this perspective, a shifting focus from territory to the EU-wide objectives under the EU 2020 delivery logic also meant that classification of regions (low-developed, transition, more-developed) based on GDP was primarily a macroeconomic and statistical tool to determine intensity of the EU financial assistance, not necessarily stemming from regional development needs and potentials. Yet, thematic concentration remained substantially unchallenged from the EU institutional actors.

## **4.2 Partnership and Multi-level Governance**

Partnership and multilevel governance naturally offer organizational formats for adequate formulations of cohesion policy objectives below EU level. As mentioned in the previous subsection on thematic concentration, these are the two elements of the 2013 Cohesion Policy Reform which along with territoriality lie at heart of a place-based policy. The reason is that, from the policy delivery perspective, their application



has direct implications for the other principles assessed in this part and thus on an entire place-based architecture.

As Barca highlighted, partnership was a vehicle for mobilisation of public and private actors' know-how and project design competence as "the ultimate purpose of the place-based approach" (Barca 2009: 100). Eloquent enough, partnership was "an idea whose time has come" (Bache 2010). Multi-level governance is particularly interesting as it originates in cohesion policy.<sup>4</sup> Unsurprisingly, Barca equally recognized its central importance for policy processes and delivery calling it "new paradigm of regional policy" (Barca 2009: XV). Even though the partnership is one of the founding principles in cohesion policy advancing participatory and consensual modes in policy-making (Bache 2010), its application has been subject to perennial criticism (Bauer 2002, Bachtler and McMaster 2008, Polverari and Michie 2009).

The spirit of the Barca Report found its way into the CPR marking substantial transformation of both formative principles compared with the previous programming period. Firstly, partnership was significantly enhanced covering not only operational programmes, as was the case in the previous period, but the whole programming exercise including partnership agreement as a single strategic framework document. Secondly, unlike prior 2014, organisation of partnership is not left solely upon discretion of member states but it is regulated from the European level, by the Commission legislation.<sup>5</sup> And lastly, while the previous CPR did not have a single reference to multi-level governance, the current one regulates it along with partnership.

However, unlike in other reform elements such as conditionalities, the Commission took rather relaxed stance towards taking more regulatory approach. This was on one hand in line with subsidiarity grounded in the Communities/EU Treaties<sup>6</sup>. On the other, the Commission way too easily sacrificed its legitimate governance tools such as monitoring and evaluation and restricted itself into a role of 'an impartial observer' merely facilitating communication and exchange of good practices via a communication platform which was, however, voluntary for member states. This was not entirely in line with the spirit of the Barca Report calling on the Commission to be a centre of competence, bold and ambitious enough to pursue reorganisation of its engagement with member states (Barca 2009: 182).

EP supported by and large the Commission direction towards partnership and multi-level governance. Its main drafting contribution rested in detailing content of Commission regulation on Code of Conduct, yet without a call for control mechanisms such as monitoring and evaluating state of play. (European Parliament 2013b). Partnership and multi-level governance are intrinsic values for the CoR which advocated for their better utilisation as indicators of participatory democracy necessary at both, vertical as well as horizontal decision-making. (Committee of Regions 2009).

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<sup>4</sup> See Hooghe and Marks (2001)

<sup>5</sup> Commission Delegated Regulation (EU) No 240/2014

<sup>6</sup> Subsidiarity was introduced already in the Single European Act, however restricted only to environment. It gained its universalistic character in the Maastricht Treaty in 1992.

Despite its ambitions to pioneer more straightforward legal articulation of participatory elements in EU governance via legislation (Committee of Regions 2012a, 2012b), the CoR eventually adopted a somewhat realistic view on the achieved compromise. Thus, the CoR took with satisfaction its own better recognition relative to the 2006 CPR which then put subnational public authorities on an equal footing with social partners and non-governmental organisations. (Committee of Regions 2014: 11)

It is assumed that the Commission relaxed stance, underpinned also by the EP and the CoR, towards further regulation of partnership and multi-level governance could be a trade-off for other agendas where notably the Commission perceived a stringent EU governance more urgently needed than here. Therefore, partnership and multi-level governance remain to be more of holistic principles than policy-required guidelines. This may eventually help national governments in securing their extended gatekeeping role. (Bache 1999).

Provisions on partnership and multi-level governance have undergone a substantial modifications compared to the previous programming periods, with the latter legally postulated for the first time. Yet, without the Commission explicit ownership of control mechanisms along with a zero pressure from other EU institutional actors, they remained subject to interpretations and practice of individual member states which have been historically prone to adopt gatekeeper's role (Bache 1999). This does not undermine the newly set approach. It is, however, miles away from the place-based approach and regional development propelled by subnational expertise, networking and an exploration of innovative solutions as envisaged by Barca.

### 4.3 Conditionality

Conditionalities as EU-level control mechanisms have been part of cohesion policy since 1988 (Bachtler, Ferry 2015: 1259). Set of conditionalities which were part of the 2013 Cohesion Package Reform, represented novelty<sup>7</sup> in their explicit and straightforward design towards a punitive and rewarding means. Some of these conditionality instruments were an entire novelty (ex-ante conditionalities), partial novelty (macroeconomic conditionality has been previously applicable only to the Cohesion Fund during the 2007-2013 period), others have been reintroduced (performance reserve), or modified (de-commitment rule previously n+2 and currently n+3). They all were top-down enforcement mechanisms based on vertical coordination, designed to stimulate, ensure and impose compliance and delivery.

In terms of the goals they pursue, we could recognize three types of conditionalities:

- ex-ante conditionalities related to key actions such as concepts/strategies, policy instruments as prerequisites of implementation;

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<sup>7</sup> Even though, it could be argued that the de-commitment rule by no means represent novelty nor a building reform element, its retaining in the post 2013 period is advocated in the Barca Report. Furthermore, it fits into complex assessment of the entire set of conditionalities, as it will be shown later in this part.

- performance conditionalities represented by performance framework along with performance reserve and de-commitment rule, related to outcomes, a performance check during the implementation;
- macroeconomic conditionalities representing economic governance related to the processes of sound economic performance;

For the purpose of the paper, it is even more useful to highlight the typology of conditionalities with regard to the framework under which they operate. Thus we can recognize two types of conditionalities:

- implementation related (performance reserve and the de-commitment rule) stemming from the cohesion policy environment;
- EU governance related linking cohesion policy either to the European Semester via country-specific recommendations (ex-ante conditionalities), or to macroeconomic surveillance mechanisms (macroeconomic conditionalities) exceeding the cohesion policy environment.

This typology is relevant not only to show complexity of conditionalities, but particularly because this typology demonstrates a problem of overload of requirements when combining the two types. Likewise, the typology shows difficulty in aligning cohesion policy to a wider framework of EU governance. These issues raise a question of efficiency of control due to its complexity and multiplication of requirements and goals which may eventually lead to a lack of transparency, reliability and accountability (Kapur and Webb 2000, Drazen 2002), as discussed later.

Unlike macroeconomic conditionalities, the implementation related conditionalities, the decommitment rule and performance reserve have not faced such a severe opposition from the EU institutional actors during negotiations of the Cohesion Package. The implementation related conditionalities originated in a need to accelerate implementation and ideally fit, into the 7 years implementation framework, optionally +3 years, while the EU governance related conditionalities addressed the issue of maximizing added value of spending (Bachtler, Ferry 2015: 1264). These challenges and the conditionalities covering them have been largely shared within the EU.

The more demanding issue lies elsewhere. As already typified above, with regard to the the framework under which conditionalities operate, we recognize two conditionalities aiming at strengthening EU governance, ex-ante conditionalities and macroeconomic conditionalities. The two are a direct prerequisite for fulfilment of both implementation related conditionalities with the direct negative impacts if the two unfulfilled. This is an extra layer of burden imposed to both implementation conditionalities, meaning their legally defined mission plus their negative relatedness to both EU governance related conditionalities. Particularly from the perspective of place-based performance, complexity and negative relatedness linked to financial repercussions for non-compliance may in the end transform the concept of conditionalities into '*restrictionalities*'. A potentially high risk of non-compliance may be detrimental not only to overall implementation in general but to a wider spread of e.g. innovation-driven projects in particular carrying significant investment risks subject to a longer period for return of investments. Instead, implementation decisions could fall into a business as usual mode aiming at reducing financial harm and political repercussions.

On the other hand, it is important to highlight that conditionalities are envisaged by the Barca Report as an instrument strengthening governance in cohesion policy. A lack of institutional coordination along with the weak control mechanisms was a frequent objection against policy's performance being undermined particularly by the Open Method of Coordination. On the other hand, control mechanisms, resting on punitive instruments, dominantly shaped the current legal provisions for conditionalities and thus, far exceeded Barca's support for these instruments.

As showed above, macroeconomic conditionalities were initially designed under the Cohesion Fund between 2007-2013. Aftermaths of the economic and financial crises legitimized the Commission ambition to expand the use of macroeconomic conditionalities, yet with no ties to cohesion objectives. Such expansion served the Commission to meet three objectives in terms of the role of this type of conditionality. Firstly, it is macroeconomic performance surveillance constituting a preventive arm, secondly, to fix performance imbalances as a corrective arm and lastly, financial support to member states, as an incentive arm.

In the Fifth Cohesion Report (2010: 178) the Commission revealed intentions expand macroeconomic conditionalities on structural funds. This step has not attracted EP attention and it overall back the employment of conditionalities. (European Parliament 2011). It was only the CoR which contested macroeconomic conditionalities right from the beginning despite accepting needs for establishing results-based financial conditionality built on fairness, proportionality, and equal treatment. (Committee of Regions 2011a). After the Commission launched the Reform Package, the CoR reaffirmed "to combat any form of macroeconomic conditionality" (Committee of Regions 2011b). European Parliament joined in as well on the basis of its own analyses showing negative impacts of macroeconomic conditionalities for cohesion policy. (European Parliament 2012a and 2012b). Therefore EP attempted to delete macroeconomic conditionalities in July 2013 (European Parliament 2013b), thus threatening a timely adoption of the Cohesion legislative package. The compromise in trilogue with the Council and the Commission was eventually achieved in October 2013 with concessions toward the EP but without changing the substance. The compromise was adopted by the EP plenary vote early November. EP in the end watered down its opposition and comforted with the compromise whereas the CoR remained indignant. (Committee of Regions 2014: 5)

A new design of macroeconomic conditionalities had thus become the most contentious issue in the entire reform package due to their restrictive nature. Major criticism towards restrictive nature of macroeconomic conditionality stemmed from missing ownership and accountability on the part of territorial actors. While budgetary policy is solely in hands of public authorities, negative consequences could potentially harm any implementation actors within the European regions. This was perceived as utterly unfair with potential detrimental effects on regional development policies. Thus, macroeconomic conditionalities showed to be in sharp contrast with territorial approach and place-based principles.

From the Commission perspective, there is at least twofold rationale for fostering control-driven nature for conditionalities in general, even at the expense of the place-

based approach. Firstly, there is an evolutionary argument. Introduction of conditionalities (the de-commitment rule and the performance reserve) in 1999 was a trade-off between member states gaining more responsibility over implementation and the Commission losing thus its direct authority over operational programmes and gaining more influence over control mechanisms instead. (Bachtler, Ferry 2015: 1261) And this became *modus operandi* also for the preparations of the following programming periods, notably the current one.

Secondly, in the aftermaths of the financial and economic crisis, the Commission sought to maintain EU's credibility as a global economic actor capable of responding to the economic stagnation by designing appropriate economic governance mechanisms. Thus, the control and coordination over the individual EU budgetary chapters including cohesion policy and increasing policy's effectiveness sought to be ensured via a strong linkage to the European Semester and European macroeconomic control mechanisms. As typified above, this is particularly the case of ex-ante and macroeconomic conditionalities. Furthermore, the Commission perceived this approach also as the trade-off between equity and efficiency (Berkowitz, P. et al. 2015).

The fact that the Commission was well aware that through strengthening EU governance it eventually weakened a place-based dimension within cohesion policy is adequately demonstrated in the Sixth Cohesion Report which "departs from previous reports [through highlighting] how good [European] governance is essential for its [cohesion policy's] effectiveness" (European Commission 2014: Foreword). At the same time, the Sixth Cohesion Report gave up any efforts to promote the place-based approach.

This showed that inside the Commission there was not a unison unequivocal support for place-based narrative at least at the time of putting forward the Cohesion package. Instead, there was a competition between DG Regio advocating a place-based narrative and alternative perspectives, notably that of DG Employment advocating a people-based avenue towards regional development and also DG Budget which already back in 2010 turned a blind eye at territorial dimension in the inclusive growth section of the Europe 2020 strategy (Mendez, 2011b: 20).

Nevertheless, there remained explicit potential for employment of a territorial dimension and a place-based conduct among conditionalities, namely under ex-ante conditionalities, as some of them directly enabled conducting key actions for fulfillment in cooperation with subnational partners. However, the CPR fell short of bolder pathway as it left this approach optional. This illustrated the problem depicted in the Barca Report. The document specifically stated that ex-ante conditionalities were needed to ensure a focus on the core EU priorities. (Barca 2009: IX) At the same time, for Barca, conditionalities were in principle a vehicle for enhancing partnership at subnational level leading via policy ownership and accountability. Regional actors informed national policies by providing their individual inputs. This is at the same time a challenging task, identifying the balance between conditionalities and subsidiarity. This means not only delimitation between the Commission imposed requirements and national/regional authorities' competence to pursue own initiatives but also a proper combination of both. This could be the case of actively employing subnational

experience into fulfillment, thus being an engine for place-based policy design. Optionality of joint national and subnational cooperation, however, leaves policy making at discretion of central governments which are prone to act as extended gatekeepers, as outlined in the previous subsection. This along with member states' responsibility for a programming exercise towards the Commission under the shared management, leaves employment of a broader territorial perspective in fulfillment of ex-ante conditionalities to a mere chance.

From the European perspective, addressing territoriality seemed to be at that time a marginal issue as the EP and CoR did not challenge relevant provisions in the draft CPR during negotiations. Place-based attributes linked to fulfillment of ex-ante conditionalities were negligible compared to the major battle fought against macroeconomic conditionalities, as showed above. This view is supported also by the releases from the Court of Auditors (Court of Auditors 2011, 2017a, 2017b), the European institution in charge of control and compliance with the EU legislation, analyzed in its releases *what* ex-ante conditionalities represent rather than *how* their fulfillment is conducted. Likewise, the European Commission in its own assessment provided merely a quantitative aggregated comparison between national and regional actions without any qualitative conclusions (European Commission 2016). An opportunity to explore a shift from optionality of engaging subnational actors in fulfillment to operationalization has not been a particularly strong incentive once conditionalities were declared fulfilled also on the part of the Commission. Yet another evidence that place-based driven options were no longer on the table.

As much as seeking for both, efficiency vs equity, has posed a challenge throughout decades of forming cohesion policy, employment of conditionalities similarly presented rivalling tendencies. While all of them bore the same formal characteristics of vertical coordination and drive towards compliance and delivery, they differ in specific goals they pursue. As noted above, dependency of the implementation related conditionalities on the governance related conditionalities made the former succumbed to the latter. They all operated in an integrated framework, though admittedly, the frame is rather negative reaching close to zero recognition of a place-based approach.

#### **4.4 Integrated Territorial Instruments**

Introducing territorial cohesion as the third principal cohesion objective in the Lisbon Treaty could be viewed as an additional stimulus for enhancing regional policy. A general perception supported also by the Commission is that a key component for cohesion policy to achieve regional development is its territorial approach to "reach citizens" (Ahner 2009: 4). To achieve this, the CPR empowered member states to organize territorial development with the wide array of integrated territorial instruments designed to promote development at different territorial levels and channel EU assistance through different funds while enabling also complementary financing. Member states can optionally set up separate organisational structures and they are required to conduct individual monitoring for integrated territorial instruments. Needless to say, these instruments are essentially designed to foster subnational cooperation, engaging variety of local actors in pursuing envisioned goals. Barca highlighted a critical role of mobilising territorial potential for successful regional

development policy (Barca 2009: 178-179). To achieve this, integrated territorial instruments should provide for different avenues operated by common rules to exploit potential at different territorial levels.

However, overall architecture lacks consistency. While enabling LEADER an access to structural funds, along already existing contributions under EAFRD, broadens the scope of support at local level, it is rather a limiting feature that the employment of the other instrument, integrated territorial investments, is only optional. Particularly this instrument fits larger territorial scales beyond local levels. Along with 5% earmarking on sustainable urban development, there is an evident trend to concentrate support on smaller territorial scales and a clear focus on rural and urban development rather than to expand support on regional scales, as also observed by some commentators (Zuber 2013: 23). This trend was acknowledged also by the Commission (Hahn 2014, European Commission 2014).

Support for agglomerations is *per se* quite a delicate issue reflecting the division of the major discussion at the time into the two rivalling approaches. On one side, there is presently discussed the place-based approach and on the other end, there is World Bank's World Development Report *Reshaping Economic Geography* (2009) promoting so called 'space-blind' or 'people-based' approach where agglomerations, which stand for large cities, are centres with high concentration of entrepreneurial activities, innovations or better public services. (World Bank 2009: 128) These benefits override consequential negatives such as depopulation of suburban and rural areas. Challenges posed by geography are tackled by spatially blind institutions in charge of preparing spatially blind strategies with solutions, often including also connective infrastructure to increase one-way mobility. The underlying difference between the two rivalling concepts is that the place-based approach links economic activities and institutions with places and correspondingly, there is no feasible development strategy without considering its spatial impact.

From the place-based perspective, agglomerations do maintain to play an important role for generating growth. However, their size matter much less than in the past. Instead, it is cities' connectivity, global engagement and competitive performance which is increasingly important (McCann and Acs 2011). Thus, public interventions should not aim to identify so called growth poles meaning large cities and focus on their supporting. Instead, they should strive for balanced territorial support and focus on exploring the untapped potential of different territories under different territorial instruments.

From the space-blind perspective, the preferred avenue for integrated territorial development under cohesion policy is supporting cities. This is not to say that majority of the allocation dedicated to integrated territorial instruments would be inevitably absorbed by agglomerations. For this, allocation mechanisms is far more complex. It is rather to point out that cities have their allocation 'guaranteed' e. g. by earmarking while other types of instruments particularly fitting wider territorial scope remain optional. It is legitimate to conclude that this is far detached from the place-based perspective with implications for insufficient utilisation of integrated territorial development. This is underpinned also by lacking an explicit link between fulfilment

of ex-ante conditionalities and mobilising regional know-how to achieve it, as discussed in the previous part.

In nutshell, combination of optional character of some integrated territorial instruments and of regional contributions to fulfilment of ex-ante conditionalities along with the relaxed Commission stance to partnership and multi-level governance and mainstreaming the core EU objectives to national and subnational levels were not particularly promising ingredients to promote integrated regional development in general and place-based policies in particular.

After the publication of the Barca Report, it could seem for a period of few years that a place-based approach was on a victorious march across the EU institutions. Such views were, however, over-optimistic. These views carried inherent contradictions and diverse interpretations of crucial issues such as governance. Unanimous support at discourse level was not translated into coherent policy framework. At discourse level, EU institutional actors easily found consensus at high conceptual level which was, however, very difficult to translate into operational policy level due to different factors. Among these factors are notably, stronger emphasis on EU governance to tackle impact of financial and economic crisis which appeared to be the priority, internal struggles between competing DGs inside the Commission and EP insufficient drive towards a previously declared support to the place-based approach. Thus, interinstitutional acceptance and satisfaction with the achieved compromise (exempting lingering CoR aversion to macroeconomic conditionalities) did not stem from accomplishing a place-based policy turn. This was already insignificant for the nearest future of cohesion policy.

## **5 Cohesion policy place-based, regional...rather developmental**

Even though, the place-based narrative dominantly shaped the discussion on future cohesion policy after the Barca Report to the extent to become “the new conventional wisdom” (Mendez 2013), the 2013 Cohesion Reform Package fell short of a more explicit employment of the place-based principles for different reasons. First of all, there was not a uniform standpoint inside the Commission to support a new place-based fashion in the aftermaths of the financial and economic crisis and a consequent demand for a strong EU governance and rivaling approaches, particularly a people-based narrative advocated by DG Employment. Secondly, other European institutional actors, EP as the co-legislator and CoR as the consultative body, stuck to the compromise in negotiating the Cohesion Package regardless their initial support for a place-based policy (with the CoR exception on their relentless opposition against macroeconomic conditionalities). Furthermore, both institutions in their reports on negotiations (CoR, 2013) regarded the final reform outcome as very successful. That shows that full-scale adoption of the Barca’s envisioned place-based approach was simply not the ultimate mission for EU institutional actors.

Thus, individual reform elements were not arranged to maximise their place-based potential, e.g. due to their optionality (integrated territorial instruments, optional regional plans under ex-ante conditionalities). Furthermore, operational scope of the



reform elements could negatively affect other reform elements (implementation related conditionalities vs governance related conditionalities) and an overall drive towards more place-based policy. Consequently, reform elements initially detected as the place-based pioneers appear almost unrelated to their origins in the Barca Report and in combination with other provisions they not only withered away from place-based origins but multiplied top-down nature of the reform package and EU-propelled governance. These were undermining conditions for employing a full-fledged place-based policy.

On the other hand, rather a modest translation of place-based principles does not undermine the reform of the 2013 Cohesion package. The contrary is true as the policy has undergone the most significant reform in its history (Becker 2019, Bachtler et al. 2017) entirely rebuilding its governance at the EU level with a substantial impact on national and subnational levels and profound effects on programming as well as on implementation. As a result, the reform enabled cohesion policy to be more focused on delivery with improved vertical and horizontal coordination backed by thorough strategic and operational planning. At the same time, the policy became subject to improved monitoring and evaluation.

To what extent policy still bears a strong territorial dimension remains questionable. For some, it no longer does (Avdikos and Chardas 2016), for others cohesion policy continues to fulfil its initial mission adjusted to current challenges such as smart specialisation or spread of an innovation agenda (McCann 2015). Clearly, the 2013 Cohesion reform package certainly does not hamper a territorial focus. However, it does not encourage it either. What it does, is mainstreaming the European policy objectives to national and subnational levels. Consequently, policy and wider European control mechanisms prevail over territorial focus. And this has not come only with the 2013 reform. This reform rather represents the climax of the trend. The major shift from the policy initial unequivocal regional focus based on financial redistribution to more development-wide orientation, has evolved over time beginning no later than during preparations of the 2007-2013 period. And major outcome of this transformation is a full-fledged European development policy, as known nowadays, focused primarily on enhanced efficiency and effectiveness (Becker 2019: 153).

The place-based revolt, triggered by the Barca Report, certainly significantly contributed to this transformation, at least as the positive and incentivising narrative. However, due to external circumstances (financial and economic crisis) and internal pressures (rivalry of Commission DGs involved and the EU inter-institutional compromise backing stronger control mechanisms and EU governance), the place-based potential, though promisingly unfolded, could not be fully realized. Thus, the overall outcome of the 2013 reform, with respect to the place-based approach, was rather modest compared to potential envisaged in the Barca Report. Window of opportunity has been shut on a half-way. At its birth, cohesion policy was endowed to follow a mission aiming at efficiency and equity which were not impeccably compatible. The place-based approach attempted to reconcile them. The outcome of the reform showed that this mission has not been accomplished and tensions remain to continue. As quickly as the place-based narrative appeared on the scene, it also withered away from policy debates. One of the Commission's working papers recently urged to

go beyond the place-people divide and proposed instead a compromise called place-sensitive distributed development policies (Iammarino et al. 2017). This also points to exceptional quality in which cohesion policy has excelled over decades. It is the ability to evolve and transform according to emerging needs.

## Conclusions

The place-based narrative swiftly invaded high-level policy debates prior the 2013 cohesion reform due to its comprehensive and convincing language at discourse level addressing key issues. Yet, it ceased to be important for the reform outcome. EU institutional actors rather opted for stronger EU governance which was a critical factor in weakening the place-based elements in the CPR. This result showed different anticipations with regard to incorporation of the key principles from the Barca Report to specific legislative provisions compared to mutual interinstitutional consent at discourse level. Particularly, the EP opted for more modest translation of the place-based elements into the Cohesion Reform Package. An unsuccessful place-based mission in cohesion policy, however, does not undermine the reform outcome. Cohesion policy is a full-fledged development policy addressing the current EU challenges.

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## The European Union's Migration and Asylum Policy under the Spotlight of the Outbreak of COVID-19 Pandemic

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**Abstract.** The European Union's migration and asylum policy has become an integral part of the political crisis of the modern European integration. The previous European Commission's efforts did not result in a reform of the EU's migration and asylum policy and the reform was thus transferred to the priorities of the newly created Commission in 2019. However, the expected legislative proposals on which negotiations were supposed to start from the ground have not yet been submitted to the European legislators. The outbreak of the current SARS-CoV-2 pandemic has once again highlighted the real need for rapid adoption of new rules, but at the same time heralded the migration and asylum agenda will be adjourned. The present paper analyzes the effects of the outbreak of the current pandemic on the migration and asylum agenda of the EU. The aim of the article is to describe the current state of negotiations on the long-awaited reform and to present the impact of the outbreak of a coronavirus pandemic in Europe on migrants and refugees heading for the EU Single Market in the first half of 2020.

**Keywords:** European Union, migration, asylum, global pandemic of SARS-CoV-2

**JEL classification:** F22, N44

## 6 Introduction

The migration crisis that emerged in 2015 exacerbated the existing problems of modern European integration. Yet another test of the European Union (EU) once again pointed out the limits of political and economic integration, which finds supporters and opponents both among the lay and experts as well. The increased influx of economic migrants and refugees seeking asylum in Europe since 2015 caught the EU clearly

unprepared to collectively manage the arisen trend. The European Commission (EC) led by Jean-Claude Juncker did not come up with legislative proposals and solutions to bring the EU Member States to consensus on migration and asylum policy reforms to meet the real needs arising from the migratory pressures since 2015. Although enormous pressure has ceased in recent years, Member States have not used the space to bring the political improvisation to an end. The EU migration and asylum agenda as part of the Presidency programs continued to fail consistently, postponing the issue of long-awaited reform to the new EC programming period following the 2019 European Parliament elections.

It was the German Presidency of the Council of the European Union (Council of the EU) in the second half of 2020 that was strongly awaited by many as a unique opportunity for a new start of reform negotiations under the auspices of a strong Member State. The outbreak of the SARS-CoV-2 virus pandemic and its rapid spread in Europe have led to the adoption of a wide range of crisis legislation and restrictions, in order to minimize its social and economic impact. The pandemic partially sidelined several political negotiations and immediately launched negotiations on rescuing the European economy. However, while the migration and asylum agenda has pretty much come to a halt, migrants and refugees seeking asylum in Europe continue to face an uncertain future due to the measures taken following the outbreak of a pandemic. Moreover, the possibilities of their entry into Europe have become even more complicated and the detention centers and camps even more dangerous due to overcrowded premises and the ever-expanding pandemic not only in the EU Member States.

## **7 The evolution of migratory pressures vs search for Member States' consensus**

In recent decades, irregular migration has become an ubiquitous concern in the EU. The turning point in the relatively stable trend till 2013 of approximately 100 million illegal border crossings by third-country citizens per year was the year 2015, when the level of such crossings increased to 1,8 million. This for Europe unprecedented almost 20-fold increase compared to 2013 (European Parliament, 2020) led to the reinstitution of pre-Schengen border checks and the opening of endless negotiations on EU migration and asylum policy. (Buonanno, 2017) The very increase in the influx of migrants and asylum seekers, often referred to as a migration crisis, is associated with several events that influenced the project of European integration in recent years, e.g. the first withdrawal of a Member State, the growth of Eurosceptic movements in individual Member States... -In addition to all these trends, in 2020, a great political improvisation resulting from various political discourses that reflect different perceptions of the policy reform by individual Member States is still present.

Over the past years, for a number of reasons, the volume of irregular border crossings detected on the EU's external borders have gradually decreased to a level comparable to the pre-crisis period. According to the European Border and Coast Guard (Frontex) in 2019, the number of such crossings decreased to less than 140,000. (Frontex, 2020a)



This more than 90% decrease in the record number of crossings set in 2015 is also accompanied by a 50% decrease of asylum applications from almost 1,3 million in 2015. However, in particular, the existing influx of migrants and asylum seekers continues to put pressure on the southern Member States forming the EU's external border, which have most intensively called for the adoption of a fair reform since the outbreak of migratory pressures. (Eurostat, 2020)

The outbreak of the so-called Migration crisis and tragic events in the Mediterranean at the beginning of 2015, brought immediate mobilization of the EC and both EU legislative bodies. The EC presented immediately on May 13, 2015 the first major document that can be described as a new beginning in attempts to reform the EU's migration and asylum policy. (European Commission, 2015) In general, much progress has been made in recent years, which has alleviated the arisen situation: signing of several international agreements with third countries, the creation of so-called Hotspots, creating support programs and increasing financial assistance for solving the pressures in third countries, creating new and strengthening existing supervisory and control authorities etc. The previous Juncker Commission put forward two packages of legislative proposals to reform the Common European Asylum System. Despite the fact that the negotiations on the seven points of the reform took place separately, until 2019 the Member States, resp. EU Council, maintained a package approach. Yet, such approach resulted in the non-adoption of the reform despite the EC recommendation, which pushed for the adoption of at least the five proposals where there is a general agreement negotiated.

As the EU Member States failed to deliver on migratory and asylum issues and solved some of them temporarily, their solution was taken over among the priority issues on the agenda of the newly formed Commission in 2019. It was these issues that became the cornerstones of the Eurosceptic campaign of several political movements in Europe before the European elections in May 2019. The stalemate on migrants and refugees has forced the new EC to abandon endless negotiations on European legislation and move forward with preparations for a new reform. At the beginning of 2020, EU Member States expected the introduction of the New Pact on Migration and Asylum, the pact that will include a plan of legislative proposals to address migration and asylum issues. However, the outbreak of the pandemic has once again made it difficult to introduce the plan and it has been postponed twice in recent months (currently to autumn 2020) once the EU is clear on the recovery fund for the consequences of coronavirus and the multiannual financial framework 2021 – 2027. (EDNH, 2020) The controversial parts of the reform, including the Dublin regulation itself, are expected to be withdrawn. (Euractiv, 2019)

The original timing of the opening of fresh migration negotiations thus predestined the German Presidency of the Council of the EU to determine the first foundations for future negotiations. The German presidency program itself, as has been the custom in recent years, has made migration and asylum policy one of the presidency's priorities. At the same time, based on the current situation, it emphasizes the urgent need for truly purposeful and rapid cooperation to resolve the crisis under the spotlight of the newly created conditions resulting from the outbreak of the current coronavirus pandemic. (Programme for Germany's Presidency, 2020) Given the outbreak of the pandemic, it

is even more unclear to what extent the German agenda can be successful in the upcoming months. However, part of the German program is based on the submitted position paper from November 2019, for which the process of informal negotiations has already begun. The position paper prepared by the Ministry of Interior is primarily a three-point plan for the reform of the Common European Asylum System. The paper rests mainly on three ideas: (i) a pre-screening of asylum claims at the border, (ii) mandatory relocation scheme and (iii) permanent responsibility for processing asylum claims. Contrary to the proposals of the previous Presidencies, the German proposal combines controlled measures with flexibility in order to reach a consensus between the anti-polar camps of the EU Member States. The paper informs that Germany is also willing to adopt more flexible solutions by withdrawing from the initially preferred mandatory relocation scheme. (Rasche, 2020)

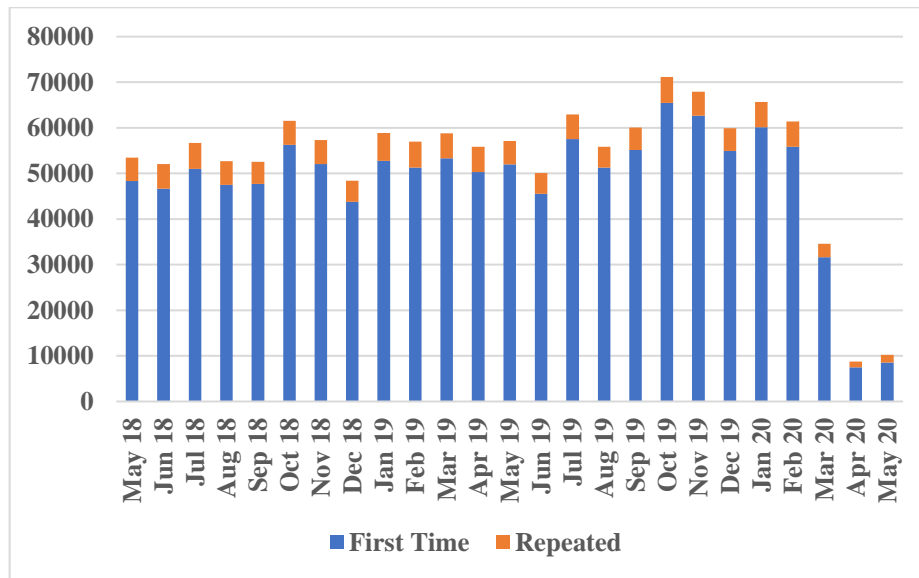
## **8 The spread of the coronavirus pandemic in Europe and its impact on EU migration and asylum**

In the response to the outbreak of the coronavirus pandemic and its subsequent boom in Europe, many EU Member States adopted a wide range of crisis legislation, often partially restricting basic human rights, probably the most commonly freedom of movement. The aim of restrictive measures was to minimize the social and economic impact of the new virus in Europe. Most EU Member States have introduced a state of emergency or other special states with emergency measures. (Euractiv, 2020) Reintroducing of border controls at all or certain sections of the individual Member States borders in order to ensure the compliance with the ban on crossing state borders has become an integral part of these measures. As a result, the cross-border migration of EU citizens as well as third-country nationals has been rapidly reduced since the mid-March 2020.

At the beginning of March, the leaders of the Member States called for a common European coordinated approach during a virtual meeting of the European Council. Following the position of the European Council, the EC has presented a proposal to temporarily restrict unnecessary travel to the EU. (European Commission, 2020) One of the exceptions of the proposal has been the exclusion of people in need of international protection or those traveling for other humanitarian reasons. The closure of border crossings and ports has thus temporarily prevented the entry of thousands of migrants and asylum seekers originating in third countries.

In general, the outbreak of a pandemic has had a significant effect on further easing migratory pressures and reducing the number of new asylum applications in Europe. During April and May 2020, the months most affected by EU restrictions on the free movement of persons in the EU, the level of the first-time asylum applications fell to long-term minimum (7507 in April, 8518 in May). (EASO, 2020) Compared to the monthly trend of asylum applications over the past two years, is equals to 80% decrease in first-time applications. (Fig. 1) Traditionally, countries such as Syria, Afghanistan, Iraq and Morocco continue to be the most common countries of origin. The decrease can also be observed in the number of illegal border crossings to the EU. According to

available data from the first six months of 2020, there were less than 36,000 crossings, with the main drop starting after March 2020. (Frontex, 2020b) Approximately 900 April's illegal crossings represent the lowest statistics since 2009 when Frontex began to record these figures. (Doliwa-Klepacka & Zdanowicz, 2020) The most frequent countries of origin of illegal migrants are similar to those of the countries of origin of asylum seekers mentioned above.



**Fig. 1.** Two year monthly evolution of first time and repeated asylum applications in the EU+<sup>1</sup> countries. (EASO, 2020)

Several NGOs, as well as some of the EU support bodies and agencies, have pointed in recent years to the state and general shortage of reception and detention centers and camps, especially in the “first line countries” concerning the migratory influx from third countries. Existing centers are often loaded with pressures several times higher than the originally intended capacity. The level of compliance with social distances, strict hygiene rules and variety of other regulations in the individual Member States is, for obvious reasons, insufficiently low in these areas. The designated centers, together with hotspots in third countries, are currently very dangerous places for a pandemic to spread. (EU FRA, 2019) The first confirmed cases in state-run detention centers have led to the gradual closure of these centers and eviction or relocation of immigrants. The centers where the infection was confirmed were immediately quarantined. So far, such cases are known mainly from Germany, Greece, Italy and other southern European countries.

<sup>1</sup> EU+ includes 27 EU Member States + Iceland, Liechtenstein, Norway and Switzerland.

Living conditions and humanitarian aid for migrants and asylum seekers in centers mentioned above is only the first part of the current issues. Another problem in the first half of 2020 was the even more complicated reception of migrants and asylum seekers into individual Member States. During March, April and May, at a time when many Member States were regulating the cross-border movement of Europeans with strict measures, it became virtually impossible for many people to get to Europe, either by land or sea. Southern European Member States, led by Italy and Malta, have restricted the operation of passenger ports and declared them unsafe. Such measures prevented anchoring of several NGO rescue ships and vessels bound for European Mediterranean ports via one of the main migration routes across the Mediterranean. (The New Humanitarian, 2020) These restrictions hit Europe at a time when front-line states were the last guarantee of safety for people sailing to the EU by sea.

According to Italian Foreign Ministry, at the end of July 2020, over 12,200 migrants had their arrival recorded in Italy while more than a third of them came from Tunisia. It is this volume that makes Italy the busiest EU Member State in recent months. (MOFA of Italy, 2020) The closure of the Italian seaports and their declaration as unsafe took place on April 8, 2020, a month after the national quarantine was declared. The criticized measure has been explained by the seriousness of the pandemic situation in Italy. (Guardian, 2020) In contrast to July 2019, when Malta accepted boats full of migrants who could moored in Italy, in April 2020, Malta also declared its seaports unsafe. (WP, 2019) Apart from how much the EU's views on port closures may have differed, the EC insisted disembarkation is a Member State matter. The political makeshift, which operated on the principle of some sacrificial Member States has become definitively unsustainable. In some countries, including Greece, reception facilities were temporarily closed, registrations suspended and interviews canceled. A special approach has also been taken by Hungary, which has indefinitely suspended admission of asylum seekers as the Hungarian government assumes that there is a significant link between coronavirus and illegal migration.

## **9 Discussion and conclusion**

The outbreak of a coronavirus pandemic has brought and still has tragic consequences for many Europeans and the whole European community and economy as such. In times of crisis, it is difficult to look for the positive effects of a crisis, which, of course, remain overshadowed by the damages caused. The current pandemic has brought about a significant acceleration of the digital transformation of the world economy. As a result of the coronavirus outbreak, several European countries have taken revolutionary steps that, by using digital transformation, facilitate the fight against the virus and protect the health of half a billion Europeans. Early EU negotiations provided coordinated actions on some issues, moreover Member States leaders and ministers gradually discussed the possibilities and conditions for financing the remediation of the economic consequences of the pandemic in the new multiannual financial framework. Negotiations on illegal migration and refugees have been once again concluded ensuring just minimum possible needs and conditions. However, according to several

NGOs operating in the Mediterranean, the closure of border crossings and ports has been and may be used in the future as a political instrument of some Member States to address EU migration and asylum policy. As many of the first estimates of the spread of the virus from the beginning of the year have proved inaccurate, it is very difficult to predict developments by the end of 2020 and beyond. The repeated increase of those infected may lead to further restrictions concerning migration and asylum in EU Member States.

The situation arisen in the first half of 2020 will certainly affect the form of new Pact on migration and asylum. Pandemic developments in third countries also pose a risk in the future, which in certain circumstances may also contribute to motivate third countries nationals to migrate to the EU. The future version of migration and asylum policy have to thus unconditionally take into account the new conditions that may persists in the coming months or even years. There is a need to ensure that humane and effective asylum procedures are thoroughly ensured without any interruptions and delays threatening third-country nationals. In order to comply with the newly established rules of social distancing, it is necessary to speed up the digitization of formal processes associated with the entry into the EU single market, which could boost processing of applications with the minimization of physical contact.

Although statistics suggest that the migration crisis is over, the current pandemic has once again highlighted of its aspects. The absence of a real reform of the EU's migration and asylum policies is reflected in overcrowded campsites and centers in many Member States, which have become one of the most vulnerable spots for the spread of a new disease. The lack of political will does not yet show enough solidarity to understand that common challenges need common solutions. Thus, more than a year after the last European elections, there is no visible progress on the migration and asylum agenda. However, the expected negotiations will certainly face even greater difficulties as Eurosceptic anti-immigration movements in some Member States have gained a new instrument in support of anti-immigration policies following the outbreak of a pandemic.

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## Cultural and Institutional Barriers to Migrants' Integration in the Context of the Slovak Republic

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**Abstract.** As a result of migration and growing cultural contacts, different cultural elements, traditions or values intersect. The socio-cultural as well as the political environment, together with the legislation, significantly influence the process of integration of migrants and thus to a large extent creates obstacles that immigrants have to face. The number of foreigners living in Slovakia is still very low, although the state has taken, on the one hand, several measures facilitating migration and integration, but on the other hand, measures which hinder acquisition of the Slovak citizenship or prevent from minority religion recognition. Thus, migrants are still not very interested in Slovakia. The article outlines institutional and cultural barriers to integration, and strives to assess the integration policy of Slovakia, while focusing on its major institutional and cultural drawbacks. Besides, by pointing out the most frequent weak points we appeal for an optimisation of integration policy of Slovakia.

**Keywords:** Integration, Slovakia, Culture, MIPEX

**JEL classification:** F22, J15

### 1 Introduction

Issues related to the admission of migrants to Slovak society lead us to questions about the relationship between nation-building and the status of ethnic, national and religious minorities. From our point of view, one of the main problems of migrants' integration is the coexistence with citizens of autochthonous society and manner of how immigrants are perceived. The current ethnocentric perception of Slovaks has an impact on the traditional as well as emerging minorities. Vašečka divides the integration process according to levels. It consists mainly of the socio-structural level (labour market, education, housing), political-institutional level (civic and political participation, etc.) and cultural-social level [1]. According to Kadlečiková, previous approaches to the



assessment of preconditions for integration have focused almost exclusively on setting legal-political conditions, and have not paid attention to the wider social context in which the integration of foreigners takes place. It is primarily the cultural and social level that includes the principles and value orientations of the host society and can be a barrier to the real integration of immigrants [1]. Thus, the article primarily focuses on the aspect of cultural integration, while taking institutional integration into consideration, since both phenomena significantly determine the social, economic and political aspects of integration. In particular, our attempt and the main contribution of the article is to find an answer to the question of whether the integration policy of the Slovak Republic can adequately respond to the most frequent and common issues of migrants. If not, our point of interest will be to identify the most common cultural and institutional barriers.

## 2 Culture and Cultural Identity

The concepts of cultural identity and cultural diversity are in the foreground of a plethora of political debate in within the European Union and Slovakia as well. The concept of culture and cultural identity is hard to define and their concepts are variously perceived. For the purposes of this article we have decided to include following section dedicated to culture.

In a broader sense, culture includes everything that human civilization creates, such as clothing, industry, dwellings, but also the spiritual creations of people such as art, religion, morality, customs and traditions, education systems and others [2].

Hofstede, the author of the 6 dimensions model of culture and one of the most significant academics in this regard, defined culture as „the collective programming of the mind which distinguishes the members of one human group from another“ [3].

Culture is not something that is easily acquired; it is a slow process of growing into a society. It includes:

- learning values (dominant beliefs and attitudes),
- partaking of rituals (collective activities),
- modelling against heroes (role models), and
- understanding symbols (myths, legends, dress, jargon, lingo...) [4].

These ingredients of culture are acquired from birth, and are influenced by the environment we live in, ie. family, school, religion, workplace, friends, media, books, and many other sources.

Based on various approaches to culture, Čiefová provides a comprehensive definition of culture: „Culture is a dynamic system consisting of values, norms, laws, beliefs, customs, as well as of patterns of thinking, feeling, acting and behaving, i.e. material or spiritual elements, which is learnt and transmitted from one generation to another generation, while providing guidelines to the members of the community who share it“ [5].

Based on the aforementioned cultural values and aspects, we can derive a definition of cultural identity. Cultural identity is often associated with a sense of belonging to a particular social group, patriotism and pride. At the same time, however, it is also associated with separation, group closure, and hostile attitude towards others.

“An ethnic group’s cultural identity involves a shared sense of cultural features that help to define and to characterize the group [...] Group members will express their choices in part through the behaviours they demonstrate in different types of situations. Especially, in the case of minority group members or immigrants, the extent to which an individual follows the group’s typical cultural pattern may be an indication of the degree of that person’s psychological assimilation or acculturation” [6].

It follows that cultural identity reflects the image of a society. It is tied to a certain language as well as to certain patterns of behaviour and is closely related to other identifying features. Cultural identity can be “learned and acquired by individuals through processes of internalization and identification with respect to others who share these categories, that is, who belong to the same cultural group” [7].

### **3 Cultural and Institutional Barriers to Immigrants’ Integration into the Society**

Migrants living in Slovakia face many problems in their daily lives. Their position in society is significantly different from that of Slovak citizens. This means that they are obliged to invest a lot of energy, time, resources to meet various criteria and requirements in order to be able to come to Slovakia, stay here and not have to leave against their will. The successful integration of foreigners plays an important role in the development of the Slovak Republic as a country that supports and respects diversity, precisely through an appropriate integration policy.

The content of integration policy should be an effort to integrate foreigners into society so that after a certain time they are no longer dependent on state support, can respect the legal and political system, culture, customs, traditions, and master the official language of members of the majority indigenous society [21].

#### **3.1 Integration Models**

Before we start assessing possible cultural and institutional barriers, it is essential to determine several approaches to integration. Vast range of integration models has been presented, but three main perspectives used in social sciences are the theory of assimilation, multiculturalism and the segregation model (Štefančík, Lenč, Algan, IOM).

- Assimilation theory - migrants begin to adapt to their new country through cultural assimilation or acculturation. Socio-economic assimilation inevitably leads to further stages of assimilation, through which ethnic groups eventually lose their cultural characteristics, such as religion, language and values. On the other hand, they accept the cultural patterns of the host country [8]. Štefančík and Lenč take reference from Faist who distinguishes 3 stages of assimilation model. At an early stage, immigrants and their descendants will adopt the language, norms and ideals of an autochthonous society. Acculturation is subsequently followed by social integration. This term refers to the participation of immigrants in the various institutions of the country of destination. At the third level – identification, immigrants feel a sense of belonging to the majority society [9].

- Multiculturalism - rejects the simple integration process proposed by the theory of assimilation. From this point of view, scientists perceive multicultural societies as composed of diverse groups of ethnic and racial minorities, as well as a dominant majority group. This view is illustrated, for example, by Handlin in the context of American society. He argues that immigrants actively shape their own identities rather than posing as passive subjects in front of the forces of assimilation. Authors like him also emphasize that some aspects of the cultural characteristics of immigrants may be preserved in a state of uneasy coexistence with the attitudes of the host country. The multicultural perspective offers, then, an alternative way of considering the host society, presenting members of ethnic minority groups as active integral segments of the whole society rather than just foreigners or outsiders [10]. It is important to make clear that the multicultural model initially respects the culture of immigrants; however, it normally has a lower value than the culture of members of autochthonous society, despite the fact that theoretically all cultures are supposed to be equal [11].
- Segregation model - rather than focusing on the processes of assimilation or integration per se, the structuralist approach emphasizes how differences in socio-economic opportunities relate to differences in social integration of ethnic minority groups. Unequal access to wealth, jobs, housing, education, power, and privilege are seen as structural constraints that affect the ability of immigrants and ethnic minorities to socially integrate. This leads to persistent ethnic disparities in levels of income, educational attainment, and occupational achievement of immigrants [7]. Migration is perceived as temporary. Limited integration of migrants to the society of the host country is therefore associated with the higher degree of probability of their return [9].

### 3.2 Cultural and Institutional Barriers to Integration

Due to its geographical location, the Slovak Republic was initially a transit country. By joining the European Union in 2004, its status of country of emigrants was transformed into a destination country for foreigners. The reasons for the foreigners' migration into Slovakia were modified by improving living conditions in the country and economic growth. However, ensuring integration policy and improvement of the process of immigrants' integration are still considered a challenge for Slovakia as the development of migration and integration policies have been lagging behind.

Differences in culture, language, values and norms reduce the attractiveness of migration since these are closely linked to the subsequent integration. Belot and Ederveen, classify cultural barriers into various categories: linguistic distance, religious distance, and cultural distance [12].

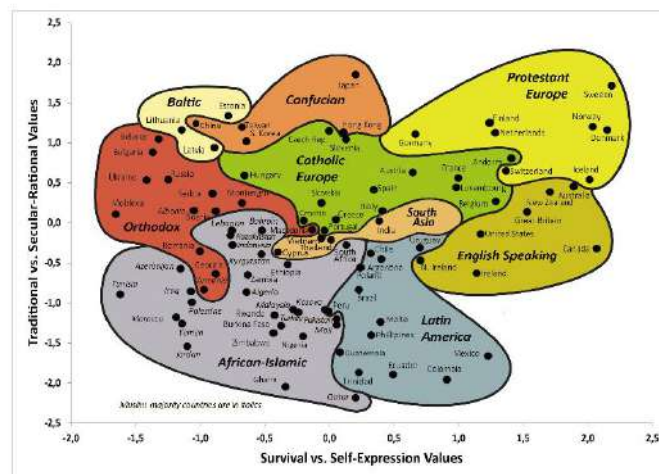
Knowledge of the language is one of the key aspects of integration. In order to understand the integration process, it is necessary to master the language of the host society. Belot and Ederveen propose an indicator measuring the linguistic distance between countries, observing clusters of countries that are linguistically close to each other, i.e. Southern countries (France, Spain, Italy, Portugal), Germanic countries (Germany, Switzerland, Austria) etc.

Although it is not the rule, areas of cultural and religious integration are often interconnected. Cultural integration simply means the degree of adaptation and

adoption of the culture of the majority society by migrants and, on the other hand, the extent of respect and recognition of migrants by the majority society. To measure cultural distance, variety of tools might be used in this regard. Among the most renowned set of measures is a measure of cultural orientation of countries proposed by Hofstede. He distinguished five dimensions on which countries differ. However, Belot and Ederveen use only four dimensions:

- Power distance (the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally)
- Uncertainty avoidance (the extent to which a culture programs its members to feel either uncomfortable or comfortable in unstructured situations)
- Individualism versus collectivism (the degree to which individuals are supposed to look after themselves or remain integrated into groups)
- Masculinity versus femininity (the distribution of emotional roles between the genders)

Notwithstanding the Hofstede's model, for gauging overall cultural distance, they also opted for Inglehart-Welzel culture map of the world, a model based on World Value Survey which measures two dimensions of cultural values: 1) Traditional versus secular-rational and 2) survival versus self-expression values.



**Fig. 1.** Culture map of countries tracking values of these (2015). *Source: Gyberg, F. 2019 [13].*

“Traditional societies are defined with respect to a series of variables such as the level of tolerance for abortion, divorce and homosexuality, the emphasis of male dominance in economic and political life, the importance of family life and parental authority and the emphasis on religion. The survival/self-expression dimension corresponds to the level of trust, tolerance, subjective well-being, political activism, and self-expression” [12].

Stemming from abovementioned facts tracking cultural differences among nationalities, immigrants often have to face the negative views of people aimed towards

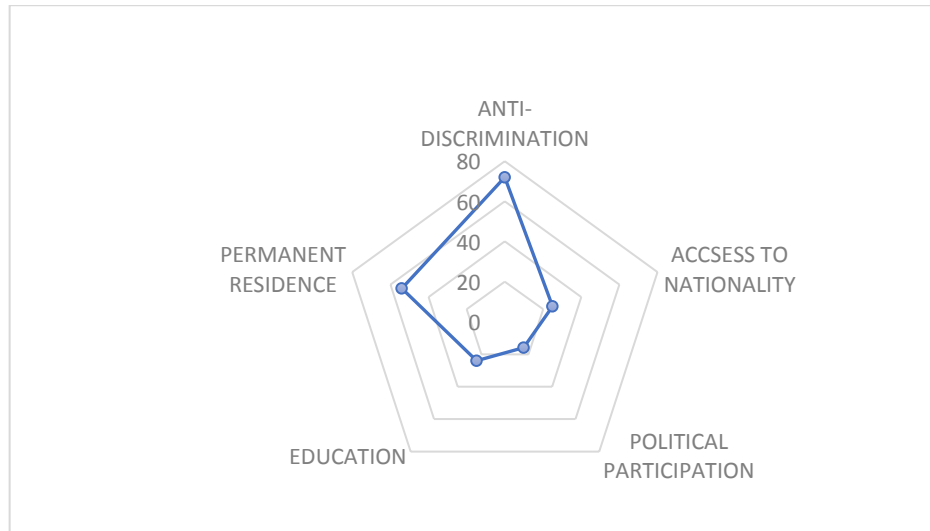
them. These are often prejudices, stereotypes or various manifestations of discrimination, racism or xenophobia, which can lead to cultural fear.

Institutional integration and barriers resulting from it consists in acquiring the same rights and opportunities, e.g. in the labour market, in the education system or in the housing system [14]. In practice, it is primarily a matter of granting citizenship and creating a level playing field for immigrants in the destination country, as well as strengthening migrants' rights in the areas of work, civic and political participation. Besides, granting equal working conditions seems to be frequent problem. The regulation of professions requiring specific skills or diplomas varies a lot across countries. "Some countries discriminate against foreigners by not recognising the professional qualifications acquired abroad" [12].

## **4 Barriers to Migrants' Integration in the Slovak Republic**

### **4.1 Methodology**

After defining aforementioned barriers, this section aims to outline barriers to integration process. Most literature dissects the integration policy of Slovakia as a whole, meaning it also tackles the topic of economic integration. However, our prime motivation is to put emphasis solely on its cultural and institutional aspects as these, from our point of view, present complications at initial stages of in-migration. The outcome of the article mostly relies on the Migrant International Policy Index (MIPEX), since it is, according to Sekulová and Gyárfášová, one of the effective indicators measuring immigrants' integration into Slovak society proposed by [22]. It is a database which uses 167 policy indicators to measure policies to integrate migrants in all EU Member States, Australia, Canada, Iceland, Japan, South Korea, New Zealand, Norway, Switzerland, Turkey and the USA (MIPEX 38). The Index measures several key policies (labour market mobility, family reunion, education, health, political participation, permanent residence, access to nationality and anti-discrimination), but we will solely focus on those which match our needs. It is important to accentuate topicality of the data as the latest data are to become available at the end of 2020, thus we stem from results published in 2014. Based on MIPEX results we will seek to support or rebut these by using findings of other academics or taking reference from Slovakia's legislation and governmental authorities.



**Fig. 2.** Graphical representation of the Slovakia MIPEX data (2014). *Source: processed by the author according to the data from MIPEX 2014.*

#### 4.2 Discussion of the study results

The first policy to observe is access to education of immigrants and their offspring, as there might be lack of institutional support and language barrier as well. Education emerges as the greatest weakness in integration policies in most countries, mainly in those which are composed of a very small number of immigrants. Schools in most countries are not required or supported to teach all pupils how to live and learn together in a diverse society. There is a lack of integration strategies and support in reaching out to immigrant students in Slovakia. Only children of migrant residents have access to full education and general support for disadvantaged students. In this context, no additional financial and professional support was systematically provided to schools. Slovakia scored 24 points out of 100 and placed on 27<sup>th</sup> place out of MIPEX 38 [15]. The children of foreign citizens authorized to stay in the territory of the Slovak Republic, children of asylum seekers and Slovaks living abroad are provided with education and training, accommodation and meals in schools under the Education Act, applying the same conditions as citizens of the Slovak Republic. For children of foreigners, basic and expanding language courses of the state language can be organized to remove language barriers [16].

Promoting the political participation of immigrants is a sign of a confident country of immigration. As part of an incoherent policy, immigrants from non-EU countries in the Slovak Republic can vote and be elected in local elections, but do not possess the right to join political parties, the right to form political associations or to contribute to the development of integration policy. Political participation is not included within integration strategies in Slovakia and has not made any progress in this area since 2007. These policies are unfavourable to support political participation and rank 31<sup>st</sup> place out of 38 with a score of 16 [15].

Citizenship policies remain a major area of weakness for most European countries. As for obtaining citizenship, Slovakia is characterized by the lowest and most inequitable naturalisation rates in Europe. This fact is also proved by Stojarová, who claims that “compared to other European countries, the conditions are stricter - a foreigner can apply for naturalization [...] after thirteen years of legal residence (five years of temporary residence and eight years of permanent residence). This is one of the strictest restrictions in Europe in the field of naturalization” [17]. In MIPEX ranking, Slovakia scored 25 points and rank 35<sup>th</sup> place among MIPEX 38 [15].

Ensuring permanent residence may be a fundamental step on the path to full citizenship and better integration outcomes. Becoming a permanent resident is an immigrant's main chance at integration in Slovakia; however, the procedure is one of the most demanding and discretionary in Europe. Immigrants are eligible to apply after 5 years of temporary residence and are confronted with some the most restrictive conditions in Europe to become and remain EU or national permanent residents (e.g. health insurance, accommodation, income, criminal record etc.). Slovakia scores 56 points and placed on the 25<sup>th</sup> place [15]. In addition, applying for legal residence in Slovakia for foreigners from third countries is associated with a significant risk of failure, as there is no legal right to obtain a work permit and a subsequent temporary residence even after meeting all the requirements set by law [18].

As far as the discrimination of immigrants is concerned, almost all European countries now have slightly favourable laws prohibiting ethnic, racial and religious discrimination. Following the adoption of EU law in 2000, the creation of national anti-discrimination laws has been the greatest and most consistent improvement to integration policies across Europe in the past 20 years. Discrimination and intolerance against immigrants on the grounds of their ethnic, national, racial or religious origin are thus contrary to the respect of every human being and his or her dignity. The Slovak Republic has made progress in this regard, placing on the 15<sup>th</sup> place with a score of 72 [15]. The Anti-Discrimination Act, in force since 1 July 2004, creates adequate instruments for equal treatment of migrants and for active suppression of discrimination. The law explicitly defines direct and indirect discrimination and, among other things, prohibits discrimination based on race, religion, and ethnicity. In addition, the Constitution of the Slovak Republic grants members of minorities the right to own development, in particular through the protection of their mother tongue [18]. Moreover, one of the planned measures of the Government of the Slovak Republic was also to support the involvement of foreigners in civic, cultural and political life in society and to improve dialogue and functioning of advisory platforms between different groups of foreigners, government and civil society to promote their active citizenship and equal access to information [19]. In this regard, several projects have been supported by the Government. These are, among others, a project KapaCITY - support for the integration of foreigners at the local level, or a project Rifugio founded by the Slovak Humanitarian Council [20].

Cultural identity plays an extremely sensitive place in an individual's life. Through it, people identify themselves to a certain social environment and social group with feeling of belonging. According to Gallová Kriglerová et al., cultural identity of immigrants living in the Slovak Republic should be only displayed in the private sphere. This attitude is evidenced by the fact that migrants have given up their public

manifestations of cultural differences (this view, however, cannot be applied to Muslims living in Slovakia). However, the success of inclusion depends above all on the permeability of individual social structures. On the one hand, the majority must allow foreigners to adopt its patterns of behaviour while keeping their own. On the other hand, minorities must do the same, especially if migrants feel a sense of belonging to a community. Therefore, it is not possible to unequivocally answer the question whether migrants in Slovakia are integrated at all and to which extent. Some of them may want to assimilate completely, others prefer to maintain cultural identity in the private sphere, while they do not want to be excessively perceived in the public. For others, cultural identity is so interconnected with everyday life that the impossibility of maintaining it affects not only private but also public life (employment, education, etc.) [18].

## **5 Conclusion**

Adapting to the majority culture is considered a very important element of integration. The issues of the feeling of belonging to culture and the need to express or preserve it in everyday life in Slovakia are also related to the fact that migrants have a feeling of belonging to a given community (based on ethnicity, religion, language or country of origin). Based on the researched aspects of integration of migrants in Slovakia, it can be clearly stated that public and integration policy, which ranks among the worst in the European Union, is not set in Slovakia to be able to respond promptly from a cultural and institutional point of view to migrants' needs and facilitate their integration process. For this reason, the added value of the article is to urge policymakers to legislation change in immigrants' favour and facilitate the whole integration process.

The discussed results show that migrants face mainly bureaucratic obstacles, which are also conditioned by the language barrier. The frequent problems immigrants deal with are, among others, a protracted and complicated process of granting citizenship and permanent residence. Moreover, diminishing language barriers by providing language courses is insufficiently supported. Presence of immigrants is not adequately reflected in country's policy as they are excluded from active policy-making. Notwithstanding this, the only positive is a fact that many precautions against discrimination, racism and xenophobia have been introduced and come into effect. Assimilation, or another model of integration such as multiculturalism, is, in view of the above, a practically unfeasible plan. Slovakia, as a strongly ethnically defined country, will not allow migrants to become a fully-fledged part of it, which leads to partial segregation of migrants and thus prevents them from participating in public events and decision-making process.

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## Funding of public service media: a case study on RTVS

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**Abstract.** Public media broadcasters in Europe have faced changes in their financing during the past decade and remain a contending force in their respective home markets. This has not been the case in Slovakia though, where the PBS is at an all-time low in public popularity and its existence has been brought up to question again and again in the past. While pressures from the public mount up, the way RTVS has been financed and managed to this day remains questionable and it is required to finally find a good solution that would not only future-proof RTVS, but also raise its popularity with the public. Therefore, in this paper we examine the current trends in PBS financing in continental Europe, contrast them with the situation in Slovakia and show possibilities for future development.

**Keywords:** Public service media, Funding, RTVS.

**JEL classification:** I139, H41, D69

### 1 Introduction

Throughout history, we can observe a part of the audience that is constantly dissatisfied with the state of public media. The fact that one cannot guarantee a complete satisfaction rate notwithstanding, this is obviously due to a plethora of different factors. First of all, there are many external factors, like pressure from the leading political party, and policies in place, which could either hinder or strengthen the freedom of internal strategic choices within the broadcaster's structures. What seems out of place though, is that this dissatisfaction is present, even though the current state of affairs enables most public broadcasters to set their content as they see fit and enables them

quite an extraordinary amount of freedom<sup>1</sup>. This poses the question - Why? If we take the example of Slovakia's public media broadcaster, the RTVS, we can see this phenomenon take place even in the public space. The dissatisfaction with the provided content by the public lead to public discussions about changing the way the public broadcaster operates in Slovakia, ranging from looking for alternative ways of financing the broadcaster, discussing the parameters of the licensing fee that every household has to pay to debating whether a public broadcaster is needed at all in this day and age. While discussing what a good notion of a reservation price for this type of a public good is worthwhile and certainly will be a discussion point in our future work, there is already a pretty convincing point given by Pouperová [1], which means discussing this point currently should not be the focus. Yet the public discussion is still propelled by the same arguments - "Why should I pay for the public broadcast if I do not consume the content it produces? Why is the quality of the content produced comparatively worse to its competitors?" The main topic of this paper is to discuss whether RTVS is indeed behaving in a non-optimal fashion, and if there is a way of it competing with the other broadcasters by changing the way it is financed.

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<sup>1</sup> It is important to add that historic context plays a role here too, as one could observe with the situation when the british media market was slowly opening, BBC held a dominant position as an incumbent.

## 2 Public broadcasting in the EU

To properly start a public debate on the system of financing the Slovak public broadcaster, a broader perspective is required. While public broadcasters have a storied history basically acting as media monopolies in the 20th century, nowadays they do have to co-exist with other privately-owned media firms, which also dictates how they are regulated, even though the media landscape is already a heavily-regulated market in most European countries, with high barriers of entry and bloated legislature in some countries. The current form of financing PBS stems from Great Britain's BBC, where people would pay a yearly subscription for the service provided by the BBC. And even though the form has changed from a yearly subscription to monthly fee, the point remains until today [2]. This model, together with the model of regulating the broadcasting spectrum, of monthly financing has been later adopted to other European countries. It has been later amended and generalized as a EU stature<sup>5</sup>, which stipulates that the member states of the EU have to provide financing to public broadcasting, if the reason is to provide a public service and if it does not set the concurrent market environment askew. [3]

Despite this, we can categorize the broadcasters to belong into 1 of 4 categories, as per Lowe and Berg [4]:

- License fee;
- Direct subsidy;
- Subscription/Pay-per view;
- Advertising.

It is important to add that this is not a discrete taxonomy, but rather a spectrum, a combination of which makes up the complete revenue of each PSB. Due to the fact that the PSB has a different goal than its private competitors, it is advantageous to split its revenue streams.

Even then, both major revenue streams (state-supplied money and advertising income) pose a risk to the mission of PSB in their own rights. As Lowe and Berg [4] posit, as the government holds a direct stake in PSB, it can influence the agenda via these "indirect" channels. On the other hand, corporations can and will leverage advertisement money in exchange for cutting unfavorable content that does not suit their brand image. The vast majority of European PSB still receive their majority shares from their regulator though, even though a trend is hardly, if at all, visible on aggregated data - a general mean on public funding is 76.9% in 2010 and 77.8% in 2018. EAO confirms this, as it states that a general trend is hard to compose, even though the percentages do vary greatly on a country level.

What does shift though, is the regulation concerning licensing fees. Licensing fees are for all intents and purposes a special tax, which is usually paid on a per-household basis. In contrast to direct subsidies, licensing fees can and are subject to tax evasion-like behavior from agents and therefore pose multiple complications when stating them in. Countries, like the Scandinavian country group in Europe never had a culture of having a licensing fee, so the PSBs there were always financed directly by government subsidies. In other countries, notably Spain, Belgium, and the Netherlands, the licensing fee was slowly phased out until it was abolished in the 2010s. On the other end of the spectrum, central and eastern European countries rely heavily on licensing fees, and in some cases to great success both in a financial and a public view, e.g. the Czech Republic or Austria. Both these countries have PSBs in a dominant position and with a good public perception [5].

Furthermore, there are also seemingly miniscule differences in countries that employ a licensing fee. From the regularity of the payment itself, ranging from monthly, through quarterly to even annually, to the way the payment is conducted. In Italy, the fee is due per each device. In other countries, it is paid per household, or on the basis of whether a resident pays for electricity. This again, makes cross-country analysis hard, as even though the overarching system might be the same, the way micro data collection is conducted differs heavily from country to country. This is also harder due to the fact, that various PSB are constrained to differing regulations, and hence it is hard to even compare the various fees in itself. If we take i.e. Germany and the Czech Republic, even if we tried to normalize the fee height on a per capita basis, it would become futile due to the fact, that German PSB operates in not one, but several different regulatory areas and even though Germany only employs a single fee, with this in mind even that looks like a irrational thing to do. PSB have to be scaled not only for different areas, but also have to provide different scales of radio and television broadcasts. On the other hand, the fact, that Germany has many times more payers than the Czech Republic, obviously leads to better scaling and better content in Germany, as we can safely assume that costs do not differ in the same proportions as income does between countries.

The biggest difference in these 2 systems though might be on how the regulator behaves when it comes to influencing the budget of the respective PSB. In countries, where PSBs rely on direct subsidies, the government has to periodically renew and/or create budgetary decisions for the PSB. While important, one could argue that in comparison to lowering or raising the licensing fee the effect on the general public is lower. While holding a discussion concerning the yearly budget certainly is worthwhile, most agents will not immediately feel the effect on their budgetary constraints, especially in comparison when the regulator decides to raise the licensing fee by a nontrivial margin. The licensing fee also gives a sense of stakeholding in the PSB, as is evident by the public argument raised in the previous section.

### 3 RTVS

Now that we have discussed the general landscape, we can talk about how the Slovak broadcaster, RTVS, works under these assumptions.

RTVS is the only PSB active in Slovakia. The broadcasting is done on the basis of a statute, not a license that is given out by the regulator, as is the case with privately-owned media in Slovakia. Its mission, competences and other details are all written down in the Act 532/2010 on Radio and Television Slovakia [6]. This statute also incorporates the means of financing RTVS. These are:

- Payments for public service broadcasting provided by Radio and Television Slovakia;
- a grant from the state budget pursuant to the act on the state budget for the relevant budget year;
- incomes from broadcast advertising;
- sponsorship payments;
- incomes from the rental and sale of assets of RTVS;
- revenues from deposits in a bank;
- gifts from natural persons and legal entities;
- inheritance;
- grants and other incomes.

Furthermore, there are other regulations directly affecting these revenue streams, as for example the revenue from broadcast advertising is further regulated by the Act 308/2000 on Broadcasting and Retransmission [7], which stipulates the overall percentage of allowed income from advertising and other comparatively strict regulations pertaining to the functioning of RTVS. This simply makes it impossible for RTVS to get the same remits from advertising as the privately owned broadcasters, as it is directly blocked by the law from doing so. Due to this and the data seen in Table 1, we can safely state that RTVS gets a heavy majority of its budget from licensing fees and a state grant.

These, among other things make it extremely hard to be competitive in the current media market environment in Slovakia. Budgetary restrictions notwithstanding, privately owned broadcasters also have multiple degrees of freedom with their choice of content broadcasted - RTVS is again, hamstrung by law and is mandated to produce certain specific, and most probably unrentable types of content which as Višňovský and Lalahová argue, are simply not popular and hence cannot perform as well as their private competitors [8]. While this certainly is something that should not be abolished, as it directly feeds into the mission of a PSB, it still does not ease the market position of RTVS right now. Furthermore, RTVS is required by law to produce at least 2

television and 4 radio stations<sup>3</sup>. In the television market alone, which is only populated by 3 major domestic players in total, its market share takes up only 11.5% [9], which is unusual for such a closed-off market structure, even more so when one considers the fact, that RTVS is the incumbent on the market. On the other hand, the radio market, which is much more saturated with various players, is a success story for RTVS, as it retains a sizable 31% market share there.

This situation leaves us with 2 potential solutions - either raising the licensing fee, or abolishing it altogether and trying to finance RTVS directly via state subsidies. Abolishing the fee would have a potential added benefit, as RTVS finances do belong under the Act 176/2004 on the management of property belonging to public institutions. This act already stipulates certain future-proof clauses which favor competitive-like management for state-run firms. This would probably require a process where the government would have to sign some form of an annual budget, in which the process of garnering more public financing would not be politically difficult. We can therefore assume that the budgetary constraint on RTVS would be widened and hence the broadcaster would provide higher quality of content in comparison to what it provides in terms of content right now<sup>4</sup>. What is questionable, besides the needed effort to practically completely redo the base laws that govern RTVS, is that if the state budget can practically support RTVS, as this policy would not be budget neutral. After all, the whole point of abolishing licensing fees is to lessen the strain on household budgetary constraints, so it has to be done without another policy that would present another form of tax revenue that would compensate it. Even more so if we look at comparable PBS budgets in Europe, as we can observe they do tend to have at least double the budget stemming from the public sector in comparison to RTVS. Furthermore, a PSB budget is mostly a fixed expenditure in the short run, usually even with a rising tendency, and tends not to be a subject to drastic cuts due to exogenous factors, i.e. economic downturns, as it is a public good after all.

On the other hand, raising the licensing fee is something that has been tossed around in the public discussion for quite some time now. And even though it has been mostly met with negative reactions, it looks like it is the most probable policy change that could happen in a short run, as it would not require any complete law stature redesigns. The central issue with raising it is by how much do we need to raise it. As we can see throughout Europe in Table 2, Slovakia has the lowest licensing fee and a comparably small population to the rest of the European countries. Even Mistrík agrees with this, as he posits that despite the fact that the fee is the lowest of all the licensing fees in Europe, both the general public and the politicians are heavily against raising it any more [10]. And even though RTVS has shown to be a profitable business in the last

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<sup>3</sup> Currently RTVS produces 3 television and 9 radio stations, some of which are online only.

<sup>4</sup> The existence of causality between budgetary constraints and the output of PSBs is trivial.



year, we can still assume it is under-developed just by looking at the operating budgets of other PSBs in Europe in countries that are similar to Slovakia.

## 4 Conclusion

As we have shown, Slovak PSB holds quite a unique position of being under-budgeted and having a bad public perception, which in turn generates a vicious circle, in which each of the aforementioned factors just exacerbates the other one. We have posited that this might change with either changing the licensing fee amount, or by shifting the financing to full state-provided subsidy. We have shown both arguments for and against such actions, even though we can show that the trend of abolishing licensing fees is certainly real and the most probable course of action in a long run.

Even then, a case for abolishing the licensing fee altogether seems spurious at best at this point. The cases of Hungary and Netherlands show that the enacting of direct subsidies was followed by political moves to influence the content and agenda of the PSB. However, raising the licensing fee in Slovakia is no easy feat either, as RTVS suffers from poor public perception and finding an optimal fee amount is needed first.<sup>5</sup> The problem with that is, as O'Hagan [11] states, that a licensing fee is a political tool first and foremost. Messing with it is highly risky and even optimizing its height might prove harder than it might seem on the first glance, as deriving a utility function is not straightforward.

In the end, more work is required in showing just where the social optimum lies with RTVS and its licensing fees. What we can say with certainty though, is that the current licensing fee has to change, even though the public discourse is by the very nature of this topic stifled. More work in finding an optimization of fee height is needed, as in contrast to abolishing it in favor to another system of financing, adjusting fee heights follows the Occam's razor principle and therefore seems realistically the best at the moment.

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<sup>5</sup> This is highly problematic due to the recent Facebook status of the Slovak prime minister stating that “license fees will certainly not be raised” as a reply to a outcry stemming from RTVS.

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**Table 1.** Yearly revenue streams in RTVS. Source: RTVS Yearbooks.

Year	Revenue	Financial revenue	Revenue from licensing fees
2015	130264941	15015647	75183154
2016	137517851	16297726	78275542
2017	139624537	22977195	80982203
2018	147518014	20164134	82570237
2019	177543933	34618520	83219881

**Table 2.** Overview of European licensing fee legislature. Source: Various public sources.

Country	Financing Scheme	Licensing Fee Eur/Month
Austria	Licensing Fee	17.21
Belgium-VRT	Subsidy	0
Belgium-BRE	Subsidy	0
Belgium-RTBF	Subsidy	0
Bulgaria	Subsidy	0
Croatia	Licensing Fee	10.52
Czech Republic	Licensing Fee	5.17
Denmark	Licensing Fee	21.5675
Estonia	Subsidy	0
Finland	Subsidy	0
France	Licensing Fee	11.58333
Germany	Licensing Fee	17.5
Greece	Subsidy	36 fee on electricity bills
Hungary	Subsidy	0
Ireland	Licensing Fee	13.33333
Italy	Licensing Fee	7.5
Latvia	Subsidy	0
Lithuania	Subsidy	0
Luxembourg	Ad Revenue	0

Malta	Ad Revenue	0
Netherlands	Subsidy	0
Poland	Licensing Fee	5.02
Portugal	Subsidy	36.24 fee on electricity bills
Romania	Subsidy	0
Slovakia	Licensing Fee	4.64
Slovenia	Licensing Fee	12.75
Spain	Subsidy	0
Sweden	Subsidy	0

## Forecasts of investment attractiveness of Russian oil companies on the example of NK Lukoil PAO

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**Abstract.** Financial analysis plays a significant role in determining both the prospects for the company's development and the possibility of attracting investment resources. It is an important tool for determining the characteristics of financial, economic and managerial activities of any enterprise. Using the example of the international company NK Lukoil PAO, a financial analysis is conducted and an assessment of investment attractiveness is given. The article considers the features of conducting financial analysis of the organization and developing solutions in assessing the investment attractiveness of the economic entity. The author competently analyzes the financial statements to reveal information that is important to investors. Methods of assessing the financial position of the company are considered in order to determine the investment attractiveness of the organization. Conclusions about the investment attractiveness of the company are made and recommendations for its improvement are provided. The forecast of future performance of the company based on its financial analysis is made to determine the company's development prospects in the global market, particularly, in the oil market that allow it to avoid investment risks.

**Keywords:** investor, investment attractiveness, investment risks

**JEL classification:** G17, G30, Y1

### 1 Introduction

Nowadays, enterprises are faced with the problem of working capital deficit, shortage of financial resources that can be negatively reflected on the production process. The purpose of assessing the investment attractiveness of an enterprise is to identify the weaknesses and strengths of its financial and economic activities, prevent possible investment risks, therefore, financial analysis of the company's operating activities is considered to be relevant today.

The main goal of an industrial organization, along with maximizing profit, optimizing the capital structure and ensuring its financial stability, is to ensure its

investment attractiveness. In addition, the effectiveness of management decisions that are made to implement the above-mentioned goals is due to many factors [1]. One of the main factors of management decision-making in organizations is believed to be the conduction of qualitative financial analysis.

Due to recent events of the spread of the coronavirus pandemic, its impact on the Russian oil sector and the investment attractiveness of companies should be noted. The coronavirus epidemic that broke out in December 2019 in the Chinese province of Hubei has become the main economic and social disaster of the first months of the year. Coronavirus 2019-nCoV had a very noticeable negative impact on world trade [9].

One of the main victims of the coronavirus is considered to be the oil market. For the first five weeks in 2020, oil prices continuously fell that was the most negative trend since November 2018, pushing the oil-producing countries and the OPEC+ cartel to a significant correction of the previous rate [12]. The industry has suffered from a sharp decline in demand, primarily from the transport sector (automobiles and air transportation), which has been the most vulnerable due to quarantine measures around the world.

In April 2020, according to Rystad Energy, demand fell by 27% and the average annual drop in demand is projected at 11% (10.8 million barrels per day) [11]. For Russia, such a change in the oil market environment carries serious risks, but they are not reflected in the statistics yet.

Overall, Russian oil exports did not suffer much in the first quarter of 2020. According to the Central Department of fuel and energy, exports of crude oil and gas condensate from Russia in January-April 2020 amounted to 86.3 million tons, which is 1.8% lower than the same indicator in 2019 [3].

In April, 22.2 million tons of Russian crude oil was exported to foreign countries. Compared to the same month last year, exports decreased by 0.3%.

Evaluating market competitiveness, Russian oil producers have the opportunities for further development since capital and operating costs are not high on average for the industry and are mainly denominated in rubles, which allow them to decline in the conditions of devaluation. In addition, the Russian oil industry has a certain margin of safety due to the peculiarities of tax regulation, in which the risks of low oil prices are transferred to the budget [8].

In the event of a possible repeat of the pandemic, the scale of the reduction of oil production will inevitably lead to reduced budgets and investment programs will be reviewed. However, this will not affect companies with high margins and a stable financial position.

## **2 Methodology and calculations**

While doing the research, financial ratio analysis was made in order to estimate the company's overall financial position and understand whether it is attractive for investors or not. Thomson Reuters Eikon was used to collect information about competitors of NK Lukoil PAO and the important financial indicators. It is considered to be the information terminal that provides a wide range of data and analytical tools

for analyzing financial, energy and commodity markets. To prepare for a comparable analysis of financial ratios, key metrics of NK Lukoil PAO were used. The table 1 shows data on the comparison of the solvency ratios for NK Lukoil PAO.

## 2.1 Financial ratio analysis

Based on data Ratios-Key metrics, the solvency ratios were analyzed and compared with industry data (table 1).

**Table 1.** Comparable analysis of the solvency ratios of NK Lukoil PAO, millions of Russian Rubles

Solvency ratios	Industry median	2014	2015	2016	2017	2018
1.Asset/Equity	2,21	1,56	1,56	1,56	1,50	1,41
2.Debt/Equity	0,27	0,25	0,27	0,22	0,18	0,13
3.Long-Term Debt/Total Capital	0,13	0,17	0,19	0,16	0,12	0,09
4.(Total Debt-Cash)/EBITDA	0,79	0,61	0,71	0,68	0,41	0,13

Source: Thomson Reuters Eikon Ratios – Key metrics Annual Standardized, Consolidated

The Asset/ Equity ratio was less than the industry median and it was decreasing all the period from 2014 to 2018. From 2014 to 2016, there were more assets that were financed by the owner's investments. For the period from 2017 to 2018, it was rather less due to the occurrence of risky non-delivery investment projects. The company faces the risks of cost overruns and delays in commissioning of production facilities.

The Debt/Equity ratio in 2014 and 2015 was approximately the same as the industry median and then it was decreasing. There were more assets that are financed by the owner's investments than financed by debts.

The ratio Long-Term Debt/Total Capital is higher than the industry median, which means that NK Lukoil PAO is more risky than the other companies, because its Total Debt holds a considerable part of the available capital. The ratio (Total Debt-Cash) / EBITDA shows that it would take less than 1 year for the company to pay back its debt if net debt and EBITDA are held constant. From 2014 to 2016, this ratio equals to the industry median approximately, however, during previous years it was lower. The ratio is satisfactory; NK Lukoil PAO is not burdened with debts.

The table 2 shows the analysis result of the liquidity ratios in comparison with industry data.

**Table 2.** Comparable analysis of the liquidity ratios of NK Lukoil PAO, millions of Russian Rubles

Liquidity ratios	Industry median	2014	2015	2016	2017	2018
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1.Quick ratio	1,03	1,15	1,26	1,02	0,95	1,20
2.Current ratio	1,34	1,59	1,75	1,51	1,36	1,62
3.Times Interest earned	10,9	16,9	10, 6	10,4	21,9	24,0
4.Cash cycle (days)	35,0	30,0	34,1	28,4	17,3	13,7

Source: Thomson Reuters Eikon Ratios – Key metrics Annual Standardized, Consolidated

For the period 2014-2018, the quick ratio is always more than 0,8. It means that NK Lukoil PAO is able to meet its current liabilities with cash. In addition, the current ratio is more than 1; it means that NK Lukoil PAO is able to meet current liabilities with all current assets during this period.

The times interest earned is always high, which means that NK Lukoil PAO can easily cover its debt obligations. The company's income is 24,0 times greater than its annual interest expense. In 2014, this ratio is much more than the industry median, but then it had decreased by 2015 due to an increase in interest expense from 22440 to 44082 million rubles. In addition, it takes for a company 35 days to convert its investments in inventory and other resources into cash flows from sales. It is quite a short period.

## 2.2 Analysis of the company's historical financial performance

Horizontal analysis (also known as trend analysis) is a financial statement analysis technique that shows changes in the amounts of corresponding financial statement items over a period of time [5].

This technique is considered to be useful to evaluate the trend situations. This tool is implemented in the research to estimate significant changes of financial statements of NK Lukoil PAO. In the table 3 we can see percentage changes of financial indicators over 2014-2018 years.

**Table 3.** Financial indicators of NK Lukoil PAO, millions of Russian Rubles

	2014	2015	2016	2017	2018
Cash and Short-Term Investments	50%	56.4%	(1.0%)	25.7%	48.3%
Total Current Assets	(8,1%)	(1.8%)	3.5%	4.2%	13.0%
Intangibles, Net	(18%)	12.1%	(22.7%)	(12.2%)	(6.0%)
Total Assets	(22,6%)	5.9%	(0.1%)	4.2%	9.7%
Total Current Liabilities	(15,7%)	(10.8%)	19.5%	15.4%	(4.6%)
Total Liabilities	1%	5.7%	(0.2%)	(2.8%)	(4.4%)



Total Equity	(31,5%)	6.1%	(0.04%)	8.14%	16.7%
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Source: Thomson Reuters Eikon Balance Sheet Annual YoY Growth, Consolidated

Total assets have increased by 5,9% from 2014 to 2015. It decreased by 0,1% from 2015 to 2016. It increased by 4,2% and 9,7% from 2016 to 2017 and from 2017 to 2018, respectively.

Total liabilities have increased by 5,7% from 2014 to 2015, which was due to the financial crisis in Russia and the budget deficit. It has decreased by 0,2%, 2,8%, 4,4% from 2015 to 2016, from 2016 to 2017, and from 2017 to 2018, respectively, which means that the debt of NK Lukoil PAO has decreased.

Total equity has increased by 6,1% from 2014 to 2015. Then, it has decreased by 0,04% from 2015 to 2016. Over the next two years, it has increased by 8,14% and 16,7%, respectively. This was due to an increase in total assets and a decrease in total liabilities over the given period.

Table 4 shows data on the percentage change of the Income Statement over 2014-2018 years.

**Table 3.** Income and profit indicators of NK Lukoil PAO, millions of Russian Rubles

	2014	2015	2016	2017	2018
Total Revenue	3,35%	4.4%	(9.1%)	13.6%	35.4%
Cost of Revenue, Total	5,1%	3.9%	(9.7%)	19.9%	44.9%
Gross Profit	1,5%	4.9%	(8.4%)	7.2%	24.8%
Operating Income	1,8%	4,43%	(9,07%)	12.8%	50.9%
Total Operating Expense	3,4%	5.8%	(11.9%)	12.8%	33.9%
Net Income	58%	(26.4%)	(29.0%)	> 99%	47.8%

Source: Thomson Reuters Eikon Income Statement Annual YoY Growth, Consolidated

During 2014, 2015, 2016, operating income changed by 4,43%, - 9,07%, and 12,8%, respectively. Operating expenses changed by 5,8%, -11,9%, 12,8%, respectively. The Income Statement shows that over the last 2 years operating income increased by 34% or by 2099184 million rubles. Operating expenses also increased by 33,9% or by 1842774 million rubles. Therefore, net income over the last 2 years increased by 47,8% or by 200369 million rubles. The main reason for the increase in net income is that operating income increases with the faster rate than operating expenses.

### 2.3 Relative valuation method for the company analysis

Doing the research, NK Lukoil PAO was analyzed and compared with its international rivals to estimate its company's stock. Table 5 shows the position of NK Lukoil PAO in comparison with its main competitors. Key indexes are estimated and compared with industry data.

**Table 5.** Relative valuation of NK Lukoil PAO, 2018

Name	RIC	P/E	P/Book	P/Sales	Market capitalization (USD)
NK Lukoil PAO	LKOH.MM	6,47	1,03	0,52	66883663935
Index average (Mean)	-	18,33	2,83	1,56	16534813203
Index median	-	7,98	1,49	0,99	6503577381
NK Rosneft PAO	ROSN.MM	8,35	1,13	0,56	68425089222
Gazprom PAO	GAZP.MM	4,92	0,32	0,58	57401301727
Novatek PAO	NVTK.MM	20,19	3,84	4,00	49568736077
Tatneft PAO	TATN.MM	7,98	2,23	1,84	25606571737
Surgutneftegaz PAO	SNGS.MM	4,65	0,34	1,03	18660278995
Transneft PAO	RNF_p. MM	4,28	0,13	0,27	4020900569

Source: Thomson Reuters Eikon Index Competitors

The P/E of NK Lukoil PAO is lower than the index average. Consequently, it shows that the company's stock price is undervalued.

The P/Book ratio for NK Lukoil PAO is 1,03 USD that indicates that investors believe that historical cost of assets doesn't reflect its true potential to generate positive cash flows. A low P/B also shows that stocks are undervalued. In comparison with its peers, NK Lukoil PAO is perceived as a growing company (only Novatek PAO and Tatneft PAO have a higher ratio than NK Lukoil PAO) as their P/B ratio is much higher than the industry averages.

The P/Sales ratio for NK Lukoil PAO is 0,52 USD that is lower than the index average. It means that investors are willing to pay 0,52 USD per dollar of sales. A low ratio may indicate that the company's stock is undervalued. In comparison with its peers, we can say that only Novatek PAO and Tatneft PAO have ratios, which are significantly higher than the index average. Therefore, it means that their stocks are overvalued.

The market capitalization of NK Lukoil PAO is equal to 66883663935 USD. In comparison with its peers, we can say that only the market capitalization of NK Rosneft PAO exceeds NK Lukoil PAO. Therefore, this company is greater, which has more publicly traded company's outstanding shares.

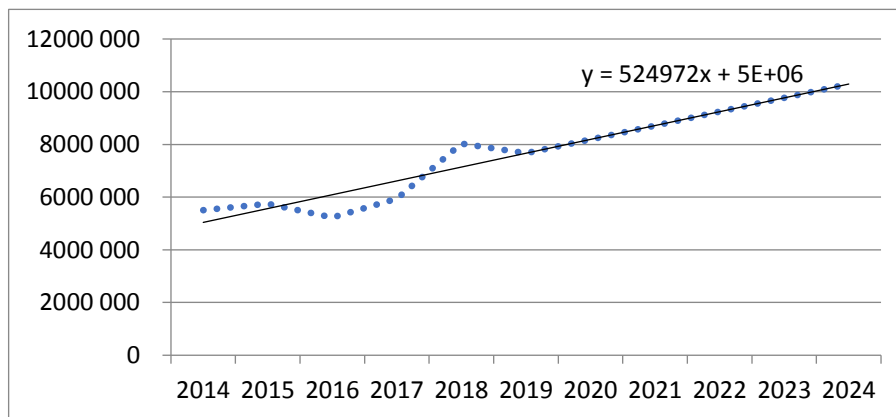
The main competitors of NK Lukoil PAO are NK Rosneft PAO, Novatek PAO, and Tatneft PAO. Novatek PAO has the highest P/E ratio, which was equal to 22,25. It means that Novatek PAO with a high P/E ratio usually indicates positive future performance and investors are willing to pay more for this company's shares. Novatek PAO has the highest EV/EBITDA.  $3746,245/268,087=13,97$ . It means that Novatek PAO has to pay 13,97 of EBITDA. For NK Lukoil PAO we found the implied share price, which was calculated as the median between the maximum and minimum value, it is equal to 10558 rubles. Therefore, it means that the share price is inflated. The company is undervalued that is a good opportunity for investors. Value investors may

focus on acquiring these investments as a method of pulling in reasonable returns for a lower initial cost.

#### 2.4 Forecast of future performance

Based on the Income Statement of NK Lukoil PAO, revenue was taken over the period from 2014 to 2018. Then, using the Excel Forecast Function, which is considered an important part of the modern business to predict future values based on historical data, the future value of revenue was calculated for the next five years. In addition, the Excel Trend Function was used to calculate a linear trend through a given set of values. This method is considered to be the effective procedure to estimate how revenue will be changed by 2024. The main goal of this research is to present some important elements of the Income Statement and their changes.

Figure 1 shows how revenue of NK Lukoil PAO will be changed by 2024.



**Fig. 1.** Revenue forecast of NK Lukoil PAO, millions of Russian Rubles

By NK Lukoil PAO revenue analyzing, we can say that revenue increased. Revenue was positively impacted by a foreign exchange gain (compared to a foreign exchange loss in 2017) and negatively impacted by increased depreciation, depletion and amortization due to the commissioning of new production assets and production growth in the Caspian Sea and Uzbekistan. Therefore, we can say that the trend is positive and revenue growth is expected in the future.

## 2.5 Investment risk for the company's business activity

While doing the research, it was identified the following group of risks that may negatively affect the industry and financial performance of NK Lukoil PAO. We have identified the following group of risks: financial, legal, operational, risk of investment program non-delivery, and climate change risk. The following risks have a high probability to occur and have the most significant impact on the company's business activities.

### 1. Financial risks

- *Price risk.* Fluctuations in prices of oil and petroleum products may have a significant impact on the price of securities and financial performance of the company. In the short-term, oil prices are expected to remain highly volatile due to uncertainty over global economy growth, changes in oil supplies and imbalances in global oil supply and demand, as well as the current high geopolitical tensions. *Risk treatment:* The implementations of a commodity supply management system; using hedging transactions, which significantly reduce the negative impacts of price fluctuations in the oil and petroleum product markets.

- *Liquidity risk.* High volatility in oil prices, foreign currency exchange rates to the US dollar, refining margins, petrochemical and power generation margins could cause imbalances in the figures included in NK Lukoil PAO group's plans, budgets, and investment programs. *Risk treatment:* maintaining the required level of approved credit facilities to ensure sufficient liquidity in meeting rating agency requirements.

- *FX Risk.* Changes in the ruble to US dollar exchange rate affect the financial state of NK Lukoil PAO, whose assets are mostly concentrated within the Russian Federation. *Risk treatment:* applying hedging instruments to its revenues denominated in other currencies.

### 2. Legal risks

- *Tax and custom regulation risk* (The financial performance of NK Lukoil PAO and its entities may be adversely affected by a heavier tax burden, unexpected revisions of tax rates and duties, as well as the cancellation of preferential customs duties applied to a number of NK Lukoil PAO). *Risk treatment:* keeping track of changes in tax and customs regulations, participating in discussing legislative initiatives, making timely assessments of prospective changes in tax and customs laws.

## 3 Conclusion

It is believed that the future prospects for NK Lukoil PAO are positive. Revenue growth will have increased by 9 times. Total assets increased by 9,6% in 2018 while total liabilities decreased by 4,38%. There were more assets that were financed by owner's investments rather than by debts. In addition, after analyzing the profitability ratios, we can conclude that over the past 5 years the EBITDA margin increased by 2% and in 2018 it is equal to 14%. It means that an assessment of a firm's operating profitability, as a percentage of total revenue, is positive. The higher this indicator, the lower the company's operating expenses in relation to total revenue. In addition, the analysis of

financial ratios shows that most of all activity ratios indicate the effectiveness of the company's operations, for example, Avg A/R days is much less than the industry median and it requires 22 days for NK Lukoil PAO to receive all the A/R. It is satisfactory and effective for the future. Given the large-scale resource base, the most important priority for the company is to implement new projects in order to increase production volumes. These projects are related both to the development of new fields and to the intensification of production at mature fields using the modern technologies and increasing the volume of production drilling and the number of well operations to increase the oil recovery.

#### 4 Recommendations

We can conclude that NK Lukoil PAO is one of the largest vertically integrated oil and gas companies in the world with positive forecasts for further development. It is recommended for the company to expand the sales market, search for new customers and implement resource-saving technologies. There are great opportunities to implement the new projects, which will be focused on increasing production (Northern Caspian, Baltic Sea, Timan Pechora, etc.) It is also recommended to work on the creation of new technologies for the development of fields with viscous oil. The main efforts are focused on the deepening of processing and modernization of capacities.

It is recommended to invest in innovation to gradually reduce the specific consumption of natural resources, materials and energy with the maximum possible output. The company's assets are mostly financed by owner's investments, which means that the company can pay off all its liabilities. NK Lukoil PAO generates more income for €1 of revenue than the industry median, which indicates that the company is quite profitable. Gross and net margins in 2018 are equal to 43,6% and 7,7%. The company's management is working very effectively: Avg. A/R and Avg. Inventory are less than the industry median. It means that NK Lukoil PAO spends less time receiving all the A/R and selling inventories.

Financial analysis shows that NK Lukoil PAO is overestimated, which means that the company's stock price is undervalued. It is effective for investors. Therefore, there is potential for growth in the long - term. We can conclude that this company has a good potential for sustainable development and production and it is generally attractive to investors, even if the pandemic will happen again.

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## Institutional Capacity and Innovation Performance

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**Abstract.** The effect of institutions on innovation outcomes, and therefore on economic growth, is a well-defined relationship in the literature. However, through the empirical analysis of the present paper, this relationship seems to differ between different groups of countries. The above issues are examined using annual data for 152 countries for the period from 2007 to 2017. The empirical investigation of the above relations highlights the fact that there is a positive and statistically significant effect of institutions on innovative performance for the total period under analysis. The countries under investigation are divided into three groups based on their difference in the institutional background score in relation to the average of 20 benchmark economies. The analysis shows that there is an "S-shaped" relationship between innovation and institutions. The higher the distance of a group from the reference economies - in terms of their institutional performance - the higher the impact of the institutional background on innovation since there is more capacity and greater potential for improvement of the institutional background. The analysis highlights the need for structural reforms to accelerate institutional changes at an unprecedented pace in order to transform institutions that hinder innovation into institutions that promote innovation within a reasonable time frame. Finally, the analysis results in the creation of heat maps (one for each country group) which presents - for each economy - which institutions are deemed necessary to be structurally reformed, culminating in policy proposals.

**Keywords:** Innovation; Institutions; Economic Development; Structural Reforms.

## 1 Introduction

The quality of institutions affects (among others) and the pace of innovation of an economy, the driving force behind economic growth (Aghion and Jaravel 2015; Pece et al. 2015). Institutional influences on innovation are at the heart of neo-Schumpeterian evolutionary economic thought (Nelson and Winter 1982, 2002; Witt 2008).

In this way, knowledge becomes a critical factor in economic growth (European Commission 2005), while strategies for localizing local innovation are considered very important for economic growth. However, there are many groups of countries that do not innovate much. This is due to the increasing scarcity of a wide array of factors complementary to innovation (Cirera et al. 2017). Throughout this paper, institutional factors are suggested to be complementary to innovation, and the effects of institutions on innovation performance are investigated, trying to define why the relationship between institutions and innovation differs between groups of countries and what the countries have to do to enhance their institutional and innovation performance.

The scope of the paper is to highlight the effects of institutions on innovation performance and to investigate whether different countries present different institutional effects on innovation outcomes. For this purpose, annual data are used for 152 countries, for the time period from 2007 to 2017. The analysis sought to prove the institutional background empirically as a factor that differentiates the economic performance of economies. Besides, the paper aims to develop critical policy implications for those countries scoring below benchmark economies, indicating what should be done to enhance their institutional and innovation performance in their attempt to converge to the benchmark countries.

The paper contributes in the relevant literature, a) indicating that there are group of countries that present different effects of institutions on innovation depending on their innovation and institutional capacity, b) leading to an "S-shaped" relationship between innovation and institutions depending on those capacities, c) elaborating the factor of time in the evolution of institutions and innovation, using the real-time of change during the time period under analysis in order to examine whether and when the countries will be able to reach the innovation and institution level of the benchmark countries, d) there are presented some policy implications, after constructing a heat map based on the differences of each country from the benchmark countries, highlighting whether there is a need for structural reforms or not and which are the institutional areas of intervention (structural reforms) in which policymakers should concentrate, and e) that the institutional background proves to be a factor that differentiates economies from each other and leads to different economic policy requirements. Thus, the analysis contributes to the discussion around one-size-fits-all policies.

The rest of the paper is organized as follows. Section 2 presents the theoretical literature review. Section 3 describes the data used and the methodology employed. Section 4 presents a discussion of the results. Finally, Section 5 presents the conclusions and policy implications.

## 2 Literature Review



Innovation is one of the most important factors of growth and prosperity (Solow 1957). One of the most effective ways to increase competitiveness in global markets to make production more efficient and cost-effective is through technology and innovation. At a micro level, firms that do not invest in innovation and technology are forced to withdraw from the market after some time (Yves and Leblanc 2002). In this way, knowledge becomes a critical factor in economic growth (European Commission 2005), while strategies for localizing local innovation are considered very important for economic growth (Carayannis and Rakhmatullin 2014; Carayannis et al. 2019). Countries whose firms fail to innovate are increasingly close to direct competition with developing countries that are characterized by lower labor costs and increasing mastery of existing technologies and business methods (Savrul and Incekara 2015).

Thus, firms and governments need to spend large amounts of resources to design and implement innovation-enhancing policies (Donges et al. 2016). However, there are still great gaps in understanding what leads to innovation. Yet low-income countries invest very little in innovation (Goñi and Maloney 2017) due to the increasing scarcity of a wide array of factors complementary to innovation. This explains the lack of convergence of low-income countries to the technological frontier.

The decisive contribution of institutions on economic growth through technology and innovation has been argued by Schumpeterian and other scholars who find that the most crucial factor in interpreting the growth differences across countries is the quality of economic and political institutions (Barro 1997; Hall and Jones 1999; Rodrik 2000, 2003; Sala-i-Martin 2002). The endogenizing of technology by the new growth theory (Aghion and Howitt 1998, 2009; Lucas 1988) limited the focus on the impact of institutions on innovation, recognizing only capital, labor and knowledge as innovation determinants.

However, institutions as the rules of the game (North 1990) -and the institutional quality- are the determinant factors of individuals decision making and, consequently, innovative activity. Economic institutions most strongly affect all kinds of human relations, whether political, social or economic (North 1990). The institutional framework has a positive effect on income growth and the knowledge economy (Andrés et al. 2015), as the quality of institutions affects the pace of innovation of an economy (Nour 2014; Casadella and Uzunides 2017) and is the driving force behind economic growth.

According to the literature, the impact of institutional quality on innovation is positive no matter the level of the technology and research and development. Acemoglu and Robinson (2000) emphasize the effect of institutional quality on the behavior of elites that could prevent innovative change, while Omidi et al. (2018), based on the analysis of Olsson (2000), find that improving institutional quality makes an appropriate basis for other variables to be more effective in innovation activities. Tebaldi and Elmslie (2013) conclude that institutional arrangements explain much of the cross-country variations in patent production. They also argue that control of corruption, market-friendly policies, protection of property rights and a more effective judiciary system boost the economy's rate of innovation. Furthermore, their estimates provide evidence that the impact of institutional quality on innovation is essential both for countries in the technological frontier as well as for countries far from the technological frontier. Moreover, financial institutions play a crucial role to solve informational and incentive problems related to R&D activities (Xu and Huang 1999).

Also, the existence of uncertainty due to a volatile institutional framework often leads to postponement of investment decisions in R&D (Petrakis et al. 2014) as there are no mechanisms that could promote innovation and economic growth.

Institutions are classified as “extractive” when they impede economic growth, and as “inclusive” when they promote it (Acemoglu and Robinson 2012). In societies with extractive institutions, entrepreneurship is obstructed, systematic risk is increased, and market functioning and efficiency are hampered (Petrakis et al. 2017). The prevalence of hierarchical structures and extractive institutions in the production process creates obstacles to the orientation of available resources to more productive destinations, making it difficult for economies to adapt or slowing their adaptation to the creative destruction that is essential to economic renaissance. Inclusive institutions allow equal access to economic opportunities which promote new ideas (Acemoglu et al. 2001). In this manner, institutional reforms and the establishment of inclusive institutions are mandatory to affect innovation in the long-run. For example, the establishment of property rights, the elimination of corruption, and a proper legal system could foster entrepreneurship and the incentives to innovate. Countries with institutional barriers that prevent or restrict the adoption of newly invented technologies allocate a relatively small share of human capital in the R&D sector (Tebaldi and Elmslie 2008).

### 3 Methodology and Data Description

The dataset used in the empirical analysis consists of a balanced panel of annual data for 152 countries<sup>1</sup> and relates to annual data from 2007 to 2017. The source of the dataset is the Global Competitiveness Index of the World Economic Forum (WEF) and more especially Pillar 1 (Institutions) and Pillar 12 (Innovation).

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<sup>1</sup> Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Barbados, Belgium, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei, Burkina Faso, Burundi, Bulgaria, Cambodia, Cameroon, Canada, Cape Verde, Chad, Chile, China, Colombia, Congo, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, France, Gabon, Gambia, Germany, Georgia, Greece, Guatemala, Guinea, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, Indonesia, Finland, India, Israel, Italy, Iran, Ireland, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea, Kuwait, Kyrgyz Republic, Laos, Latvia, Lesotho, Lebanon, Liberia, Libya, Lithuania, Luxembourg, Madagascar, Malaysia, Malawi, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Nigeria, North Macedonia, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Timor, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

To examine the effects of institutions on innovation performance, the following baseline estimation equation is employed:

$$Innovation_{it} = \alpha_i + \beta * Institutions_{it} + \gamma * Z_{it} + \lambda_t + u_{it}, \quad (1)$$

where  $i$  denotes the country ( $N_{max} = 152$ ) and  $t$  the year ( $T_{max} = 11$ ). The dependent variable  $Innovation_{it}$  is an index that is comprised by the WEF using the following variables: the capacity for innovation, quality of scientific research institutions, company spending on R&D, university-industry collaboration in R&D, government procurement of advanced technology products, availability of scientists and engineers, patent applications, and intellectual property protection.  $Institution_{it}$  is an index that is comprised by the WEF using the following variables: property rights, intellectual property protection, diversion of public funds, public trust in politicians, irregular payments and bribes, judicial independence, favoritism in decisions of government officials, efficiency of government spending, burden of government regulation, efficiency of legal framework in settling disputes, efficiency of legal framework in challenging regulations, transparency of government policymaking, business costs of terrorism, business costs of crime and violence, organized crime, reliability of police services, ethical behavior of firms, strength of auditing and reporting standards, efficacy of corporate boards, protection of minority shareholders' interests and strength of investor protection 0-10 (best). Moreover,  $\alpha_i$  is a set of country-specific fixed effects capturing the influence of unobserved country-specific heterogeneity,  $Z_{it}$  is a vector of control variables, and  $\lambda_t$  is a set of time dummies for each year in the sample, controlling for year-specific effects that are common to all countries.

The control variables included in the analysis are the following: (a) higher education and training as a measure for human capital (Faems and Subramanian 2013; Diebolt and Hippe 2019; Fonseca et al. 2019). This is a pillar of Global Competitiveness Index of the World Economic Forum comprised by the following variables: secondary education enrollment rate, tertiary education enrollment rate, quality of the education system, quality of math and science education, quality of management schools, internet access in schools, local availability of specialized training services, the extent of staff training. (b) Goods market efficiency as well as labor market efficiency are used as broader measures of how the product and the labor market work (Ang and Cheng 2005; Gu 2005; Dima et al. 2018). Goods Market Efficiency is a pillar comprised by the following variables: the intensity of local competition, the extent of market dominance, the effectiveness of anti-monopoly policy, effect of taxation on incentives to invest, total tax rate, number of procedures required to start a business, the time needed to start a business, agricultural policy costs, the prevalence of non-tariff barriers, trade tariffs, the prevalence of foreign ownership, the business impact of rules on foreign direct investments, the burden of customs procedures, imports as a percentage of GDP, degree of customer orientation, buyer sophistication. Labor Market Efficiency is a pillar comprised by the following variables: cooperation in labor-employer relations, the flexibility of wage determination, hiring and firing practices, redundancy costs, the effect of taxation on incentives to work, pay and productivity, reliance on professional management, country capacity to retain talent, country capacity to attract talent, female participation in the labor force. (c) Inflation is also used as a measurement of the macroeconomic conditions in the economies under consideration (Chu et al. 2018; He

2018). (d) Government Efficiency is also used as a measurement of how effectively the governments work (Rodriguez-Bolivar 2014). (e) Furthermore, internet access in schools is used as a measurement of economic development of the countries (Collis 1996; Amour 2012). This is provided as the responses to the following questions: “In your country, to what extent is the Internet used in schools for learning purposes?”. (f) Lastly, pay and productivity are used as the extent to which payments are seen as a motivation that leads to productivity (Ederer and Maso 2013). This is provided as the responses to the following questions: “In your country, to what extent is pay related to employee productivity?”.

All data are drawn from the Global Competitiveness Reports (annual reports from 2008 to 2018) of the WEF.

The analysis of Equation (1) is based on panel data estimation methods. Fixed effects (FE) estimation approach is employed, which allows for individual heterogeneity using different intercepts across countries and can be estimated using ordinary least squares (OLS). Furthermore, cluster-robust estimation for standard errors is used to control for serial correlation and heteroskedasticity for every economy.

Table 1 presents the descriptive statistics for the variables used in the empirical analysis.

**Table 1.** Descriptive statistics

	<i>N</i>	<i>Avg.</i>	<i>St.Dev.</i>	<i>Min</i>	<i>Max</i>
<b>Innovation</b>	1524	3.44	0.86	1.68	5.84
<b>Institutions</b>	1524	4.07	0.88	2.09	6.19
<b>Pay and Productivity</b>	1524	3.98	0.67	2.09	6.04
<b>Higher Education and Training</b>	1524	4.15	1.00	1.90	6.29
<b>Goods Market Efficiency</b>	1524	4.30	0.58	2.76	5.83
<b>Labor Market Efficiency</b>	1524	4.30	0.56	2.55	5.95
<b>Government Efficiency</b>	1524	3.66	0.77	1.41	6.05
<b>Inflation</b>	1519	5.35	8.82	-8.81	254.94
<b>Internet Access in Schools</b>	1524	4.09	1.27	1.29	6.76

Then, in order to export a benchmark of countries, we look for the countries that rank in the top 30 countries in 2007 and 2017 based both on their innovation performance and their institution performance. The final dataset includes the countries<sup>2</sup> that have a better performance the years 2007 and 2017 in both innovation and institutions at the same time, and so we end up with a sample of 20 countries. In order

<sup>2</sup> Australia, Austria, Belgium, Denmark, Finland, Germany, Hong Kong, Ireland, Israel, Japan, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland, United Kingdom, United States of America.

to extract the benchmark, we calculate the average values of the top 20 performer countries per year for the period under analysis for the innovation and institutions.

Then, for each country, the difference from the benchmark countries on institutional performance is calculated. To do this, firstly the average performance of the benchmark countries per year is calculated. Then the total average performance of the benchmark countries for the entire period is calculated. Besides, for each country, the average of its annual institutional performance for the period 2007-2017 is calculated. Finally, the difference between the average institutional performance of each country and the total average of the benchmark countries is calculated.

Equation (1) is regressed for the total of 152 countries under analysis as well separately for each one of the groups of countries (group countries A, B, C and for the benchmark countries), to check whether how the institutional background affects innovation performance differs for individual groups of countries.

In addition, to test what would be the benefit for the innovation performance if each group would change its institution performance up to the level of the institutional performance of the benchmark countries the regressors of equation (1) are used for each group of countries in combination with the size at which each group of countries must increase its score in the institutional background to reach the performance of the benchmark countries.

At the same time, it is calculated the time dimension regarding the improvement of institutions and innovation up to the benchmark levels, for each group, based on the evolution of innovation and institutions during the period under analysis. Firstly, there is calculated an average of the countries' performance per year for the reference period under investigation for innovation and institutions. Then, the average annual growth is calculated. Based on this average rate of change, it is estimated when each group could reach the performance of the benchmark countries.

The latter procedure is indicative of whether the performance of countries over the last 11 years (2007-2017) alone is sufficient to approach benchmark countries or whether additional efforts are required (structural changes). Thus, based on the differences of the countries from the benchmark, heat maps are constructed for the groups of countries A, B and C, which capture the specific institutional sub-variables in which it is deemed appropriate to carry out structural reforms.

## 4 Empirical Results

The 132 countries (i.e. the countries of the analysis except from the 20 countries that make up the benchmark countries) are divided into three groups based on the distance of each country -in its institutional performance- from the benchmark countries, as follows:

$$\begin{aligned} -3.83 &\leq \text{Group A} \leq -2.01 \\ -2 &\leq \text{Group B} \leq -1.01 \\ -1 &\leq \text{Group C} \leq 0 \end{aligned}$$

In Group A belong the countries that have a score on the institutional background lower by 3.83 to 2.01 points compared to the benchmark countries. In Group B belong the countries that have a score on the institutional background that is

2 to 1.01 points lower than the score of the benchmark countries. Finally, in Group C belong those countries that have a score on the institutional background that is 1 to 0 points lower than the score of the benchmark countries.

Table 2 presents the three groups of countries.

**Table 2.** The three group of countries and the institutional differences from benchmark

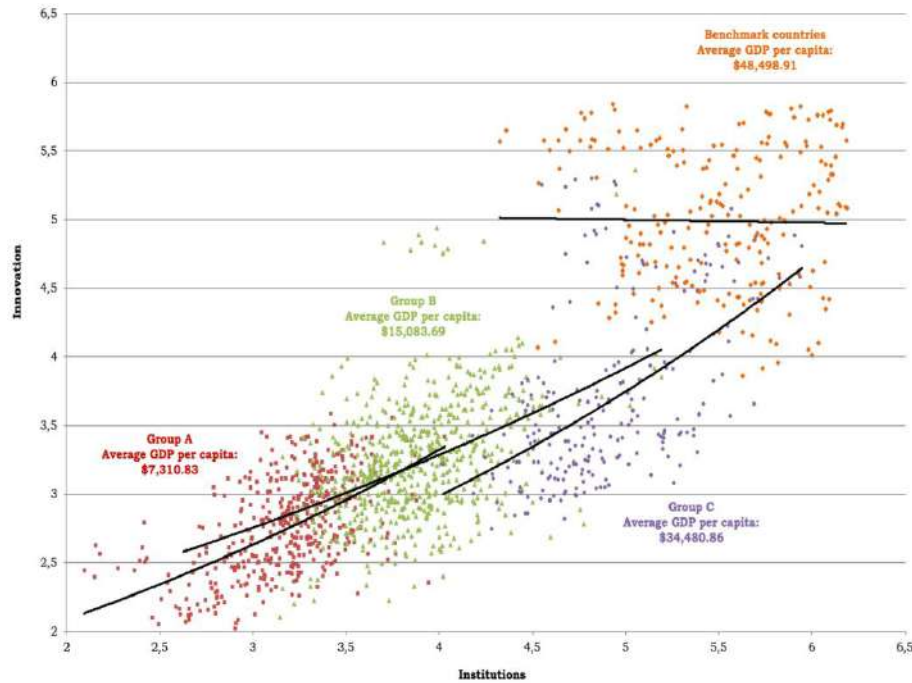
Group A		Group B		Group C	
Angola	-3,8	Brazil	-2,0	Gambia	-1,0
Myanmar	-3,8	Cambodia	-2,0	Bhutan	-0,9
Venezuela	-3,2	Kenya	-2,0	Cyprus	-0,9
Haiti	-2,8	Libya	-2,0	Jordan	-0,9
Chad	-2,8	Philippines	-2,0	Mauritius	-0,9
Yemen	-2,8	Albania	-1,9	Puerto Rico	-0,9
Burundi	-2,6	Italy	-1,9	Botswana	-0,8
Paraguay	-2,6	Croatian	-1,9	Brunei	-0,8
Argentina	-2,5	Lesotho	-1,9	Malta	-0,8
Bolivia	-2,4	Benin	-1,9	Uruguay	-0,8
Guinea	-2,4	Burkina Faso	-1,9	Chile	-0,7
Republic of		Romania		Taiwan	-0,7
Kyrgyzstan	-2,4		-1,9		
Mauritania	-2,4	Slovakia	-1,9	France	-0,6
Bangladesh	-2,4	Suriname	-1,9	Bahrain	-0,5
Ukraine		Trinidad	and	Barbados	-0,5
	-2,4	Tobago	-1,9		
Bosnia and		Armenia		Estonia	-0,5
Herzegovina	-2,3		-1,8		
Gabon	-2,3	Vietnam	-1,8	Oman	-0,4
Dominican		Greece		Saudi Arabia	-0,4
Republic	-2,3		-1,8		
Ecuador	-2,3	Iran	-1,8	Rwanda	-0,2
Congo	-2,3	Hungary	-1,8	Qatar	-0,2
Lebanon	-2,3	Tanzania	-1,8	Iceland	-0,1
Madagascar	-2,3	Jamaica	-1,8	Canada	0,0
Belize	-2,3	Egypt	-1,7	United Arab Emirates	0,0
Nicaragua	-2,3	Ethiopia	-1,7		
Timor		Northern			
	-2,3	Macedonia	-1,7		
Ivory Coast	-2,2	Senegal	-1,7		
Guatemala	-2,2	Turkey	-1,7		
El Salvador	-2,2	Ghana	-1,6		
Zimbabwe	-2,2	Kazakhstan	-1,6		
Mongolia	-2,2	Liberia	-1,6		
Mozambique	-2,2	Malawi	-1,6		
Moldova	-2,2	Panama	-1,6		
Nepal	-2,2	Swaziland	-1,6		
Nigeria	-2,2	Syria	-1,6		
Russia	-2,2	Thailand	-1,6		
Serbia	-2,2	Czech republic	-1,6		
Algeria	-2,1	Azerbaijan	-1,5		
Bulgaria	-2,1	Georgia	-1,5		
Guyana	-2,1	Zambia	-1,5		
Cameroon	-2,1	Indonesia	-1,5		
Colombia	-2,1	Laos	-1,5		
Mali	-2,1	Latvia	-1,5		
Mexico	-2,1	Poland	-1,5		
Honduras	-2,1	Cape Verde	-1,5		
Uganda	-2,1	Sri Lanka	-1,5		
Pakistan	-2,1	Tajikistan	-1,5		
Peru	-2,1	India	-1,4		
Sierra Leone	-2,1	Lithuania	-1,4		
		Morocco	-1,4		
		Montenegro	-1,4		

Seychelles	-1,4
Spain	-1,3
China	-1,3
Korea	-1,3
Costa Rica	-1,3
Slovenia	-1,3
Kuwait	-1,2
Namibia	-1,1
South Africa	-1,1
Portugal	-1,1
Tunisia	-1,1

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Figure 1 presents a scatter plot on the relationship between innovation and institutions for Group A, B, C, as well as for the benchmark countries for the period 2007-2017. The figure also presents the level of economic development of each group of countries, as expressed by the average per capita GDP of the countries for the total period under analysis.

**Figure 1.** Scatter plot of the relationship between innovation and the institutional background, 2007-2017



The empirical results are expected to lead to the emergence of a positive relationship between the institutional background and innovation for all groups of countries, except for the benchmark countries. Besides, for the whole analysis period Group A presents the lowest average per capita GDP of \$7,310.83, Group B countries have an average per capita GDP of \$15,083.69, Group C countries average per capita GDP of \$34,480.86, and the benchmark countries average per capita GDP of \$48,498.91. This highlights the positive link between both the institutional background and the level of innovation with the level of economic development of the countries.

Then, an empirical assessment of the relationship between the institutional background and the level of innovative activity is performed, through the estimating equation (1).

Table 3 presents the estimations of equation (1) for the total sample under analysis (152 countries).



**Table 3.** Estimations of equation (1) - Total Sample (152 countries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Institutions	0.48*** (13.38)	0.30*** (12.03)	0.24*** (9.51)	0.17*** (5.78)	0.16*** (5.35)	0.16*** (5.35)	0.08** (2.01)	0.08** (1.97)	0.07* (1.82)
Innovation (1 year lag)		0.53*** (21.37)	0.49*** (18.32)	0.48*** (18.66)	0.47*** (18.04)	0.47*** (17.99)	0.47*** (18.54)	0.47*** (18.18)	0.46*** (17.56)
Higher Education and Training			0.19** (5.89)	0.17*** (5.50)	0.18*** (5.68)	0.17*** (5.56)	0.17*** (5.41)	0.15*** (4.52)	0.14*** (4.50)
Goods Market Efficiency				0.15*** (3.86)	0.13*** (3.26)	0.13*** (3.27)	0.13*** (3.27)	0.12*** (3.09)	0.10*** (2.61)
Labor Market Efficiency					0.09*** (3.20)	0.08*** (3.18)	0.07*** (2.65)	0.08*** (2.94)	0.05* (1.73)
Inflation						0.01*** (5.06)	0.01*** (3.77)	0.01*** (4.23)	0.01*** (2.91)
Government Efficiency							0.09*** (2.89)	0.08*** (2.79)	0.08*** (2.78)
Internet Access in Schools								0.03*** (2.80)	0.04*** (3.24)
Pay and Productivity									0.05*** (4.54)
N	1524	1357	1357	1357	1357	1354	1354	1354	1354
R <sup>2</sup>	66.58%	94.13%	93.91%	93.83%	93.64%	93.64%	93.95%	93.67%	93.38%
F-stat	129.72* **	667.42** *	563.42* **	465.62** *	399.18* **	418.08* **	399.64* **	402.90* **	386.26* **

**Notes:** The t-statistics values are displayed in parentheses. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% significance level, respectively. Each column represents a separate regression. All regressions have included the effect of the time variable (taking into account the effects common to countries in each year) as well as clustered robust standard errors (to take into account the effects on each economy separately).

The institutional background has a positive and statistically significant effect on innovation (regression 1). If the score for institutional background of the countries increases by 1 point, the corresponding score of the innovation index will increase by 0.48 points. This is the relationship that connects the two quantities whichever combination of control variables is taken into account (regressions 2 to 9).

Table 4 presents the estimations of equation (1) for Group A.

**Table 4.** Estimations of equation (1) - Group A (48 countries)

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Institutions	0.57*** (9.39)	0.43*** (10.01)	0.38*** (10.24)	0.31*** (5.50)	0.30*** (5.50)	0.31*** (5.69)	0.16* (1.75)	0.17* (1.90)	0.14 (1.56)
Innovation (1 year lag)		0.47*** (9.52)	0.47*** (9.59)	0.47*** (9.28)	0.47*** (9.26)	0.46*** (9.02)	0.47*** (9.43)	0.46*** (9.04)	0.45*** (8.93)
Higher Education and Training			0.11** (2.11)	0.10** (2.03)	0.11** (2.05)	0.09* (1.79)	0.07 (1.48)	0.05 (1.08)	0.05 (1.07)
Goods Market Efficiency				0.14** (2.09)	0.14** (2.05)	0.16** (2.25)	0.16** (2.30)	0.15** (2.23)	0.12* (1.71)

Labor Market Efficiency					0.01 (0.13)	0.01 (0.05)	0.01 (0.12)	0.01 (0.12)	-0.03 (-0.61)
Inflation						0.01*** (5.26)	0.01*** (5.82)	0.01*** (5.64)	0.01*** (4.64)
Government Efficiency							0.13** (1.94)	0.11* (1.76)	0.14** (2.09)
Internet Access in Schools								0.04 (1.28)	0.04 (1.25)
Pay and Productivity									0.06** (1.99)
N	451	397	397	397	397	394	394	394	394
R <sup>2</sup>	32.94%	88.45%	80.95%	79.24%	79.23%	78.80%	79.42%	79.33%	78.98%
F-stat	61.21**	219.37*	179.05*	152.12*	126.49*	316.39*	256.16*	157.82*	148.52*
	*	**	**	**	**	**	**	**	**

**Notes:** The t-statistics values are displayed in parentheses. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% significance level, respectively. Each column represents a separate regression. All regressions have included the effect of the time variable (taking into account the effects common to countries in each year) as well as clustered robust standard errors (to take into account the effects on each economy separately).

The institutional background has a positive and statistically significant effect on innovation (regression 10) for Group A countries as well. However, it is observed that the impact, in this case, is higher than in Table 3. This means that if the score of institutional background increases by 1 point, the corresponding score for innovation will increase by 0.57 points. This is the relationship that connects the two quantities whichever combination of control variables is taken into account (regressions 11 to 17, only in regression 18 the regressor of the institutional background is not statistically significant).

Table 5 presents the estimations of equation (1) for Group B.

**Table 5.** Estimations of equation (1) - Group B (61 countries)

	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
Institutions	0.51*** (11.17)	0.31** *	0.24** *	0.17*** (4.08)	0.17** *	0.17** *	0.11** (1.93)	0.12** (2.22)	0.11** (2.03)
Innovation (1 year lag)		0.51** *	0.45** *	0.44*** (9.83)	0.44** *	0.44** *	0.44** *	0.42** *	0.41** *
Higher Education and Training			0.20** *	0.18*** (4.07)	0.19** (3.69)	0.19** (3.66)	0.19** (3.64)	0.15** (2.90)	0.15** (3.00)
Goods Market Efficiency				0.17*** (3.67)	0.16** (3.45)	0.16** (3.47)	0.16** (3.47)	0.16** (3.47)	0.13** (2.88)
Labor Market Efficiency					0.04 (0.96)	0.04 (0.94)	0.03 (0.72)	0.03 (0.83)	-0.01 (-0.33)
Inflation						0.01 (0.62)	0.01 (0.61)	0.01 (0.70)	0.01 (0.70)

Government Efficiency							0.06 (1.55)	0.05 (1.16)	0.05 (1.12)
Internet Access in Schools								0.05 (2.75)	0.05 (2.76)
Pay and Productivity									0.08** * (2.67)
N	617	549	546	546	546	546	546	546	546
R <sup>2</sup>	22.01%	85.28%	81.92%	82.51%	82.36%	82.41%	83.38%	82.41%	80.29%
F-stat	84.95** *	226.01 ***	267.42 ***	187.14* **	162.98 ***	140.32 ***	122.89 ***	106.70 ***	117.37 ***

**Notes:** The t-statistics values are displayed in parentheses. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% significance level, respectively. Each column represents a separate regression. All regressions have included the effect of the time variable (taking into account the effects common to countries in each year) as well as clustered robust standard errors (to take into account the effects on each economy separately).

The institutional background has a positive and statistically significant effect on the level of innovation (regression 19) for Group B countries, too. However, this effect is lower than that for Group A countries. This means that if the score of institutional background increases by 1 point, the corresponding score for innovation will increase by 0.51 points. This is the relationship that connects the two quantities, whichever combination of control variables is taken into account (regressions 20 to 27).

Table 6 presents the estimations of equation (1) for Group C.

**Table 6.** Estimations of equation (1) - Group C (23 countries)

	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
Institutions	0.44*** (4.64)	0.24** *	0.17** *	0.12 (1.56)	0.09 (1.33)	0.11 (1.59)	-0.07 (-0.78)	-0.07 (-0.83)	-0.07 (-0.77)
Innovation (1 year lag)		0.56** *	0.54** *	0.50*** (8.56)	0.48** *	0.48** *	0.47** *	0.47** *	0.47*** (7.93)
Higher Education and Training			0.22** *	0.19** (2.27)	0.18** (2.29)	0.17** (2.29)	0.15** (2.03)	0.17* (1.97)	0.17* (1.93)
Goods Market Efficiency				0.19 (1.53)	0.15 (1.26)	0.13 (1.23)	0.12 (1.14)	0.13 (1.22)	0.12 (1.08)
Labor Market Efficiency					0.16** *	0.16** *	0.12 (2.23)	0.12** (2.30)	0.11* (1.67)
Inflation						-0.01* (-1.95)	-0.01** (-2.04)	-0.01** (-2.00)	-0.01** (-2.21)
Government Efficiency							-0.20** (2.43)	0.20** (2.47)	0.19** (2.02)
Internet Access in Schools								-0.01 (-0.98)	-0.01 (-0.66)

Pay and Productivity									0.03 (0.53)
N	235	210	210	210	210	210	210	210	210
R <sup>2</sup>	26.09%	93.09%	93.09%	92.32%	92.11%	92.01%	90.79%	90.97%	90.91%
F-stat	10.87**	178.55	108.20	111.04*	100.39	121.91	112.89	124.80	190.46*
	*	***	***	**	***	***	***	***	**

**Notes:** The t-statistics values are displayed in parentheses. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% significance level, respectively. Each column represents a separate regression. All regressions have included the effect of the time variable (taking into account the effects common to countries in each year) as well as clustered robust standard errors (to take into account the effects on each economy separately).

The institutional background has a positive and statistically significant effect on the level of innovation (regression 28) for Group C as well. However, this effect is lower than that for groups A and B. This means that if the country's institutional background score increases by 1 point, the corresponding innovation score will increase by 0.44 points. This is the direction of the relationship that connects the two quantities for the combinations of control variables in regressions (29) and (30). In contrast, in regressions (31) to (36) the statistical significance regarding the impact of institutions on innovation is lost.

Table 7 presents the estimations of equation (1) for the benchmark countries.

**Table 7.** Estimations of equation (1) - Benchmark (20 countries)

	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
Institutions	0.21** (2.17)	0.12 (1.65)	0.05 (0.75)	-0.01 (-0.08)	-0.02 (-0.23)	-0.04 (-0.51)	0.05 (0.68)	0.07 (0.93)	0.07 (0.88)
Innovation (1 year lag)		0.53*** (7.30)	0.46*** (6.20)	0.45*** (6.40)	0.41*** (8.67)	0.38*** (7.13)	0.38*** (7.45)	0.39*** (7.65)	0.39*** (7.77)
Higher Education and Training			0.32*** (5.02)	0.32*** (5.07)	0.31*** (4.94)	0.31*** (5.41)	0.31*** (5.33)	0.25*** (3.78)	0.26*** (3.72)
Goods Market Efficiency				0.10 (0.97)	-0.01 (-0.03)	0.02 (0.19)	0.03 (0.31)	0.04 (0.43)	0.04 (0.43)
Labor Market Efficiency					0.25*** (3.94)	0.26*** (3.77)	0.31 (3.80)	0.32*** (4.19)	0.33*** (4.17)
Inflation						0.01*** (2.71)	0.01*** (2.81)	0.01** (2.31)	0.01** (2.14)
Government Efficiency							-0.09 (-1.54)	-0.13* (-1.95)	-0.13* (2.68)
Internet Access in Schools								0.08** (2.55)	0.08*** (2.68)
Pay and Productivity									-0.04 (-0.11)
N	220	200	200	200	200	200	200	200	200
R <sup>2</sup>	42.00%	88.45%	80.66%	80.04%	71.26%	67.79%	65.25%	62.52%	62.51%
F-stat	13.92**	154.78*	96.14**	93.36**	168.61*	102.37*	101.56*	73.04**	68.22**
	*	**	*	*	**	**	**	*	*

**Notes:** The t-statistics values are displayed in parentheses. \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% significance level, respectively. Each column represents a separate regression. All

regressions have included the effect of the time variable (taking into account the effects common to countries in each year) as well as clustered robust standard errors (to take into account the effects on each economy separately).

For the benchmark countries, the institutional background has a positive and statistically significant effect on the level of innovation (regression 37). However, this effect is even lower than the corresponding for the groups A, B and C. This means that if the score for the institutional background of the countries increases by 1 point, the corresponding score of the innovation index will increase by 0, 21 units. In fact, when the analysis includes the various combinations of control variables (regressions 38 to 45), the statistical significance regarding the impact of institutions on innovation is lost.

It is observed that the higher the difference in the institutional background of the countries from the corresponding institutional background of the benchmark countries, the higher the positive effect of the institutional background on innovative outcomes. Thus, depending on the group that the countries belong to, they can be classified into high institutional innovation-driven, middle institutional innovation-driven, low institutional innovation-driven and very low institutional innovation-driven, based on the effects of institutions on innovation.

High institutional innovation-driven countries record the longest distance from benchmark countries. These are mainly low-income and low-level economic growth countries that are characterized by low levels of innovation and quality of the institutional background and show - at least in theory - low institutional and innovation capacity with great potential for improvement (high institutional innovation-driven countries).

Respectively, middle institutional innovation-driven countries are less distant from the benchmark countries, compared to the group A. These are mainly low- and middle-income countries, with a medium level of economic growth, which are characterized by higher levels of innovation and quality of institutional background and show - at least theoretically - higher institutional and innovation capacity with slightly less potential for improvement (middle institutional innovation-driven countries) compared to Group A countries.

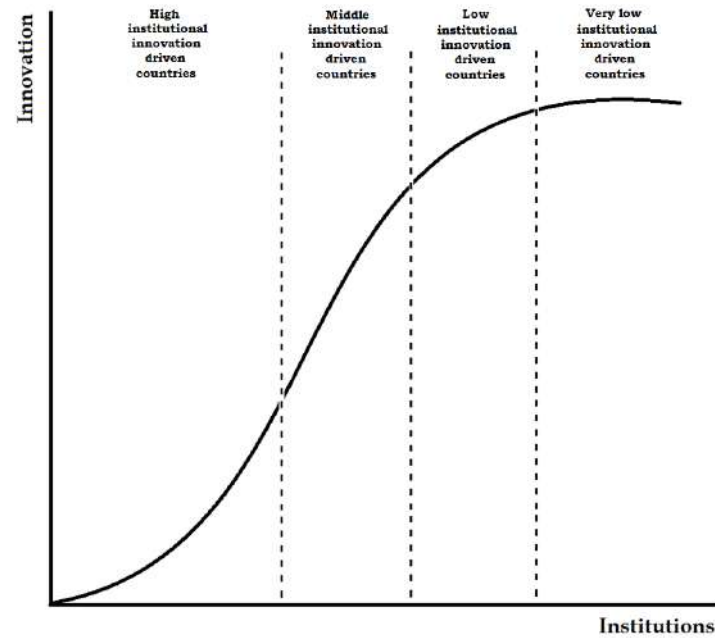
Approaching the benchmark, low institutional innovation-driven countries are middle and high income countries, characterized as quite developed and by even higher levels of innovation and quality of institutional background and show - at least in theory - less institutional and innovation capacity with less potential for improvement (low institutional innovation-driven countries) compared to countries from Groups A and B.

Very low institutional innovation-driven countries are high-income countries, which record the highest level of economic growth and show the best performance in both innovation and institutions for 2007 and 2017, while as the regression estimate (1) shows, they have no room for improving their institutional and innovation capacity as they have reached an "almost optimal" level.

An "S-shaped" relationship between innovation and institutions is derived, depending on the innovation and institutional capacity of each group of countries, meaning that in the first stage of this relationship there are countries in which innovation presents an increasing rate of increase when institutions increase, at the second stage there are countries that present a bit slower increasing rate of increase than in the first stage, at the third stage there are countries that present even more slowly

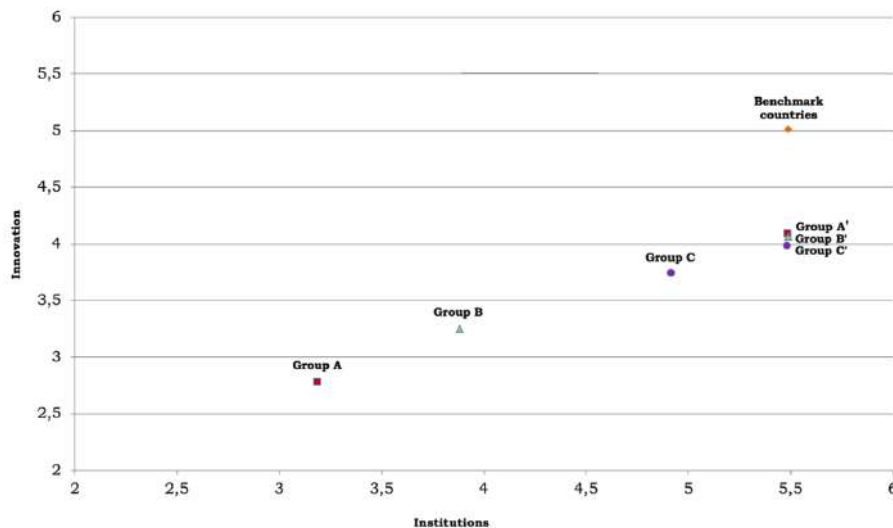
increasing rate of increase than at the first and the second stage, and at the fourth stage there are countries in which there is no significant relationship between innovation and institutions, since these are countries that have reached their innovation and institutional capacity. Figure 2 depicts the relationship between institutions and innovation for the different groups of countries.

**Figure 2.** Institutions and innovation capacity of the three groups and benchmark



Besides, Figure 3 shows what would be the benefit for the innovation performance of each group of countries (A, B and C), if the institutions of these countries were increased at the level of the benchmark countries, using the regression estimates of the regressions (10), (19) and (28) of Tables 4, 5, 6.

**Figure 3.** Innovation performance of each group if institutions were enhanced in the level of the benchmark countries



Based on the relationships that emerged from the empirical results of the analysis for each group of countries, it follows that even if the institutional background of the three groups of countries increased to the level of the respective institutional background of the benchmark countries, this would not be enough to approach the level of innovation performance of the benchmark countries.

Besides, concerning the time dimension of innovation improvement at benchmark levels, it is noted that Group A would require 95 years to reach the benchmark performance of 2017 (based on the average annual rate of change of innovation for the period 2007-2017), while the average rate of change for institutions for this group is marginally below zero and therefore would never approach the performance of benchmark countries. For Group B and Group C, based on the average rate of innovation change over the period 2007-2017, the relative measurement stands at 114 years and 53 years, respectively, while the institutions are expected to approach the levels of benchmark countries in 1750 years (!) and 712 years (!) in Group B and Group C, respectively<sup>3</sup>.

Given that the rate of change of innovation and institutions over the period 2007-2017 is not enough to bring the 132 countries at the innovation level of the benchmark countries, structural reforms are necessary to improve the existing institutional background of these countries, which - based on the results of the empirical analysis - are expected to lead to an improvement in the countries' innovation performance.

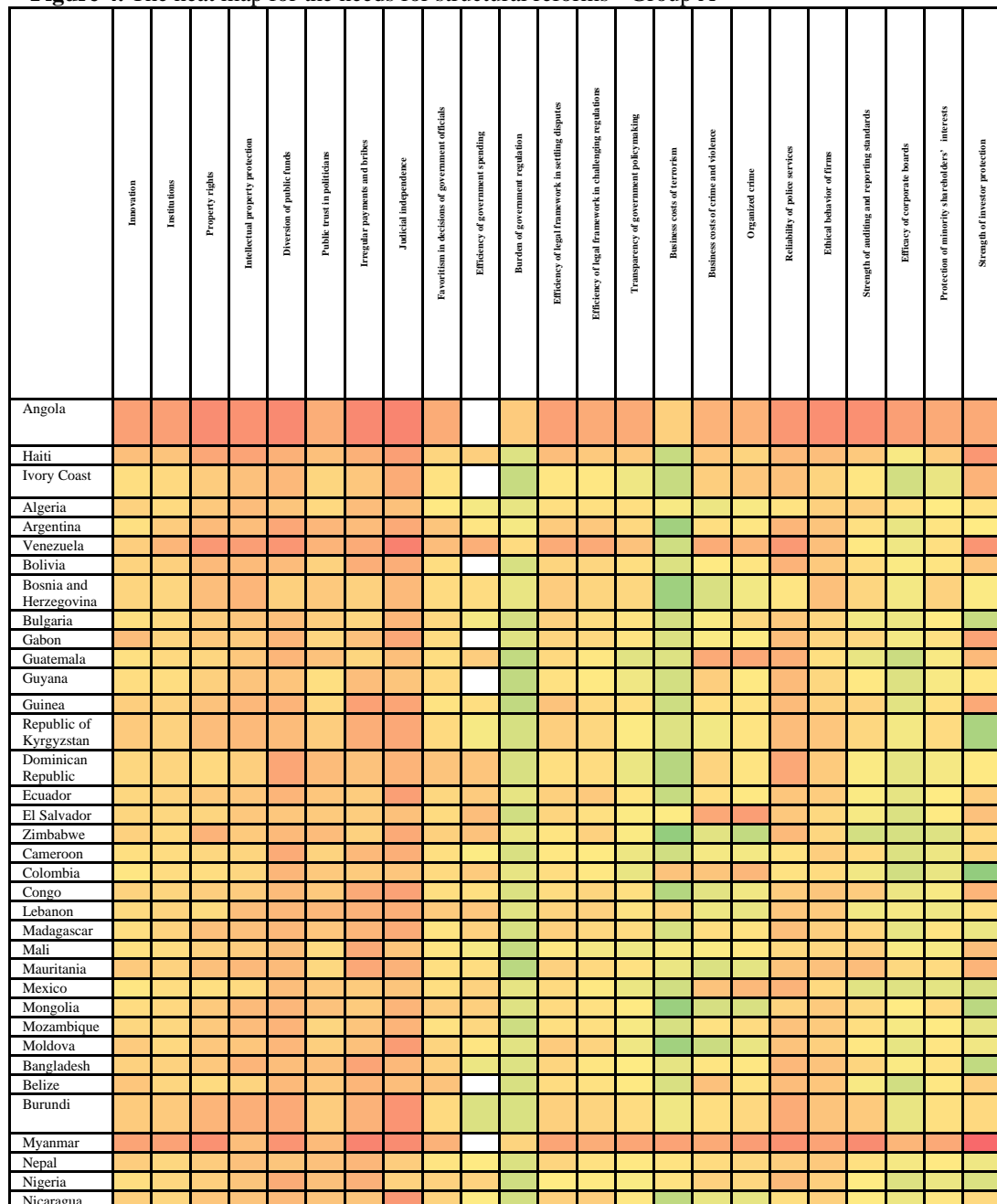
Thus, Figures 4 to 6 depict some heat maps (one for each group of countries), in which the differences of each country from the benchmark countries are identified, highlighting the institutions of the countries that need improvement. The more red the colour presented in the cells of the three tables, the higher the need for structural

<sup>3</sup> Of course, it should be noted that the period under analysis includes the period of the crisis that affected almost all economies. As a result, these time horizons may actually be shorter.



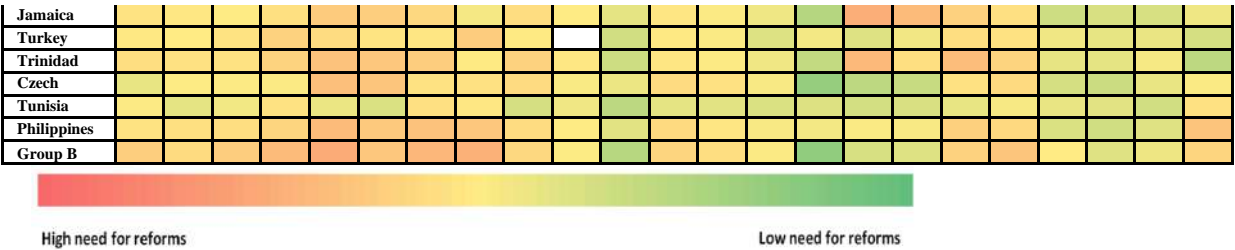
changes in these fields. On the contrary, the more green the colour, the closer the country's performance is to that of the benchmark countries.

**Figure 4.** The heat map for the needs for structural reforms - Group A



[illegible]

[illegible]



**Note:** White cells indicate unavailable data.

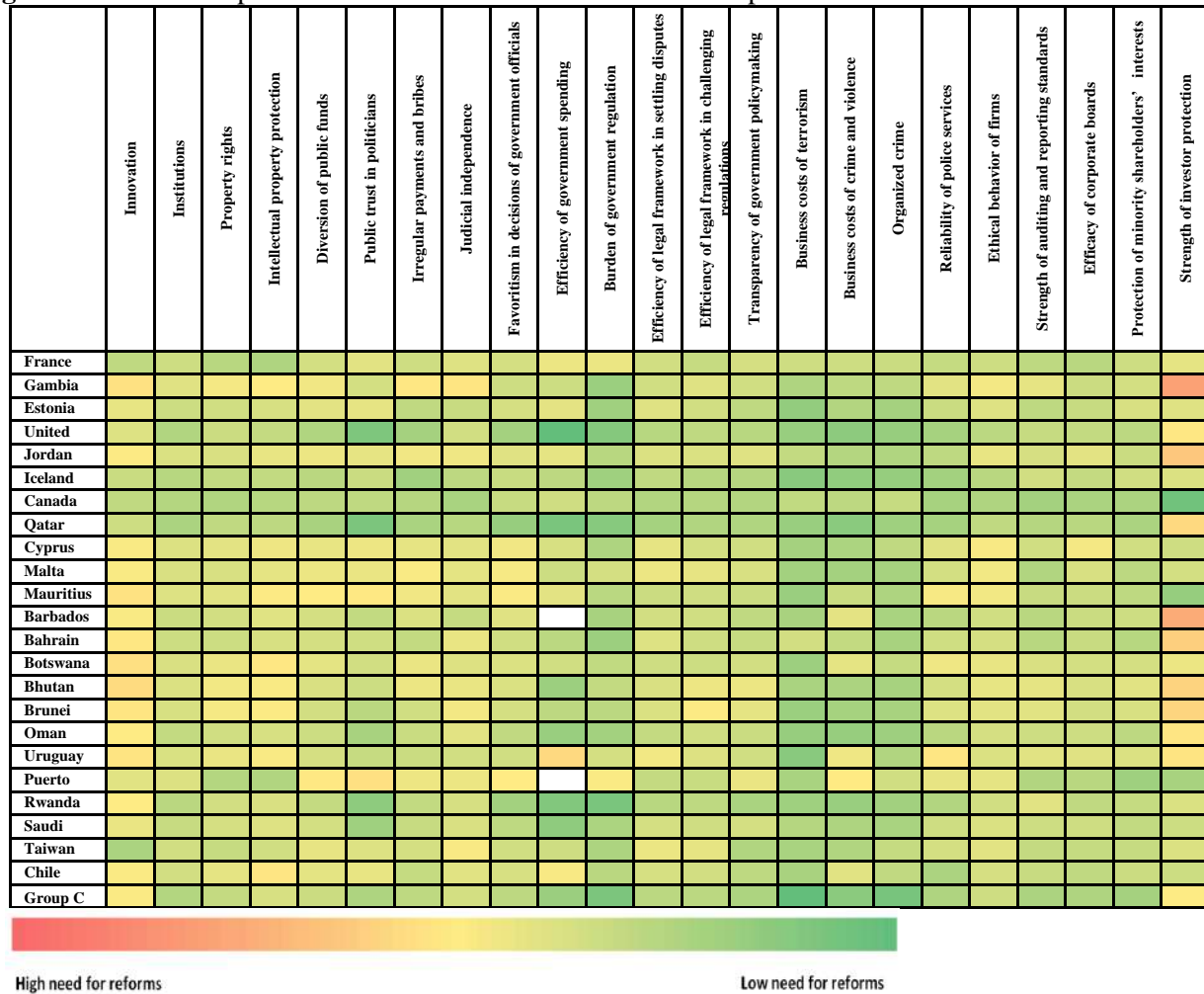
More specifically, Group A countries seem to face the greatest need for reforms in their institutional environment. More specifically, for group A countries in general, interventions are considered necessary in almost all institutional variables, but especially in terms of interventions such as the strengthening of property rights and intellectual property protection, the improvement of diversion of public funds, the increase of public trust in politicians and the reliability of police services, the reduction of irregular payments and bribes, the increase of judicial independence and the improvement of the ethical behavior of firms.

**Figure 5.** The heat map for the needs for structural reforms - Group B



**Note:** White cells indicate unavailable data.

The countries belonging to the group B also face quite big problems and need reforms in their institutional environment. However, they are characterized by a clearly better institutional environment compared to the countries of group A. More specifically, for the group B necessary are considered interventions in corresponding areas with those of the group A, such as the strengthening of intellectual property protection, the improvement of the diversion of public funds, the increase of the reliability of police services, the reduction of irregular payments and bribes, the increase of judicial independence and the improvement of the ethical behavior of firms.

**Figure 6.** The heat map for the needs for structural reforms - Group C

**Note:** White cells indicate unavailable data.

Finally, group C countries list the least problematic institutions, as the distance between these countries and the benchmark countries is relatively small. This is the reason why the need for interventions is limited to areas such as increasing the strength of investor protection.

## 5 Discussion and Conclusions

This paper attempts to approach the relationship between institutional background and innovation capacity and capability as well as to define why this relationship differs between groups of countries.

The empirical investigation highlights the fact that there is a positive and statistically significant effect of institutional background on innovative performance for the overall period under analysis. Out of the total sample, 20 countries stand out (benchmark countries), based on their institutional and innovative performance in the years 2007 and 2017. The rest of the examined countries are divided into three groups (A, B and C) based on their differences from the performance of the benchmark countries regarding the variable institutional background, for the overall period. The higher the distance of a group from the reference economies, the higher the impact of the institutional background on innovation due to the higher capacity and the greater the potential for improvement of the institutional background. For the benchmark countries, there is little effect of the institutional background on innovation performance (in fact, there are no statistically significant effects when control variables are included in the analysis), which confirms that these countries have already exhausted or are depleting their institutional and innovative capacity and have not now "space" for significant improvement of their institutions and their innovation. The conclusions of the analysis are reflected in an "S-shaped" relationship between the institutional background and the innovative performance, in which the countries are divided into countries of high, medium, low and very low institutional and innovation capacity. This separation is directly related to the level of economic development of the economies as well.

The analysis also shows that even if groups A, B and C improved their institutional background at the level of the benchmark countries, this would not be enough to reach the innovation outcome of the benchmark countries (based on the results of the estimates of the basic equation of analysis). In addition, based on the rate of change of institutions and innovative performance during the period 2007-2017, it is concluded that the countries of groups A, B and C would reach the level of the benchmark countries only at a very long-run. Thus, the only way for countries to accelerate the process of improving their innovation performance is through structural reforms that push for a faster change in their institutional background to transform institutions that hinder innovation into institutions that promote innovation. This is the only way to increase innovation outputs within a reasonable time horizon. From the heat maps presented, it emerges -for each economy but also for each group of countries collectively- which are the institutions that are deemed necessary to be structurally reformed. As expected, Group A countries have the greatest need for structural reforms to improve their institutional background, and thus their innovative performance, while Group C countries have the least need.

The results of the above analysis are of great importance to policymakers since it is shown that improving the institutional background leads to a significant improvement in the innovative performance. If economic policymakers realize the benefits of structural change in specific institutions for the innovative performance of their economies, this can lead to a significant boost to their economies. It is therefore imperative to accelerate structural reforms, especially for countries characterized by

high and medium institutional and innovation capacity. This need is exacerbated especially after the expected technological changes within the next century that may increase the wealth and economic efficiency of some economies and possibly lead to a larger gap between the groups of countries included in this analysis. The economies of groups A and B seem to have common needs for the specific institutions that require structural changes. In Group A and Group B economies, structural change must focus primarily on strengthening property rights and intellectual property protection, improving the efficiency and credibility of governments, and improving business ethics. In Group C economies, structural change must focus primarily on maintaining investor confidence.

Besides, the fact that different groups of countries present different effects of the institutional background on innovation outcomes highlights the fact that the institutional background is an important factor in differentiating economies. Each economy is required to treat different institutional areas to converge with the benchmark countries. Similarly, benchmark countries require different approaches to further improve their innovative performance. This raises the issue of the effectiveness of policies implemented in all economies in the same way (one-size-fits-all policies), as the institutional background differentiates economies and requires a different approach from economic policymakers.

In the shortcomings, the period under analysis includes the years in which the global financial crisis of 2008 erupted and affected most economies around the world. This can lead to some misinterpretations as the innovative performance of economies may have been affected by the broader macroeconomic environment. For this reason, the estimates of the empirical analysis also control the broader macroeconomic conditions of the economies using specific control variables.

Future research could address those shortcomings and concentrate on building a theoretical framework on the overall relationships developed. For instance, the basic Schumpeterian Paradigm ideas (Aghion and Akcigit 2017; Aghion et al. 2015) could be theoretically enriched with the effects of institutions and culture on innovation outcomes. More intensive future efforts to address endogenous issues - and not just through control variables - would advance the study of this relationship. Furthermore, future research could investigate whether and why countries or geographical regions with specific socio-cultural and institutional frameworks perform differently on innovation outcomes.

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## **Tax fairness and tax morality: The difficult fight against tax havens**

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**Abstract.** In principle, the use of a tax haven and offshoring is not illegal per se. However, it can be viewed critically through the moral perspective. Due to tax havens, states lose horrendous sums of tax money, which are subsequently lacking for the financing of infrastructure, education, social system etc. Not least because of the Corona crisis, there is an increase in national debt, as states had to invest large sums of money in the economy and social systems to ensure their continued existence in times of a pandemic. In the long run, states will have to raise more tax money to pay these debts. It is therefore time to address the unequal distribution of the tax burden and the tax behavior of multinational corporations on a global scale. Tax laws must be adapted to the modern requirements of globalization, internationalization and digitalization. In addition, taxes must be paid in countries where value creation takes place and where these profits are actually generated. Physical presence, the deployment of employees, the use of infrastructure should be components that are relevant for the taxation of corporations. The use of a tax haven is morally justified only if the economic relations with the home state (use of public services, use of infrastructure, profiting from security and stability in the home state) are reduced to the same extent as a company wants to reduce its tax burden in the home state.

**Keywords:** tax haven, tax fairness, tax morality, tax evasion, offshoring

**JEL classification:** F23, H26, H71

## 10 Offshore, Tax Haven, Letterbox Company, Tax avoidance, Tax Evasion: a definition of the terms

The term “tax haven” can be regarded as an umbrella term for different problem fields: letterbox company, tax harmful behaviour, tax morality, offshoring, tax haven, tax evasion, tax avoidance.

“Offshore” means a country or area in which the respective tax-saving subject is not resident. From a tax perspective, however, only jurisdictions which offer a number of “benefits” for foreign taxpayers are eligible. In any case, the taxpayer’s aim is to keep the tax burden as low as possible (Macho, Schwaiger, Stieber, 2015).

If you are looking for a generally accepted definition of the term “tax haven”, the OECD described in a report on “Harmful Tax Competition” from 1998 the following criteria:

**No or low taxation:** This can be achieved by removing income from the tax base or by not determining the tax base on the basis of actual income or by setting the tax rate accordingly low. No or very low taxation is always the prerequisite for a tax haven.

**Differentiation from the domestic economy:** Tax havens typically grant tax benefits only to those who do not participate in the economy of the tax haven country. The reason for this is to prevent the negative effects of the tax regime from affecting the home country.

**Lack of transparency:** Normally, the legal framework is clear to taxpayers and they claim or fulfill their rights and obligations under the rule of law. In tax havens, the framework for taxation is usually unclear and it is possible, for example, to set taxes on an individual basis. In this case, there is a deviation from the principle of equal taxation. Another possibility for lack of transparency is represented by tax havens that have a necessary legal basis, but do not apply it in accordance with the rules (for example due to corruption or other defects in the rule of law).

**Lack of information exchange:** This is one of the most important criteria for a tax haven. Legal or factual circumstances can ensure that foreign tax authorities receive no or insufficient information from a tax haven.

Some countries are not tax havens as a whole, but they do allow “partial tax havens” by creating favourable tax situations for certain types of income (Macho, Schwaiger, Stieber, 2015).

*Lechner* characterizes the term “letterbox company” as a company without substance which is not able to perform outputs and services that justify or warrant a profit allocation (Lechner, 2008).

The judiciary defines “letterbox companies” as those that do not have their own business operations and therefore cannot provide services. Usually, they do not have qualified personnel, they do not perform economically meaningful functions and therefore cannot participate in the working life (Macho, Schwaiger, Stieber, 2015).

From a practical point of view it can be stated that in tax havens such letterbox companies are a frequently used vehicle for shielding and tax avoidance.

A “tax haven” provides the structural conditions for tax evasion. A taxable entity tries to save taxes by a chosen construction and usually accepts that it is on the borderline between fiscal legality and illegality, with the effect that it reduces its tax

contribution in its home country without reducing the use of infrastructure, the market or any other advantage or benefit to the same extent (Macho, Schwaiger, Stieber, 2015).

From the point of view of the general public in the home country of the taxpayer, this means that the taxpayer continues to participate in economic life as usual and makes profits, but does not contribute to the financing of the home country from these profits. In this context, the technical literature distinguishes between the terms "tax avoidance" and "tax evasion". "Tax avoidance" is defined as such constructions which are threatened due to tax regulations with penalties because the entity operates in regard to the tax obligations, already illegally. In contrast, legal strategies or legally permitted tax-reducing constructs are called "tax avoidance" (Trenkwalder, 2005).

Whether the tax haven construction is still within the legally permissible range or already adheres to illegality is, at least morally, very questionable.

## **11 Tax fairness and tax morality**

In recent decades, the cross-border mobility of people and companies has given rise to international competition, which also affects the area of taxation. When it comes to tax avoidance, the advocates of the state redistribution system startle and plead for tax morality. It should not be forgotten that the order of the tax system lies in the power of the state. It is not citizens or companies that create unconstitutional laws or invent legal loopholes. It is the state itself. If citizens or companies move within the legally permissible limits in the area of taxes, they can hardly be blamed for this. On the contrary, citizens and companies act in accordance with the law. A tax-minimizing compliance with the law is therefore not tax evasion - even if this is done by using offshore instruments. There are many legal ways to take advantage of countries with a low tax burden - tax havens are among them. Anyone who denounces the possibility of saving taxes should therefore address the alleged mistake not to the tax saver, but to the legislator and at the global political level (Merten, 2017).

### **2.1 Homo economicus and tax morality**

In decision-oriented business theory, the experimental models are usually based on the "homo oeconomicus". This refers to an individual who makes decisions purely according to rational criteria. His actions are determined by the pursuit of profit and benefit maximization.

Applied to tax matters, this means that the "homo oeconomicus" tries to maximize his income. In this context, he must also weigh up the extent to which he uses risky strategies - such as the use of tax havens - to achieve this. The determinants of this decision are the reduced tax payments on the one hand and the back taxes and penalties to be paid, weighted by the probability of detection on the other hand (Mueller, 2011).

From the point of view of a tax authority this means: the higher the probability of being discovered and the higher the penalty to be feared, the lower the expected tax evasion (Macho, Schwaiger, Stieber, 2015).

Basically, a distinction is made between "normal tax reduction" and "bad tax reduction". It is thus distinguished whether a structure is covered within the scope

granted by the legislator or whether a procedure to be sanctioned was chosen. In the course of time, the basic economic model of "homo oeconomicus" developed in 1972 and thus the maximization of benefits (Allingham, Sandmo, 1972) is refuted by empirical studies, since in reality much less tax evasion takes place as expected on the basis of the model described (Hofmann, 2010). Since a generally valid explanation for this deviation from the basic economic model of evasion has not been found yet, it is also referred to in the academic literature as the "taxpayer puzzle" (Mueller, 2011). The conclusion that more controls and higher penalties result in a lower evasion rate could not be confirmed either. On the contrary, strict controls by the state reinforce the intention to pay as little tax as possible (Schaltegger, Schneider, Torgler, 2008). In this climate of mistrust, the taxpayer faces the question why he should voluntarily pay more taxes (Mueller, 2013). One possible explanation for the taxpayer puzzle is the influence of tax morality on the tax-paying behavior of tax subjects. A high tax morale causes the avoidance of facts that do not correspond to reality and "classic tax evasion", while taxpayers with a low tax morale are much more likely to maximize the benefits (Macho, Schwaiger, Stieber, 2015).

## **2.2 Factors with an influence on tax morality**

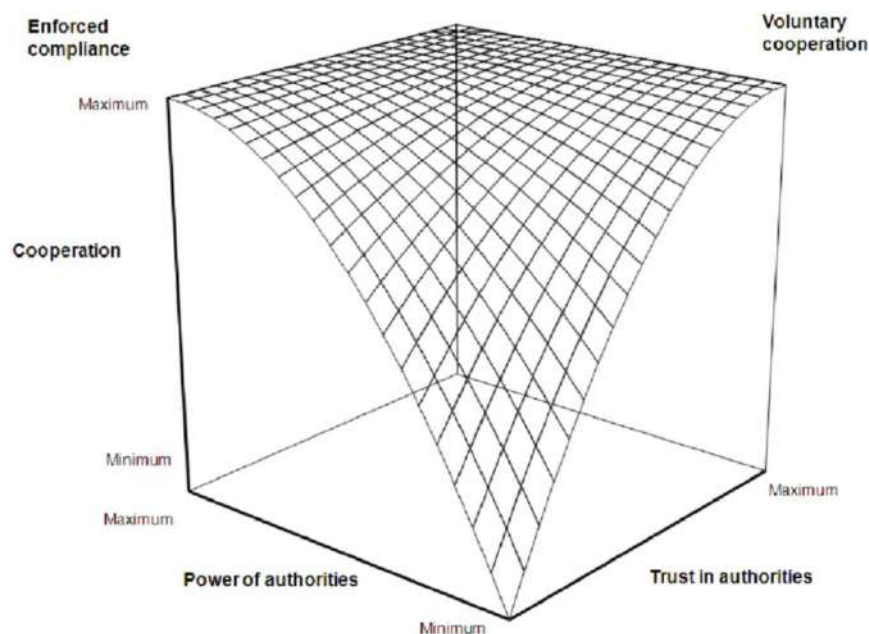
The German Federal Ministry of Finance describes the factors which influence tax morality on the basis of an OECD study from 2013 as follows:

- Importance of the direct democratic elements of a jurisdiction: the more important, the higher the tax morality.
- The more decentralized the structure of a state, the higher the tax morality.
- The higher the overall economic burden of taxes and duties, the lower the tax morality.
- The level of the tax rate also influences the tax morale: if it is high, the tax morality is comparatively low.
- If the taxpayers expect other taxpayers to evade taxes, the tax morality is lower.
- If the taxpayers have little confidence in the national parliament, tax morality is also lower here.
- The more religious the taxpayers are, the higher the tax morality of a country's population.

Further significant differences in tax morality result from the different characteristics (gender, education, age, etc.). A tax authority that wants to positively influence tax morality must therefore be aware of the specific tax morality of the target group. By certain purposeful activities (e.g. transparency in the use of funds by publication of reports in different media over the use of the tax incomes) it could be tried to change the tax morality (Macho, Schwaiger, Stieber, 2015).

## **2.3 The Slippery Slope Framework by Kirchler**

The Slippery Slope Framework developed by *Kirchler* assumes two types of tax compliance: On the one hand, tax compliance can be enforced by the financial authorities' means of power, on the other hand it can be achieved on a voluntary basis by trusting the authorities. In this theoretical approach it is possible to achieve a maximum level of tax compliance by the sole use of coercive instruments completely without trust in the authorities. Accordingly, a maximum level of tax compliance can also be achieved through an absolute relationship of trust between the authorities and the taxpayer, entirely without the use of coercive governmental measures. In practice, this three-dimensional model can not be reproduced in this way. For pragmatic reasons alone, no tax compliance can arise from a complete lack of trust in the authorities on the one hand or from a complete renunciation of official coercion on the other. These two extremes can therefore be excluded (Kirchler et al, 2008).



**Fig. 14.** Slippery Slope Framework by *Kirchler* (Kirchler et al, 2008)

## 2.4 The Risk Differentiation Framework by the *Australian Taxation Office*

The *Australian Taxation Office* developed the so-called Risk Differentiation Framework. This instrument is used to identify taxpayers who have risky positions on their books and who do not voluntarily disclose them. The behavior of the ATO towards the respective taxpayers results from the classification into one of the four groups. For cooperating companies, the ATO has a more service-oriented approach. In contrast, "higher risk taxpayers" and "medium risk taxpayers" are confronted with the full severity of the law. It is interesting that the ATO has specific suggestions and behavioral



changes ready for taxpayers of the last two groups so that taxpayers who are more willing to take risks can also benefit from the service-oriented treatment. This means that the ATO tries, in cooperation with the respective responsible individuals, to move the majority of taxpayers to the areas of "key taxpayer" and "lower risk taxpayer" (Macho, Schwaiger, Stieber, 2015).



**Fig. 2.** Risk Differentiation Framework by the *Australian Taxation Office* (Australian Taxation Office for the Commonwealth of Australia, 2014).

## 12 Consequences caused by tax havens and tax harmful behaviour

Besides the moral aspects, tax haven constructions lead to losers and winners in financial terms. On the one hand, there are states that are largely deprived of tax money, on the other hand, there are tax haven states and tax payers that offer tax haven constructions or use them for their own benefits. Therefore, tax havens and tax harmful behaviour are something negative when it is considered from the perspective of the financial losers or when it is rejected for moral reasons (Macho, Schwaiger, Stieber, 2015).

In 2012, when the tax payments of Amazon, Google and Starbucks in Great Britain became the subject of parliamentary investigations, the public also became aware about the respective tax payments of multinational companies in Great Britain. The published

balance sheets quickly showed that the taxes on profits paid by the companies were not in any reasonable relation to the turnover generated. Starbucks, for example, made almost nothing but losses in the UK with over 400 stores in 14 years, although press releases and shareholder reports reported quite different figures. The very low tax burden in comparison to sales also became the focus of media attention at Google and Amazon. Statements by the Google Chairman that they were "very proud that Google managed to keep its tax bill as low as possible" did not necessarily contribute to the general calm. In the case of Starbucks, this led to public calls for a boycott of the coffee house chain in the UK. Some branches were even occupied by angry people in protest. It is therefore quite possible that published, unconventional tax practices may influence the public image of a taxpayer negatively (Macho, Schwaiger, Stieber, 2015).

Due to questionable tax practices on the part of multinational companies, states lose considerable tax revenues. This lack of tax money deprives the affected states of considerable sums of money with the result that public services, infrastructure, educational and social systems etc. have to be financed by other sources of income or through national debt.

### **12.1 Offshore systems and their relevance to the global economy**

In almost every major economic event or scandal in the recent decades, the offshore system has played a significant role, in many cases it has been the center of the action. Massive inequality in Europe, in the USA and in low-income countries can only be understood if tax havens are included in the analysis (Merten, 2012):

- Saddam Hussein's political power had significant support in the offshore world.
- The unique influence that former Prime Minister Silvio Berlusconi had on Italian politics was largely an offshore story.
- Fraudsters, who inflate artificially the price of certain stocks with the so-called pump-and-dump tricks and then sell these assets to the unsuspecting public, always hide behind offshore constructions.
- In connection with the smuggling of weapons to terrorist organizations or the expansion of mafia empires, offshore destinations are always involved.
- Drug trafficking alone generates worldwide sales of over 500 billion dollars annually, transacted through tax havens in the Caribbean. From there, the profits of the bosses flow into the banking system and into the asset markets. A suitcase can hold a maximum of one million euros - without the offshore system and its transfer possibilities in money laundering, the illegal drug trade would be a very insignificant industry today.
- The rise of private equity companies and hedge funds is also due solely to offshore constructions.
- The corporate scandals of the Bank of Credit and Commerce International (BCCI), Enron, Parmalat, Long Term Capital Management, Lehman Brothers - all these have exploited sophisticated offshore systems.

- Many multinational corporations would never have become so large and powerful without tax havens. Goldman Sachs, for example, is an offshore product through and through.
- Every recent financial scandal that has come to public attention is attributable to the offshore system (Panama Papers, Lux Leaks, etc.).

Nevertheless, tax havens and offshore financial centers are never the whole story. After all, offshore always exists in connection with something that happens elsewhere - hence the term "offshore". Without an understanding of the offshore system, the history of our modern world cannot be understood. Drugs are only a fraction of the offshore business, illegal funds, evaded taxes and the disappearance of business from corporate balance sheets are added to this. In the offshore world there are no rules on how to do accounting. Offshore is like a salon where balance sheets are manipulated (Merten, 2012).

## 12.2 Inequality as a result of tax havens and tax harmful behaviour

Based on a study by *Tørsløv, Wier and Zucman*, close to 40 % of multinational profits are shifted to tax havens in 2015. Non-haven European Union countries appear to be the largest losers from this phenomenon. According to their estimates, about half of the globally shifted profits accrue to the shareholders U.S. multinationals. Since capital ownership is concentrated, the shift in profits tends to reduce the effective tax rate of the wealthy, which can contribute to increasing inequality.

According to the study "Tax Evasion and Inequality" from 2019 by *Alstadsaeter, Johannesen and Zucman*, tax evasion rises sharply as assets increase, which means that offshore tax evasion is highly concentrated among the rich.

Great responsibility results out of great power: That is why the attention of data leaks like the Paradise Papers rightly is focused on the wealthy: They simply "have" more wealth than others. They have more possibilities to decide for themselves in which way and how much tax they pay; to reduce their taxes, they can use options that are not available to a middle class or normal citizen. Social ethicists are coming to the realization that many of those who operate in the offshore system have "terminated the social contract aimed at reducing inequality" under which property is not only a private right of disposal but also an obligation to the general public (Alt, 2018).

When markets and ethics fail, regulations and governments are needed in order to prevent capital from "fleeing", to track down illicitly accumulated assets and to make them available again for the common welfare. But why can police officers, tax investigators or public prosecutors not do their job? The main reason is a defect in the globalized world: While capital movements were unleashed worldwide and politically desired, states failed to set up a corresponding system of regulation across national borders. This is why today states can only do what they are expressly allowed to do - and this often ends at their national borders. In principle, wealthy people can do many things that are not expressly forbidden - and, moreover, many things that are forbidden with a low risk of being caught, by cleverly exploiting the legal gaps between states or even trying to expand these gaps through lobbying. In 2012, a hearing in the British

House of Commons revealed that the so-called big-four auditing firms (PwC, Deloitte, EY and KPMG) offer their clients "tax optimization models" in the knowledge that, if audited, they have only a five percent chance of being recognized as legally compliant. This is relatively risk-free because authorities are hardly in a position to conduct a thorough audit. All this is, among other things, the result of the consistently implemented competitive capitalism, which has location and tax competition as an integral part. In it, states fight with tax benefits for the attraction of wealthy people and companies. It is now recognized, that this sooner or later destroys the existence of state authority - not least because of the data leaks from Offshore Leaks (2013) to Paradise Papers (2017) (Alt, 2018).

## Conclusion

From a moral point of view, using a tax haven is only consistent if you break off your economic connections to your home country or renounce services and markets there to the same extent as you reduce your tax burden. For a taxpayer a fair tax payment can be justified quite morally if he acknowledges that public goods such as infrastructure, but also the security and stability of a democratic state with basic market economy principles are provided, which are financed by the taxpayers through taxes. Without public goods, economic activity would not be conceivable in the form we know today, and a modern market economy state has no other means of raising funds than taxes. This collection of taxes is pervaded by the principle of uniformity of taxation: Equal circumstances are treated equally and unequal circumstances are treated unequally. Provided that these approaches do not only exist theoretically, but are actually enforced, they provide an approximate consideration for the tax collection of each individual. Therefore, the assumption can be made that a tax moral action does not necessarily mean that someone acts against his interests. A shift of profits, which are actually earned in the actual state of domicile, is to be described as highly immoral from this point of view, since other taxpayers are disproportionately burdened more heavily. This means that the principle of uniformity of taxation is no longer guaranteed (Schmiel, 2012).

The issue of tax havens is currently more topical than ever before: the Corona crisis and the resulting need for state intervention in the economy and social systems have led to increased national debt. In the long term, states will need more tax revenues to pay off these debts. In this context, global policymakers would have to make adjustments to tax laws as quickly as possible. On the one hand, tax laws must increasingly be adapted to a globalized economy, while on the other hand aspects such as the increasing internationalization of companies and the digitalization of multinationals must also be included in the revision of tax laws. The most important aspect in this context should be that companies must pay their taxes in the country where the actual value creation takes place or where profits are generated. Components such as the physical presence of companies, the number of employees, the use of sales markets and the use of

infrastructure must be prerequisites for the taxation of companies: "If you want to have my sales market, if you want to use my infrastructure, you have to pay your taxes here"!

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## Changes in the EU27's export and import structure and comparative advantages of the EU27 with the UK

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**Abstract.** The EU27, besides the effects of COVID-19, have to face uncertainty about the absence of an agreement with UK. The aim of the paper is to examine changes in the EU27's export and import structure, focusing on the commodity structure of EU27-UK trade as well as the comparative advantages of the EU27 in relation to the UK. The Eurostat and the ITC databases were used in the paper. To examine EU27 exports to the UK and EU27 imports from the UK the RCA index was used. No significant changes were recorded in the EU27 trade by products groups. A slight decrease, by 5 percentage points, was gained in the EU's imports in product group - energy. The most exported commodities to UK were chapters HS87, HS84 and HS85 and the most imported were HS84, HS27 and HS87. The results of the RCA index showed that the EU27 exported to the UK also commodity chapters in which it achieved the comparative disadvantage. From the UK, the EU27 imported mainly the commodity chapters in which it reached comparative advantage. This result was in contrary with the theory of comparative advantages. We justified it by trade within the integration block.

**Keywords:** Comparative advantage, European union, Merchandise trade.

**JEL classification:** F 10, F 15

### 1 Introduction

International trade, particularly its size and evolution of imports and exports, is an important indicator of the performance of the European Union (EU) economy, showing how it interacts with other countries and its position (Eurostat, 2020). For several decades, the EU has been one of the world's largest players (Baláž, P. et al., 2019a). Numerous authors have examined whether the EU can be considered as trade power or as global actor e.g. S. Meunier and K. Nicolaïdis (2006), Ch. Bretherton and J. Vogler (2006) or Z. Kittová (2020). This theme is still actual in connection with current issues and challenges facing the EU, either in connection with the geopolitical changes (Kašťáková, E. et al., 2019), in connection with brexit (Smith, M., 2019) or, in connection with the triad of economic power (Družbacká, B., Krivosudská, S., 2019; Baláž, P. et al., 2019b). In 2019, the export of EU28 members represented 33.4% (EU27

– 30.9%) of the total world exports with the value of 5.6 trillion EUR (EU27 – 5.2 trillion EUR). The EU28 has long been the world's largest exporter. In connection with the exit of the United Kingdom (UK), the EU's position weakened, reducing its share of world exports by 2.5% in 2019 (Trade map, 2020). Despite the EU lost a market with over 65 million population, it is still the largest single market in the world economy.

In addition to the slowdown of economic growth or the spread of populism, the European economy had to face a sudden recession in the first half of 2020 with the deepest output contraction since World War II. Measures against the spread of COVID-19 were introduced around the world, voluntarily shutting down large parts of the economy. Overall, the EU's annual growth rate is expected to contract by about 8.3% in 2020. In the first quarter of 2020, the level of GDP fell by 3.2% in the EU. The European economy is expected to accelerate in the second half of 2020 and in 2021, but with bigger and more persistent differences across member states (European Commission, 2020).

Besides the effects of COVID-19, the absence of an agreement for the EU-UK relationship is a significant risk. Brexit has been one of the biggest challenges for the EU since its establishment. With its 27 members, the EU is facing a historic turning point that could influence the future decisions of member states to remain in the integration bloc. Until the end of December 2020, Britain has a transitional period during which it has to negotiate an agreement of the future trade relations. Otherwise, the EU will trade with the UK under the WTO rules.

For this paper, studies dealing with EU-UK relations, the EU commodity structure, and the EU's comparative advantages are relevant. EU-UK relations were addressed by e.g. A. Belke and S. Ptok (2018) or K. Kotliński (2018). Z. Kittová and S. Krivosudská (2020) were focused on intra- and extra-regional trade of the EU, with an emphasis on EU27-UK relations and the changes caused by Brexit. M. Lawless and E.L.W. Morgenroth (2019) have focused on the product and sector level impact of hard Brexit across the EU. They found that food and textile trade would be hardest hit by hard Brexit and reduced by up to 90%. M. Maciejewski (2019) demonstrated in his study that the similarity in the demand structure of trade partners influences the commodity structure of trade between them and the effects of this influence are different for trade relations of countries which are on a different level of economic development. The RCA (the Reveal Comparative Advantage) index was used in studies by S. Bojnec and I. Ferto (2018) and they proved that larger trade costs decrease the probability of keeping up the comparative advantages, while the level of economic development, the size of the country, the agri-food export diversification, and being a new EU member state increases it.

Comparative advantages were examined also by N. Issabekov and A.M Suchecki (2016) who analysed the EU anti-dumping policy in terms of the revealed comparative advantages, or by M. Boglioni (2018), or by J. De Lucio et al. (2020). However, there are some limitations of using the RCA index, which were pointed out by A.J. Yeats (1985), J. Hinloopen and C. Van Marrewijk (2001) or E. Siggel (2006), who argued that high export volumes may be affected by some market distortions, such as subsidies or undervalued exchange rates. In his study, he stated that the RCA index expresses more export competitiveness than comparative advantage. A. Costinot et al. (2012)

have developed a new RCA index that allows isolating exporter-specific factories that manage trade flows. Their study was followed by E. Leromain and G. Orefice (2013), where several improvements were suggested. Based on an econometric estimate, they have created a database of the RCA index and compared the results with the Balassa index. Although several other variants of the RCA indexes have been developed, the Balassa index was used to fulfil the purpose of this paper.

## 2 Methodology

Given the current developments in the world economy and especially in the European economy, the paper aims to examine changes in the EU27's export and import structure, focusing on the commodity structure of EU27-UK trade as well as the comparative advantages of the EU27 in relation to the UK.

Mainly secondary sources of information provided by recognized databases of the Eurostat and the ITC - Trade map were used in the paper. In the analytical section, a simple analysis was used to examine EU27 and UK trade. Using the linear function the trend lines of EU27's exports and imports were created. The comparison method was used to determine changes in the product group in EU27's exports and imports to the world. EU27 exports to the UK and EU27 imports from the UK were examined by using the RCA index. The idea to determine a country's strong sectors by analysing the actual export flows was popularized by B. Balassa (1965), followed up by the Ricardian theory of comparative advantage. The RCA index shows a sectoral composition of a country's exports to global exports. It is a measure of a country's relative advantage or disadvantage in a specific industry as evidenced by trade flows (The World Bank, 2013a). The RCA index of the chosen country for the selected product is measured by the product's share in the country's exports in relation to its share in world trade.

The RCA is calculated as (The World bank, 2010):

$$RCA_{ij} = \frac{\left(\frac{x_{ij}}{x_{it}}\right)}{\left(\frac{x_{wj}}{x_{wt}}\right)} \quad (1)$$

where  $x_{ij}$  are values of country  $i$ 's exports of product  $j$ ,

$x_{wj}$  are the values of the world exports of product  $j$ ,

$x_{it}$  refer to the country's total exports,

$x_{wt}$  refer to the world total exports.

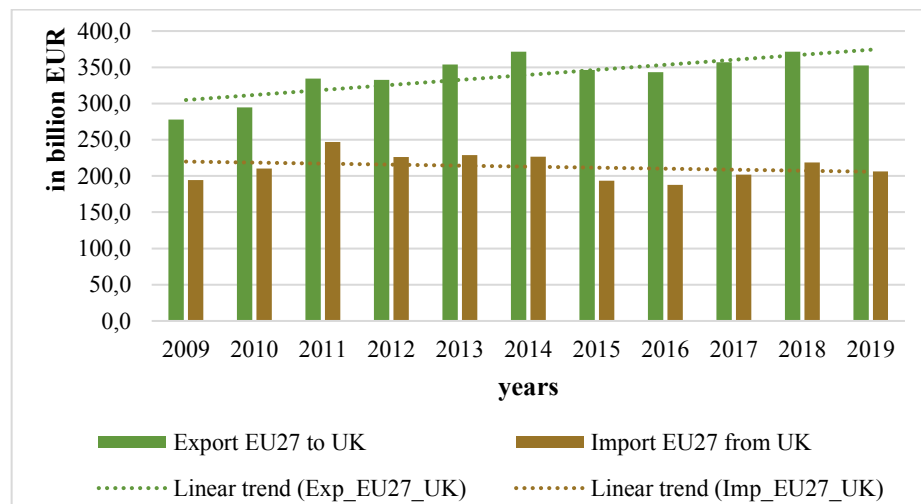
The result of the index between 0 and 1 indicates the comparative disadvantage. Similarly, if the index is above 1, the country has comparative advantage in exporting the product. It means that a country's share of exports in that sector exceeds the global export share of the same sector (World bank, 2013b). The RCA can be used to obtain information about potential trade prospects with new partners. Countries with similar RCA profiles are unlikely to have high bilateral trade intensities unless intra-industry trade is involved (The World bank, 2010).



### 3 Analysis of EU27 merchandise trade and EU27-UK trade relations

In 2019, EU27 exports grew faster than imports, and consequently, the active trade balance increased from 202.2 billion EUR in 2018 to 255.1 billion EUR (Trade map, 2020). The main destination for EU27 exports in 2019 were other European countries accounting for just over one-third of the total, followed by Asia (28%) and North America (25%). In 2019, about 40% of EU imports came from Asian countries, followed by European countries (31%) and North America (17%) (Eurostat, 2020). In 2019, the EU's major export partner was the USA with an 18% share. The second was the UK (15%) and then China (9%), Switzerland (7%), and Russia (4%). The EU's main import partner was China with a 19% share, followed by the USA (12%), UK (10%), Russia (7%), and Switzerland (6%) (Trade map, 2020).

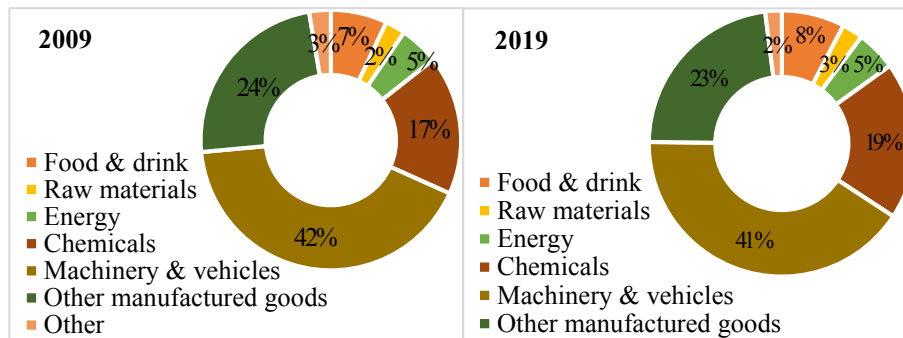
The UK's exit from the EU has aroused a discussion about next functioning of mutual trade relations. For this reason, Fig. 1 shows the development of EU27 merchandise trade with the UK from 2009 to 2019. In 2009, EU27 exported to the UK the goods in the amount of 277.7 billion EUR. By 2019, it increased up to 352.6 (+20%). The highest export volumes were reached in 2014 (371.4 billion EUR). Exports of the EU27 returned to this level in 2018 but fell by 5% in 2019. Exports of EU27 to the UK has had a growing trend. In 2009, EU27 imported goods from the UK in the amount of 194.3 billion EUR, while by 2019 there was only a slight increase of almost 6% to 206.4 billion EUR. In 2011, imports of the EU27 from the UK reached the highest value (246.8 billion EUR). On the contrary, the lowest values of imported goods were in 2015 at the level of 193.7 billion EUR. Imports of EU27 from the UK were prone to volatility, with its trend line declining.



**Fig. 1.** Development of EU27-UK merchandise trade from 2009 to 2019 (in billion EUR).  
Source: ITC 2020.

### 3.1 Exports of the EU27 and EU27-UK commodity structure

Fig. 2 shows a comparison of EU27 exports by product group in 2009 and 2019. Product groups can be divided into the primary products which contain food and drink, raw materials and energy; and manufactured products including chemicals, machinery and vehicles and other manufactured goods. The share of manufactured products in EU27 exports did not change over the years and reached 83%. Compared to 2009, the share of chemical products increased to 19% (+ 2 percentage points). Conversely, the decrease was recorded in machinery vehicles to 41% (-1 percentage points) and other manufactured goods to 23% (-1 percentage points). Compared to 2009, the share of primary products increased to 16% (+2 percentage points). The share of food & drink was exported at the level of 8% (+ 1 percentage points) in 2019, raw materials at the level of 3% (+ 1 percentage points), and energy was unchanged at the level of 5%.



**Fig. 2.** EU27 exports to the world by product group in 2009 and 2019 (in %). Source: Eurostat 2020.

Table 1 shows the commodity structure of EU27 merchandise exports to the UK based on HS2 for 2019. Chapter **HS87** (*Vehicles other than railway or tramway rolling stock*) was exported in the largest volume of 62.9 billion EUR with a share of 17.8% of total EU27 exports to the UK. The most represented was a subchapter '8703 (*Motor cars and other motor vehicles principally designed for the transport of persons, including station wagons and racing cars*) in the amount of 36.4 billion EUR. The second most exported chapter was **HS84** (*Machinery, mechanical appliances, nuclear reactors, boilers*) worth 43.0 billion EUR with a share of 12.2%. The most represented subchapter was '8471 (*Automatic data-processing machines and units thereof*) in the volume of 6.3 billion EUR. The third exported chapter was **HS85** (*Electrical machinery and equipment and parts thereof*) in the amount of 30.0 billion EUR and 8.5% share. Within this group, the most represented was '8517 (*Telephone sets, including telephones for cellular networks or other wire-less networks*) in the amount of 6.2 billion EUR. Other exported chapters were HS30 (*Pharmaceutical products*) with a share of 6.3% and HS39 (*Plastics and articles thereof*) with a share of 3.7%.

**Table 14.** Commodity structure of EU27 exports to the UK in 2019 (in billion EUR) and RCA

PRODUCT CODE AND LABEL		EU27 EXP	RCA 2019
'87	Vehicles other than railway or tramway rolling stock, and parts and thereof	62.9	1.49
'84	Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	43.0	1.19
'85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	30.0	0.67
'30	Pharmaceutical products	22.2	2.01
'39	Plastics and articles thereof	13.0	1.20
'90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	11.3	1.15
'27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	11.1	0.46
'71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin	8.5	0.37
'88	Aircraft, spacecraft, and parts thereof	6.3	1.19
'22	Beverages, spirits and vinegar	6.3	1.76

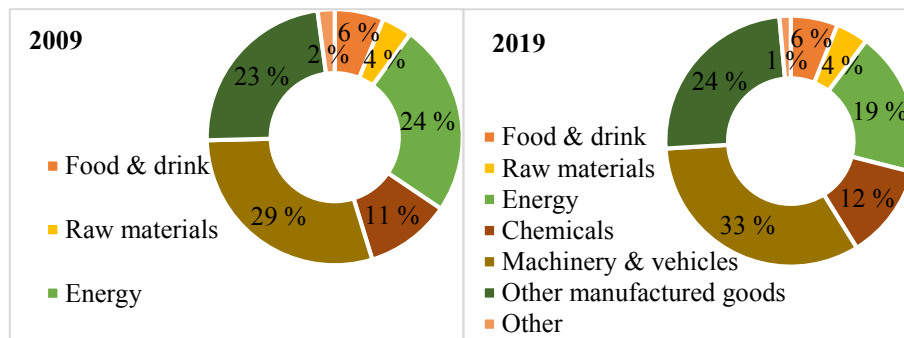
Source: Own compilation from ITC, 2020.

Table 1 presents the calculations of the RCA index for the most exported commodity chapters from the EU27 to the UK in 2019. Comparative advantages are achieved with values greater than 1. The EU27 reached the highest comparative advantage in chapter HS30 (Pharmaceutical products) with a value of 2.01. Other chapters were HS22 with a value of 1.76 and HS87 with 1.49 value. Based on the calculations, we found that the EU27 gained the highest comparative advantage in HS45 (Cork and articles of cork) with the value of 3.0 and HS06 (Live trees and other plants) with 2.2 value, followed by the aforementioned HS30. However, these commodity chapters were not exported in sufficient volume by the EU27 to the UK, and therefore are not included in the table. The EU27 mainly exported the product chapters in which it achieved the comparative advantage. The EU27 also exported chapters in which it reached the comparative disadvantage (value is <1) as HS85, HS27, and HS71.

We justify this by limitations associated with the use of the RCA index. The index compares the share of a good in a country's total exports with the share in total world exports. The values of the index also depend on the values for other goods. It means that a high share of one good in total exports also means a low share of other goods in total exports. This fact can be considered as a structural deformation. An important factor is also that the trade was realized within the integration block, so there may be an emergence of dependence between countries, which distorts the results of the index.

### 3.2 Imports of the EU27 and EU27-UK commodity structure

Fig. 3 shows a comparison of EU27 imports by the product group in 2009 and 2019. The manufactured products predominated in imports, but in a smaller proportion as in exports. In 2019, 69% of manufactured products were imported, which represents an increase of 6 percentage points compared to 2009. Machinery & vehicles had the largest share with 33% (+ 4 percentage points), followed by other manufactured goods with 24% (+ 1 percentage points) and chemicals with 12% (+ 1 percentage points). Compared to 2009, imports of primary products decreased to 29% (-5 percentage points). This decline has occurred in product group chemicals to 19%; food & drink with 6% and raw materials with 4% were unchanged. The mentioned decrease was closely related to the fall of the oil price in this period.



**Fig. 3.** EU27 imports by product group in 2009 and 2019 (in %). Source: Eurostat, 2020.

Table 2. shows the commodity structure of EU27 merchandise imports from the UK based on HS2 for 2019. Chapter **HS84** (*Machinery, mechanical appliances, nuclear reactors, boilers*) was the most imported in the amount of 25.7 billion EUR and 12.5% share. The most represented subchapters were '8411 (*Turbojets, turbopropellers and other gas turbines*) in the volume of 2.8 billion EUR and '8471 (*Automatic data-processing machines and units thereof*) in the volume of 2.6 billion EUR. The second most imported chapter was **HS27** (*Mineral fuels, mineral oils and products of their distillation*) in the amount of 25.1 billion EUR and 12.2% share. The most represented subchapter was '2709 (*Petroleum oils and oils obtained from bituminous minerals*)

in the amount of 10.6 billion EUR. The third most imported chapter was **HS87** (*Vehicles other than railway or tram rolling stock*) in the amount of 24.8 billion EUR and 12.0% share. Within this chapter, the subchapter with the largest share was '8703 (*Motor cars and other motor vehicles principally designed for the transport of persons, including station wagons and racing cars*) in the amount of 15.3 billion EUR. Other important import chapters were HS85 (*Electrical machinery and equipment and parts thereof*) with a share of 7.7% and HS30 (*Pharmaceutical products*) with share of 5.7%.

**Table 2.**Commodity structure of EU27 imports from the UK in 2019 (in billion EUR) and RCA

PRODUCT CODE AND LABEL		EU27 IMP	RCA 2019
'84	Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	25.7	0.99
'27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	25.1	0.88
'87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	24.8	1.30
'85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	15,8	0.72
'30	Pharmaceutical products	11.8	1.42
'39	Plastics and articles thereof	8.1	1.16
'90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	7.3	0.94
'29	Organic chemicals	6.4	1.23
'88	Aircraft, spacecraft, and parts thereof	5.0	1.15
'38	Miscellaneous chemical products	4.4	1.21

Source: Own compilation from ITC, 2020.

In the table above are shown calculations of the RCA index for the most imported commodity chapters by EU27 from the UK for 2019. Following the theory of comparative advantage, the EU27 should import mainly commodities in which it has the comparative disadvantage (the value is <1). The EU27 achieved the comparative disadvantage in chapters HS84, HS27 and HS85, and HS90. Surprisingly, the EU27 predominantly imported the commodities with the comparative advantage. It could be caused by the fact that the EU27 and the UK have had so far operated in a mutual integration block and traded without restriction. Individual countries were able to compensate their comparative disadvantages with another member state. By comparing the EU27 and the UK, the results were distorted. In a commodity chapter in which one country can achieve a comparative advantage, the other country in the block can reach comparative disadvantage. For the EU27, as a block of 27 countries, data were averaged. EU27 achieved the comparative advantage in chapters HS87, HS30, HS39, HS29, HS88, and HS38.

## 4 Conclusion

The world economy is facing the biggest slump in its history due to COVID-19. In addition to this situation, the EU has to cope with the UK's exit. In this context, this paper is focused on examining changes in the EU27's export and import structure. Following Brexit, the author focused on the commodity structure of EU27-UK trade as well as the comparative advantages of the EU27 in relation to the UK.

International trade is an important indicator of economic performance. The EU reached an active trade balance in 2019. Since 2009, exports of EU27 to the UK have increased by 20% and its trend line was increasing. EU27 imports from the UK have gained only a slight increase of 6%. In the period 2009-2019, the trend line was prone to volatility and declining.

The EU27 export's share in manufactured products did not change compared to 2009 and stayed at 83%. The share of primary products increased only slightly to 16%. Only minimal changes were gained within the individual product groups. Compared to 2009, the share of EU27 imports of manufactured products increased to 69% in 2019. Imports of primary products recorded decrease by 5 percentage points in product group - chemicals because of falling oil prices.

In 2019, the commodities exported from the EU27 to the UK were mainly from the chapters HS87 (Vehicles other than railway or tram rolling stock), HS84 (Machinery and mechanical appliances), and HS85 (Electrical machinery and equipment). The EU27 achieved the highest comparative advantage in export to the UK in chapter HS30 (Pharmaceutical products). From the UK, the most imported commodities to the EU27 were from chapters HS84 (Machinery, mechanical appliances), HS27 (Mineral fuels, oils and products of their distillation), and HS87 (Vehicles other than railway or tramway rolling stock).

Examining the RCA index of the EU27 imports from the UK, we found that the EU27 imported not only products in which it gained the comparative disadvantage, as follows from Ricardo's theory of comparative advantages. Paradoxically, the result showed that the EU27 imported mainly the commodity chapters in which achieved comparative advantage. We assign this to free trade within the integration block.

In the paper, we encountered several limitations. The first were the weak points of the Balassa Index, which were revealed in our research. The fact that the EU27 and the UK were (and till the end of 2020 still are) the part of the integration block may distort the results of research. There are many positives of free trade as well as some negatives. The emergence of dependence between countries and subsequent deviation from their own specialization can lead to moving away from Ricardo's understanding of comparative advantage. The availability of data was the next limitation in our research, for which we did one part of the research at the SITC (Standard International Trade Classification) level and the other part at the HS (Harmonized System) nomenclature level.

The main contribution of this paper is the finding that the calculation of the RCA indexes between EU27 and the UK was not in line with expectation. The EU27 also exported commodity chapters in which it had the comparative disadvantage and imported predominantly commodity chapters in which it achieved the comparative advantage. If an agreement between the EU27 and the UK will not be concluded by the end of 2020, it may lead to a reduction in mutual trade, as well as to disruption of current goods flows.

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## Social campaign as a tool to improve awareness of affluence disease

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**Abstract.** The world is facing many difficult issues that, despite development, are plaguing society and growing. In a democratic society, no one can be ordered, but it is possible to influence information, literacy, change the attitudes and opinions of the population. It is at this stage that the involvement of social marketing is necessary to solve social problems. One of the problems is the growing number of cases of breast cancer. Despite the fact that this disease is treatable with early diagnosis, 1,061 lives die every year only in Slovakia . While in 1996 the mortality rate was 699 cases in the years 2014-2018 mortality exceeded the limit of 1000 cases. The developing trend is influenced by several factors, especially alcohol, obesity, stress, lack of sleep. To create a suitable plan, it is important to know the information and literacy of the population. Through inquiries, we found out the shortcomings in the awareness of respondents. These deficiencies have been observed mainly in lower education groups. Focusing on these groups can help reduce the incidence and especially the mortality of breast cancer.

**Keywords:** social campaign, correspondence analysis, prevention

**JEL classification:** I12, C3,

### 1 Social marketing

Marketing became an inseparable part in the normal operation of the society. Despite that, classic marketing also came through a big wave of critique, which recorded the transition from the main target of the company such as profit to socially oriented philosophy, which would solve the global problems. Companies that understood the meaning of socially oriented philosophy are better on the target market and are effectively raising the wealth of the customer and the company (Strážovská, 2003). Alongside social marketing the term social marketing was developed, which deals with the questions such as: poverty, diseases of civilization, food shortages and the safety of

the population. The year 1951 can be marked as the beginning of the social marketing, when Wiebe dealt with the question: „Can brotherhood be sold like soap? “. The question described the ineffectiveness of salesmen and the lack of interest from consumers regarding the social ideas (Wiebe, 1951). In 1979 Rotschild reacted to Wiebe's question and argued that soap, which people are physically able to hold cannot be compared to intangible thoughts (Warlop&et al.,1999).

Today the meaning and effectiveness of social marketing is proved, however there still exists the disunity among the interpretations of various authors. Božíková a Vaňová (2014) define social marketing as: „constant social management process aimed at solving social problems and the adoption of healthier life style by creating harmony among market demand and offering social entrepreneurship based on the use of specific marketing methods and tools“. On the other hand Kotler a Zaltman (1971) perceive social marketing as: „proposition, implementation and program control to influence the acceptability of social ideas and include considerations of product planning, pricing, distribution and marketing research“. We can state that there are two directions in the perception of social marketing: 1. Social marketing is perceived as specific area, 2. Social marketing is built upon classic commercial marketing. Here are some examples of both directions. The author Bačuvčík (2011) can be assigned to the first direction and states that: “social marketing focuses on the expansion or change of social standings, where in the meantime commercial and noncommercial marketing focuses more on the interests of individual organizations“ or the authors Čihovská a Kováčová (2011), who noticed the differences between social and commercial marketing. More authors lean towards the second direction such as Donovan and Henley (2010) who define social marketing as: „application of marketing concepts and techniques, which lead to achievement of societal goals “or Kuldová (2010):“social marketing uses marketing techniques to influence social behavior “.

Based upon the similar signs of social and commercial marketing such as: customer orientation, usage of marketing research during the whole process, application of market segmentation or emotional impact of campaigns of commercial and social marketing (Čihovská&Kováčová, 2011), we can state that social marketing uses marketing techniques to achieve social benefit.

### **1.1 Social campaign as tool of social marketing**

Social campaign serves as means of communication with the target audience. Unlike commercial campaign, social campaign aims to sell the idea. The importance of social campaigns rose in the 1970's when for the first time campaigns mentioning health and safety of population appeared. For example in Sweden and Canada it was a campaign aimed against drugs and alcohol, in Australia there was a campaign aimed at the importance of seatbelts in automobiles (Vartiak, 2015). Today fair social campaigns should include these phases: segmentation of market, choice of target group, formulating the main goal of the campaign, using the communication channels and evaluating the effectiveness of the campaign (Rogers, 1983).

With the development of social campaigns, the definitions of various authors also developed. Saunders et al. (2015) define social marketing campaign as follow:

combination of concepts and methods from marketing with those in other disciplines, to „influence the behavior which benefits the individuals and communities for the greater good“, (Grier & Bryant 2005) completes this idea with the fact that using social campaigns it is possible to address large-scale unidentifiable persons and also small changes in behavior can mean significant changes in health of population. Grier and Bryant's idea supports the statement of Čihovská and Kováčová (2009): 20 years ago social campaigns focused at the target segment, but this approach is not enough for the campaign should reach a wider audience. To achieve greater impact, the social campaigns are financed by market sector.

As an example we can list the project “Healthy breasts” which helps in the fight against third most common cancer disease: Breast cancer. The project managed to raise more than 1,2 million €, which were used for enlightenment in the fight against the disease and the purchase of equipment. In spite of various campaigns the most important element in the fight against cancer is prevention and regular medical checks.

## 1.2 Methodology

For data categorization purposes, we use correspondence risk, which examines the association between two or other variables. The evaluation of the analysis can be combined within a two-dimensional space and a correspondence map (Xiang, 2020). This method is very suitable for clearing contingency tables. The aim of the analysis is to find such a solution in which it is possible to draw the main information from the original table into a subspace with a lower number of dimensions, with the least possible loss of information (Coss, 2017). We refer to row loads as  $r_i$  column loads as  $c_i$  where the  $R$ -member vector of row loads is denoted by the symbol  $r$  and  $S$ -member vector of column loads as  $c$ . We express the matrix of line profiles  $R$  as:

$$R = D_r^{-1}P = \begin{bmatrix} r_1^T \\ r_2^T \\ \vdots \\ r_R^T \end{bmatrix} \quad (1)$$

Where  $D_r$  is diagonal matrix with element vector  $r$  on diagonal. Matrix of row profiles  $C$  express as:

$$C = D_c^{-1}P^T = [c_1, c_2, \dots, c_s] \quad (2)$$

Where  $D_c$  is diagonal matrix with element vector  $c$  on diagonal. Whole correspondence table have form:

$$\begin{bmatrix} P & r \\ c^T & 1 \end{bmatrix} = \begin{bmatrix} p_{11} & p_{12} & \dots & p_{1S} & r_1 \\ p_{21} & p_{22} & \dots & p_{2S} & r_2 \\ \dots & \dots & \dots & \dots & \dots \\ p_{R1} & p_{R2} & \dots & p_{RS} & r_R \\ c_1 & c_2 & \dots & c_S & 1 \end{bmatrix} \quad (3)$$

For row loads refer:

$$r = \sum_{j=1}^S p_{+j} c_j \quad (4)$$

And for column loads refer:

$$c = \sum_{i=1}^R p_{i+} r_i \quad (5)$$

To assess the dissimilarity between row and column variables, we use the Chi-square distance expressed as:

$$\chi^2 = \sqrt{\sum_{j=1}^S \frac{(r_{ij} - r_{i+})^2}{c_j}} \quad (6)$$

Correspondence analysis search coordinates of point, which best describe original data while preserving as much information as possible. coordinates of point become of standardized Residuals  $\mathbf{Z}$ , where they singular decomposition have formula:

$$\mathbf{Z} = \mathbf{U} \cdot \mathbf{\Gamma} \cdot \mathbf{V}^T \quad (7)$$

Where  $\mathbf{\Gamma}$ , is diagonal matrix and refer, that  $\mathbf{U}^T \mathbf{U} = \mathbf{V}^T \mathbf{V} = \mathbf{I}$  (Řezánková, 2017).

## 2 Analysis of the education impact on health literacy

The analysis was performed through inquiries using a standardized questionnaire aimed at informing Slovak respondents in the field of breast cancer. The first part of the questionnaire is dedicated to questions of residence, education and age. Second part of the questionnaire is dedicated to awareness of the respondents and contains 16 questions. For our analysis we will use the questions: highest level of education, how often self-examination is performed from the age of 30 until the period of menopause (transition), how often examination is performed after the menopause (transition). To determine the impact of education on variables: how often self-examination from the age of 30 until the period of menopause (transition), how often the examination after the menopause (transition) is performed we will use the correspondence analysis, which in the first phase examines the existence of association between input variables and then analyzes the closer relationships.

As first we will examine the mutual association between education variables and how often self-examination after the age of 30 until the period of menopause (transition). Missing values were removed from the model.

**Table 1.** Contingence table

education1	Self-examination 30-woman transition			Active Margin
	1 x month	1 x in 2 months	1 x in 3 months	
secondary	217	126	102	445
academic	124	24	41	189
elementary	73	42	53	168

Active Margin	414	192	196	802
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Source: own processing based on data

Contingency table expresses the absolute numbers of row and column frequencies.

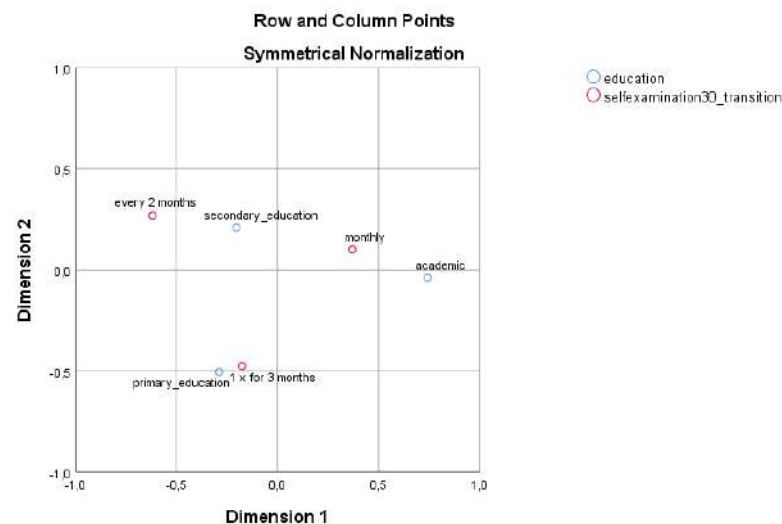
**Table 2.** Summary

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	,170	,029			,829	,829	,032	,004
2	,078	,006			,171	1,000	,037	
Total		,035	28,128	,000 <sup>a</sup>	1,000	1,000		

a. 4 degrees of freedom

Source: own processing based on data

Important information from the Summary table is the Chi-Square statistic, which in our case is 28,128 and implies that there is an association between the input variables and we reject the null hypothesis about the independence of variables. Since the input variables contain 3 variations, the system gives us a reduction of the dimension by 1 unit. The table shows the first dimension explains 82.9% of the PivotTable relationships and the second 17.1% indicating that the two-dimensional correspondence map captures 100% of the PivotTable relationships.



**Fig.1.** Correspondence map for variable education and self-examination between the age of 30 and the transition.

Based on the correspondence map we can state a significant influence in the respondent's thinking based on highest achieved level of education. 3 groups were created for us: respondents with elementary education, state the intervals of self-examination once in 3 months, whereby this interval is shortened with higher education. Respondents with academic education indicate the shortest time of self-examination which is once per month.

Second analysed dependence is between education and how often examination after the menopause (transition) is performed. Many women underestimate this period, but up to 80% of new cases are women after the age of 50, so it is important to know the perception of respondents on this issue. Missing data were excluded from the model.

**Table 3.** Contingence table

education	Self-examination after woman transition			Active Margin
	1 x per month	1 x in 2 months	No longer performed	
secondary	244	142	58	444
academic	131	39	18	188
primary	71	68	31	170
Active Margin	446	249	107	802

Source: own processing based on data

Contingence table expresses absolute numbers of row and column frequencies between two variables.

**Table 4.** Summary

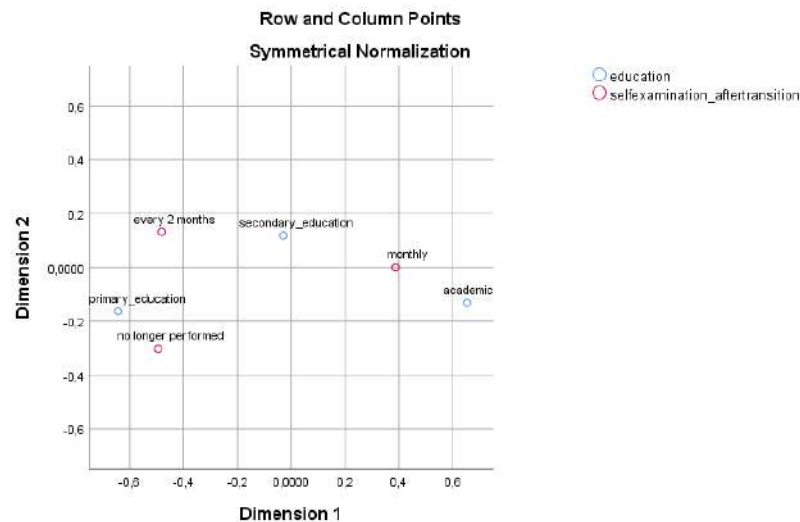
Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	,188	,035			,991	,991	,034	,002
2	,018	,000			,009	1,000	,036	
Total		,036	28,605	,000 <sup>a</sup>	1,000	1,000		

a. 4 degrees of freedom

Source: own processing based on data

We state that there is a statistically significant dependence between the variables of education and the intervals of self-examination based on Chi-Square statistics, which in our case is higher than the table value of 9,488 and we reject the null hypothesis of

independence between variables. The table shows that the first dimension explains 99.1% of the PivotTable relationships and the second the remaining 0.9%, indicating that the two-dimensional correspondence map captures 100% of the PivotTable relationships.



**Fig.2.** Correspondence map for education variables and self-examination after the transition.

The correspondence map again shows the space for education of respondents with lower education, as it is shown that self-examination is not performed according to respondents with elementary education. Higher completed education intensifies the regularity of self-examinations.

## Conclusion

Based on the analysis we can state education as an important factor in the literacy of the respondents and we can consider the respondents with higher education as more sensitized and responsible against their health. It is in such cases that the space for social marketing opens up, which has become the basis for a better future all over the world. This is a global problem that affects us fundamentally and there is room for change, as breast cancer is no longer necessarily a fatal disease, but with early diagnosis, many cases can be cured. Breast cancer has a growing trend not only in terms of absolute numbers but also in terms of percentage among cancers. In 2011 breast cancer was found in 2803 new cases, while in 2018 we are speaking of 2999 new cases. Our recommendation is to educate people through social campaigns, which will be target to older scholars in primary school. It is important to start as soon as possible, because students at this age gain a lot of habits.

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## Slovak population mortality modelling and forecasting using Lee-Carter model

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**Abstract.** The aim of this paper is to use Lee-Carter stochastic mortality model for fitting and forecasting mortality pattern of population in Slovak republic. We have modelled age-specific mortality rates for males and females separately as well as by excluding sex as mortality factor due to Gender directive on data from 1993 to 2017 through the age interval from 0 to 100 years. Haberman and Russolillo method is used for estimation of Lee-Carter model parameters. Auto regressive integrated moving average (ARIMA) model is applied to forecast values of time dependent parameter of model for following five years to obtain expected values of mortality rates at different ages along with 95% confidence intervals. We can say that Lee-Carter model is eligible for modelling and forecasting mortality for insurance companies because of its accuracy and forecasting possibilities. Therefore, the model is useful tool for many actuarial calculations such as premiums, technical provision, Minimal Capital Requirement, Solvency Capital Requirement etc.

**Keywords:** Haberman-Russolillo method, Age-specific mortality rates, ARIMA, Lee-Carter model

**JEL classification:** C52, J11

### 1 Introduction

The mortality behaviour of the population is constantly evolving. The quality of life is increasing every year, and this is, of course, reflected in the development of mortality which has improved significantly in recent decades. Among other things, it is caused by technical progress in medicine, sociology, pharmacy, and other sciences directly or indirectly related to death. The dramatic decline in mortality poses very serious financial risks for life insurance companies for which knowledge of mortality behaviour of the population depending on age is key factor of many actuarial calculations, such as the calculation of premiums and technical provisions. The more accurately policyholders' probability of death can be estimate, the lower risk of incorrect valuation of insurance contract (respectively inappropriate deposit of funds) is borne.

The first attempts to model mortality were based on deterministic scenarios. This led to formation of the mortality laws which describe mortality at a fixed point in time, hence underestimating the improvement in mortality because the actual mortality is stochastic and constantly evolving. For example, stochastic models have been investigated in connection to actuarial science by Milevsky and Promislow (Milevsky and Promislow, 2001). They proposed a model for pricing options on future mortality and interest rates with conclusion that both mortality and interest rate risk can be hedged, and the option to annuitize can be priced by locating a replicating portfolio involving insurance, annuities and default-free bonds. There were few attempts to make stochastic models from deterministic mortality laws. Effort of McNown and Rogers was successful, and they extended the deterministic mortality model of Heligman and Pollard (Heligman and Pollard, 1980) by stochastic assumptions and therefore created one of the stochastic mortality models (McNown and Rogers, 1989).

Stochastic models of mortality also include the Lee-Carter model (Lee and Carter, 1992) which we will discuss in more detail in this paper. This model contains the time-dependent factor that is solved using time series models. In their work, Lee and Carter applied the Singular Value Decomposition (SVD) method to estimate parameters. The advantage of this method is simplicity thanks to which this model has become very popular. It is used to model and predict mortality in many countries such as the United States (Lee and Carter, 1992), China (Lin, 1995), Japan (Wilmoth, 1996), India (Singh and Ram, 2004 and Yadav et al. 2012), Scandinavian countries (Kossi et al., 2006) and many others. The aim of this paper is to apply the Lee-Carter model to the mortality behaviour of the Slovak republic population and to prognose mortality for the following years.

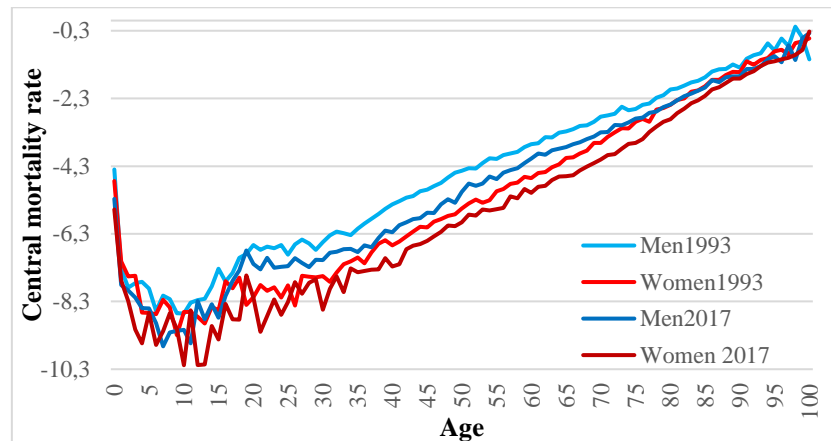
## 2 Data description

Our study is based on data on the mortality of the population of the Slovak Republic in the years 1993 to 2017 obtained from the website [mortality.org](http://mortality.org). The Human Mortality Database (HMD) provide open, international access to detailed population and mortality data for 41 countries. From this database, we obtained data on the number of deaths at specified age in a Slovakia during a certain time and the corresponding population at risk of the same age in the same geographic area during the specified time period of study which are needed to calculate age-specific mortality rates for the age range from 0 to 100 years. The formula for calculating age-specific mortality rates is as follows:

$$m_{x,t} = \frac{D_{x,t}}{L_{x,t}} \quad (1)$$

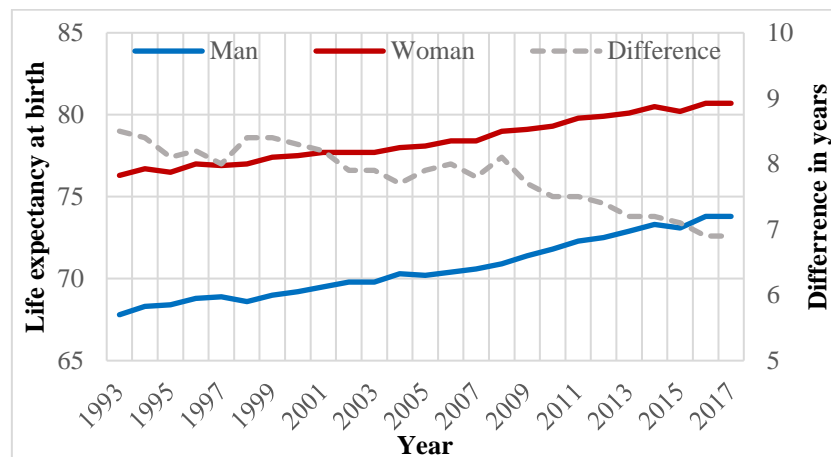
where  $D_{x,t}$  represents the number of deaths at age  $x$  and at time  $t$  and  $L_{x,t}$  denotes the mid-year population at age  $x$  and at time  $t$ .  $m_{x,t}$  is also known as the central mortality rate or full name, the age-specific central mortality rate of persons at age  $x$  and at time  $t$ . We apply the Lee-Carter model to the Slovak population taking into consideration gender, separately for men and women. We also omit the gender factor in modelling

due to insurance legislation - Gender Directive (Council Directive 2004/113/EC of 13th December 2004 implementing the principle of equal treatment between men and women in the access to and supply of goods and services). An example of age-specific central mortality rate data is provided in Figure 1. Graph contains natural logarithm of mortality rate of men and women in years 1993 and 2017.



**Fig. 115.** Age-specific central mortality rate of men and women in 1993 and 2017

From the Figure 1, we want to highlight two facts. First, improvement of mortality mentioned above is evident. Besides that, throughout the whole age range, the mortality rate for women is lower than the mortality rate for men. However, the differences between the mortality rates of the male and female population are constantly decreasing. While in 1993 there were up to 1 200 men died per 1 000 women who died, currently it is only 1 040 men per 1 000 women. This can be also confirmed by synthetic indicator of life expectancy at birth whose value increases from year to year.



**Fig. 2.** Life expectancy at birth and its difference between men and women

In 2017, the life expectancy of women at birth was 80.7 years and the life expectancy of men at birth was 73.8 years. Compared to the previous year the life expectancy for women decreased by 0.1 year and for men on the other hand it increased by 0.1 year. During the observed period of 25 years, women's life expectancy at birth increased by 4.4 years, men's life expectancy at birth increased by 6 years. An important trend is the decrease in difference in the life expectancy at birth between the sexes shown in Figure 2. In 1993, the gender gap was 8.5 years, by 2017 it had dropped to 6.9 years.

### 3 Lee-Carter model and method of parameter estimation

#### 3.1 Lee-Carter model

Lee and Carter (1992) introduced the first stochastic model of mortality. The basic Lee-Carter model has been extended several times, even by the authors of the model themselves (Lee, 2000) by including new parameters. Lee and Carter assume that the logarithms of the central death rates satisfy:

$$\ln(m_{x,t}) = \alpha_x + \beta_x \kappa_t + \varepsilon_{x,t} \quad (2)$$

The parameter  $\alpha_x$  describes the general shape of the logarithm of the central mortality rate across age. This parameter is not time-dependent and represents the average mortality of people at the age  $x$ . The parameter  $\kappa_t$  is the only time-dependent element that characterize fluctuation of the mortality level depending on the time  $t$ . If it drops the mortality will improve and if it raises the mortality will get worse.  $\beta_x$  determines how this change in mortality level affects  $m_{x,t}$  at particular age  $x$ . If it is high compared to a certain age  $x$ , it means that the mortality rate improves faster in this age than in other ages. Conversely, if this parameter were negative it would mean that mortality is deteriorating at these ages.  $\varepsilon_{x,t}$  reflects a random component caused by historical influences that the model did not capture.

When estimating the parameters, we must consider the constraints, the choice of which does not affect the quality of the model therefore their determination is individual. In the literature, however, we most often encounter limitations proposed and used by the authors of the model themselves, that are  $\sum_x \beta_x = 1$  and  $\sum_t \kappa_t = 0$ .

#### 3.2 Parameter estimation

There are several methods for estimating the parameters of the Lee-Carter model. Lee and Carter estimated the parameters on mortality data of USA from 1933 to 1987 using Least Squares Method. Specifically, they estimated  $\beta_x$  and  $\kappa_t$  via a Singular Value Decomposition (SVD) of the residuals, essentially a method for approximating a matrix as the product of two vectors. Other methods are for example The Maximum Likelihood Estimation, The Weighted Least Square, Newton-Raphson algorithm and method of Haberman and Russolillo presented in "Lee Carter Mortality Forecasting: Application to the Italian Population" (Haberman and Russolillo, 2005). Haberman

and Russolillo method was used in this paper to fit model to mortality data of Slovak population.

Calculation steps:

1. Computation of  $\alpha_x$  – since this parameter is fixed over time but changes across ages, average of all  $\alpha_x$  over time is appropriate.

$$\alpha_x = \frac{1}{T} \sum_t \ln(m_{x,t}) \quad (3)$$

2. Once  $\alpha_x$  for each age is found,  $\kappa_t$  can now be computed. In general, we estimate the values of the parameter  $\kappa_t$  for each year  $t$  according to formula

$$\kappa_t = \sum_x (\ln(m_{x,t}) - \alpha_x) \quad (4)$$

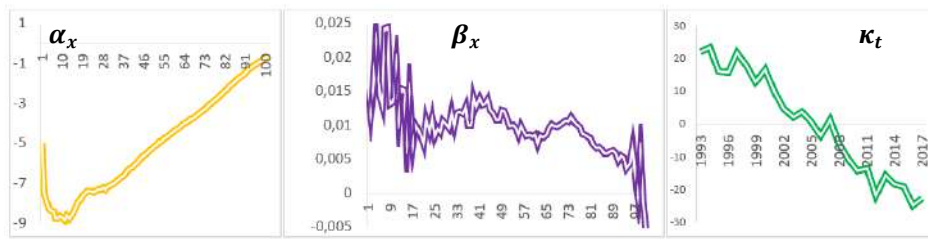
3.  $\beta_x$  in equation (2) is basically the slope of the difference between the logarithm of the mortality rate and  $\alpha_x$  over time  $t$  at a specific age  $x$  and the values of  $\kappa_t$ .

$$\beta_x = \frac{\sum_t \kappa_t (\ln(m_{x,t}) - \alpha_x)}{\sum_t \kappa_t^2} \quad (5)$$

4. In this step, Lee-Carter proposed to re-estimate  $\kappa_t$  in such a manner that the death rate observed in reality is aligned with the parameters  $\alpha_x$  and  $\beta_x$  obtained for each age  $x$ .

#### 4 Fitting of model to Slovak mortality data

The main problem of modelling the probability of death or mortality rate is that continuous theoretical probabilities of death are estimated by statistical calculations from real data, which are classified into relatively large age intervals. In other words, the immediate probabilities of death are replaced by the probabilities calculated for the annual age interval. This causes unsystematic irregularities.



**Fig. 3.** Parameters  $\alpha_x, \beta_x, \kappa_t$  of Lee-Carter model for Slovak republic

This section presents the results of estimation of parameters in Lee-Carter model for population of Slovak republic. Estimated values of age dependent parameters are reported in Table 2 and estimated values of time dependent parameter is reported in Table 1. Displayed tables demonstrate the result for population without sex as mortality

factor. Due to large amount of data, output of modelling mortality for men and women separately will be presented in following section of paper through figures. For analysis as well as estimation of parameter we used SAS Enterprise Guide software.

**Table 1.** Estimated values of time-dependent parameter  $\kappa_t$  of Lee-Carter model

Year	$\kappa_t$	Year	$\kappa_t$
1993	22,051	2006	-3,4318
1994	23,306	2007	1,2594
1995	16,025	2008	-5,7732
1996	15,979	2009	-10,7653
1997	21,649	2010	-14,1634
1998	17,863	2011	-13,4698
1999	13,024	2012	-21,6505
2000	16,610	2013	-15,4490
2001	9,560	2014	-18,1597
2002	4,848	2015	-18,8833
2003	2,222	2016	-24,6047
2004	3,694	2017	-22,4041
2005	0,664		

**Table 2.** Estimated values of parameters  $\alpha_x$  and  $\beta_x$  of Lee-Carter model

Age	$\alpha_x$	$\beta_x$	Age	$\alpha_x$	$\beta_x$	Age	$\alpha_x$	$\beta_x$	Age	$\alpha_x$	$\beta_x$	Age	$\alpha_x$	$\beta_x$
0	-4,969	0,015	20	-7,413	0,007	40	-6,191	0,014	60	-4,273	0,009	80	-2,497	0,008
1	-7,467	0,012	21	-7,389	0,011	41	-6,081	0,013	61	-4,190	0,007	81	-2,390	0,007
2	-7,933	0,016	22	-7,409	0,009	42	-5,975	0,013	62	-4,104	0,008	82	-2,280	0,007
3	-8,277	0,022	23	-7,431	0,011	43	-5,865	0,014	63	-4,024	0,008	83	-2,165	0,007
4	-8,387	0,014	24	-7,363	0,008	44	-5,737	0,012	64	-3,957	0,009	84	-2,076	0,006
5	-8,401	0,013	25	-7,321	0,009	45	-5,652	0,012	65	-3,879	0,010	85	-1,979	0,006
6	-8,766	0,024	26	-7,309	0,009	46	-5,542	0,011	66	-3,800	0,010	86	-1,861	0,006
7	-8,766	0,024	27	-7,246	0,011	47	-5,435	0,011	67	-3,720	0,010	87	-1,768	0,006
8	-8,637	0,013	28	-7,295	0,010	48	-5,344	0,012	68	-3,639	0,010	88	-1,683	0,006
9	-8,729	0,013	29	-7,175	0,010	49	-5,244	0,012	69	-3,552	0,010	89	-1,578	0,006
10	-8,839	0,019	30	-7,126	0,012	50	-5,133	0,011	70	-3,468	0,010	90	-1,484	0,005
11	-8,646	0,011	31	-7,057	0,010	51	-5,047	0,010	71	-3,379	0,011	91	-1,371	0,006
12	-8,781	0,015	32	-7,020	0,012	52	-4,948	0,010	72	-3,281	0,011	92	-1,290	0,005
13	-8,632	0,015	33	-6,881	0,012	53	-4,880	0,010	73	-3,201	0,011	93	-1,202	0,004
14	-8,405	0,007	34	-6,827	0,012	54	-4,764	0,009	74	-3,101	0,011	94	-1,097	0,004
15	-8,252	0,015	35	-6,716	0,013	55	-4,709	0,010	75	-3,003	0,010	95	-1,029	0,007
16	-7,912	0,007	36	-6,640	0,010	56	-4,612	0,009	76	-2,912	0,010	96	-0,930	0,003
17	-7,813	0,010	37	-6,515	0,010	57	-4,533	0,008	77	-2,817	0,009	97	-0,897	0,000
18	-7,617	0,009	38	-6,410	0,014	58	-4,460	0,009	78	-2,712	0,009	98	-0,781	0,006
19	-7,504	0,008	39	-6,278	0,013	59	-4,360	0,008	79	-2,603	0,008	99	-0,732	-0,001



Fig. 4. Actual and fitted age-specific central mortality rate in 1993 and 2017

In Figure 4, we have plotted observed and fitted age-specific central death rates for 1993 (start of projection) and 2017 (end of projection). We observed that the fitted mortality rates are very close to observed (actual) mortality rates except actual rates have unsystematic volatility mentioned before.

## 5 Forecasting

Forecasting is one of the fundamental features of stochastic modelling. The advantage of the Lee-Carter model is that once we find the values of the time-invariant parameters  $\alpha_x$  and  $\beta_x$ , it is necessary to predict the future development only of the mortality index  $\kappa_t$ . There are several methods of prediction, such as using regression curves or one of the most popular methods is ARIMA (autoregressive integrated moving-average) modelling. The ARIMA approach was first popularized by Box and Jenkins and ARIMA models are often referred to as Box-Jenkins models. According to SAS User's Guide: An ARIMA model predicts a value in a response time series as a linear combination of its own past values, past errors (also called shocks or innovations) and current and past values of other time series.

The order of an ARIMA (autoregressive integrated moving-average) model is usually denoted by the notation  $ARIMA(p,d,q)$ , where  $p$  is the order of the autoregressive part,  $d$  is the order of the differencing,  $q$  is the order of the moving-average process.

We have considered some possible choices of ARIMA models for modelling mortality index. We used Akaike information criterion (AIC) to identify the most suitable model. In general, when you are comparing candidate models, smaller AIC indicate the better fitting model. According to AIC,  $ARIMA(0,1,1)$  is the best fitted model for mortality index estimated for population of Slovak republic without sex as mortality factor with value of AIC 131.63. When we performed ARIMA modelling for women and men separately, the results were different. For men most appropriate model

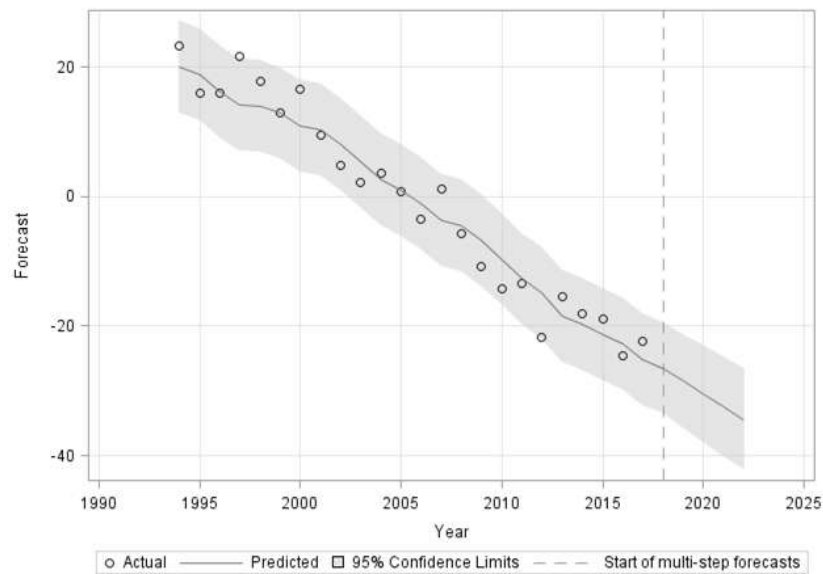


with AIC equals to 131.22 was ARIMA (1,1,0). For women was estimation more difficult but leading model was ARIMA (0,2,2) with corresponding AIC = 150.03. Results are obtained by the SAS Enterprise Guide software. We have used the best fitted ARIMA models for forecasting future values of the mortality index.

**Table 3.** Forecasted values of time-dependent parameter  $\kappa_t$  with 95% confidence limits.

Year	Forecast	95% Confidence Limits	
2020	-30,4916	-37,9385	-23,0447
2021	-32,4777	-40,1038	-24,8515
2022	-34,4637	-42,265	-26,6625
Year	Forecast Men	95% Confidence Limits	
2020	-38,5321	-47,7686	-29,2956
2021	-40,2589	-50,2336	-30,2842
2022	-42,9781	-54,0153	-31,9409
Year	Forecast Women	95% Confidence Limits	
2020	-27,4328	-39,391	-15,4746
2021	-26,2034	-38,1615	-14,2452
2022	-30,7744	-42,8202	-18,7287

Source: own processing based on results from SAS Enterprise Guide



**Fig. 5.** Forecast of  $\kappa_t$  using ARIMA modelling in SAS Enterprise Guide

Source: output of SAS Enterprise Guide

In the Table 3, we have given the forecasted values of mortality index  $\kappa_t$  along with its 95% confidence intervals for next three years. We observed that in following years mortality rates are expected to decline for population of Slovakia. This is due to

decreasing nature of parameter  $\kappa_t$ . Graphic output of forecast from SAS Enterprise Guide is display in Figure 5. We have forecasted values of age-specific death rate by using estimated parameters  $\alpha_x$ ,  $\beta_x$  and forecasted values of the mortality index. From the prognose we can say that in following years we do not expect for mortality rates to change drastically.

In Figure 6 we can see estimated values of age-specific mortality rates along with 95% confidence interval for men and women separately as well as together. We obtained useful tool for actuarial calculation. We choose to estimate time dependent parameter  $\kappa_t$  only for three years for multiple reasons. Firstly, by the prognose for shorter period we obtain more accurate results and also we assumed that life insurance companies recalculate their mortality assumptions at least every couple years which is recommended even with stochastic Lee-Carter model due to possibility of change in mortality pattern of population as seen between 1993 and 2017 in Figure 1.

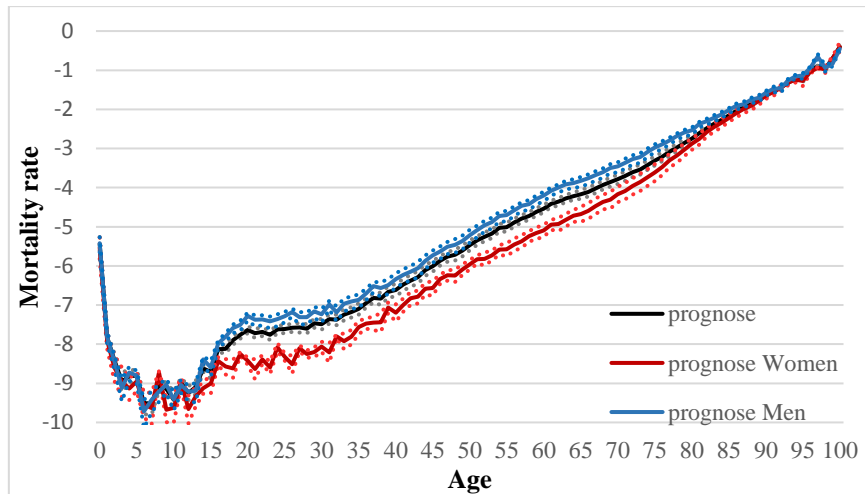


Fig. 6. Prognose of age-specific mortality rates along with 95% confidence interval

## 6 Conclusion

We modelled the age-specific central mortality rates of Slovakia population by using the Lee-Carter model for age interval from 0 to 100 years based on mortality data from 1993 to 2017. We can say that Lee-Carter model is eligible for modelling and forecasting mortality for insurance companies because of its accuracy and forecasting possibilities. Based on parameters of Lee-Carter model we identify following:

- a) The general pattern of mortality represented by  $\alpha_x$  for both female and male population shown high infant mortality, an accidental hump around age 22 years (more visible within the male population) and nearly exponential increase at older ages.
- b) The sensitivity of mortality ( $\beta_x$ ) has indicated mortality decline at high rate at early stage of life around ages 5 - 15 years for female as well as for male

population than other ages. It means that mortality varies substantially when the general mortality index  $\kappa_t$  changes. The old ages (50 and above) showed lower parameters which means that mortality slightly varies during that period.

- c) Mortality index  $\kappa_t$  has decreasing trend which denote improvement (decrease) in mortality. This improvement is larger among male population.

Gender differences in mortality are still significant so the question about relevance of Gender directive in insurance remains. Future research will attempt to back-test the results of this Lee-Carter model.

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## The evaluation of foreign trade cooperation between the European Union and the Eurasian Economic Union based on selected indicators<sup>1</sup>

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**Abstract.** The Eurasian Economic Union (EAEU) can be considered as an important partner for the European Union (EU), in terms of its strategic raw materials and geographical interconnectedness within the Eurasian continent. The development of their foreign trade relations is defined by many historical, political, economic, and other factors. The EU has a long-term negative trade balance with the EAEU. Their foreign trade relations have been significantly affected since 2014 by sanctions between the EU and Russia. This was one of the reasons, in addition to the unfavorable price development on the world energy commodity markets, which caused a reduction in their mutual trade. In terms of the development of the EU's revealed comparative advantages over the EAEU, we have seen a continuous decline. The EU has the greatest revealed comparative advantage in the machinery and transport equipment, which is also its largest export item. On the contrary, it has the biggest comparative disadvantages in mineral fuels, which represent almost 70% of the total imports from the EAEU. The analysis of intra-industry trade suggests that there is growth in almost all groups, the largest increase occurred in the group of food, drinks and tobacco. Intra-industry trade between the EU and the EAEU has the highest value in the group of other manufactured goods. For the mutually prosperous trade relations between the EU and the EAEU, the geopolitical context needs to be corrected and the transformation process of its economies is expedient.

**Keywords:** Eurasian Economic Union, European Union, foreign trade, revealed comparative advantage.

**JEL classification:** F10, F15, F60.

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## 1 Introduction

The European Union (EU) and the Eurasian Economic Union (EAEU) are substantial integration groups on the Eurasian continent. The long-term development of their foreign trade is determined by many historical, political, economic, and other factors. Their current trade interaction reflects long-term comparative advantages. The new development trajectory of their mutual relations could be reflected primarily in a significant restructuring of the commodity structure of exports and imports.

The current expansion of relations between the EU and the EAEU is limited by the need for transformation processes, especially on the part of the EAEU countries (Kašťáková, Drieniková, Zubařová, 2019). The intensification of the direct and indirect effects of globalization mechanisms, which are spread to individual economies by the transmission effect in the conditions of instability of the world economy, will affect the direction of their mutual trade cooperation to a large extent. In the coming economic recession caused by the COVID-19 pandemic, which has affected almost all sectors, the identification of comparative advantages and the ability to adapt to ever-changing conditions is the key to survival. Although the EU is by far the most successful example of regional integration, it has faced many threats in recent years. These include the declining competitiveness of some member states, power disputes with the United States and China, migration and climate crisis, and last but not least, the definitive withdrawal of the United Kingdom from the EU. All these factors in the context of the new economic reality indicate to the EU the importance of shaping trade relations with third countries. The EAEU could be a promising partner for the EU, given its strategic raw materials amenities and geographical proximity. Even French President de Gaulle foresaw the fate of the whole of Europe as a single space from the Atlantic to the Urals. Ongoing trade relations can become one of the incentives for economic development for both parties and at the same time facilitate the process of crisis recovery of their economies.

The aim of this paper is to examine the current development of foreign trade between the EU and EAEU based on the analysis of selected one-factor indicators (interregional revealed comparative advantages and intra-industry trade index).

## 2 Literature review and methodology

The concept of comparative advantage adduces the capability of a country to produce some product or service not only with higher productivity, as initially proposed by Ricardo, but also higher product differentiation than other countries in a given trade area (Lafay, 1987). Assessing countries' comparative advantages is a dynamic concept, as a country's ability to produce certain goods changes over time, in response to various endogenous and exogenous factors, such as changes in property factors, including technology and human capital. There are several ways to express whether a country has a comparative advantage. One of the initial approaches is to determine the country's specialization in the production of goods through the expression of the Balassa index.

It is formally recorded as:

$$RCA_1 = \frac{\frac{x_{ij}}{x_{it}}}{\frac{x_{wj}}{x_{wt}}} \quad (1)$$

where  $x_{ij}$  and  $x_{wj}$  represent export values of product  $i$  to country  $j$  and world exports of product  $j$  and  $x_{it}$  and  $x_{wt}$  refer to total country exports and total world exports (Balassa, 1965). If the RCA index is less than 1, the country has a comparative disadvantage in the product. Similarly, if the index exceeds 1, the country was found to have a clear comparative advantage in the product. Since then it has been refined and revised several times (Balassa, 1977) and (Balassa, 1989). There are also some other approaches on how to calculate comparative advantage, since other authors tried to add their contribution to improve and calculate the RCA index, namely Hinloopen and Marrewijk (2001), Vollrath (1991), Yeats (1985) and others. This paper applies the approach to the composition of formula in which the revealed comparative advantage is a logarithm of the share of exports and imports of goods categories of the integration group in total exports and imports of the same integration group. It is defined as:

$$RCA_2 = \ln \frac{\frac{x_{ij}}{M_{ij}}}{\frac{x_j}{M_j}} \quad (2)$$

where  $x_{ij}$  stands for the exports of country  $j$  in commodity group  $i$ ;  $M_{ij}$  stands for the imports of country  $j$  in commodity group  $i$ ;  $x_j$  stands for the value of total exports of country  $j$ , and  $M_j$  stands for the value of total imports into the country  $j$ . If  $RCA_2$  is more than 0, it suggests that in the country there exists revealed comparative advantage for exports of the commodity group; and if it is less than 0, it induces revealed comparative disadvantage in the commodity group. For more detailed identification of the revealed comparative advantage (Hinloopen, Merrewijk, 2001), possible values of the index can be classified into four categories determining its size, respectively intensity:

- $0 < RCA \leq 1$  no comparative advantage,
- $1 < RCA \leq 2$  weak comparative advantage,
- $2 < RCA \leq 4$  moderate comparative advantage,
- $4 < RCA$  strong comparative advantage.

Another one-factor indicator by which we evaluate foreign trade between the EU and the EAEU is the intra-industry index. Intra-industry trade appears when countries simultaneously export and import goods produced by the same industries. This effect is not conceptualized by the standard comparative advantage theory of international trade and requires explanations based upon factors such as scale economies, product differentiation, imperfect markets, and consumers' taste for variety (Vona, 1991).

Although works dating back to the phenomenon of intra-industry trade can be traced back to the 1960s literature, Grubel and Lloyd (1975) provided a comprehensive empirical study of the importance and measurement of intra-industry trade.

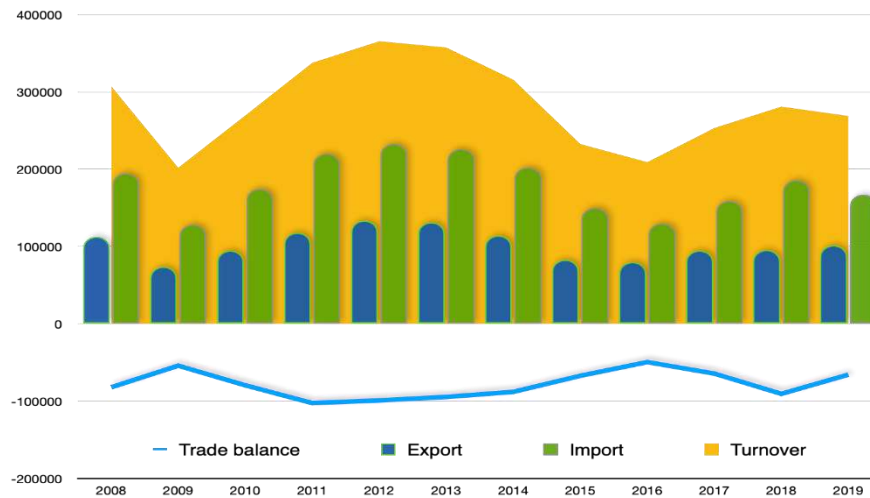
$$GL_i = \frac{(X_i + M_i) - |X_i - M_i|}{X_i + M_i} = 1 - \frac{|X_i - M_i|}{X_i + M_i} \quad ; 0 \leq GL_i \leq 1$$

Where  $X_i$  denotes the export and  $M_i$  the import of good  $I$ . The index's range is from 0 to 1. If  $GL_i = 1$ , it indicates that there exists intra-industry trade between considered countries. Conversely, if  $GL_i = 0$ , there is no intra-industry trade at all. A higher index value classifies a higher level of specialization in intra-industry exchange, considering that, a lower value of GL index indicates that the foreign trade is closer to the inter-industry trade (Egger, Greenaway, & Egger, 2005).

Data sources used are from Eurostat statistics, more specifically the international trade database (extraEU-27), according to the SITC classification.

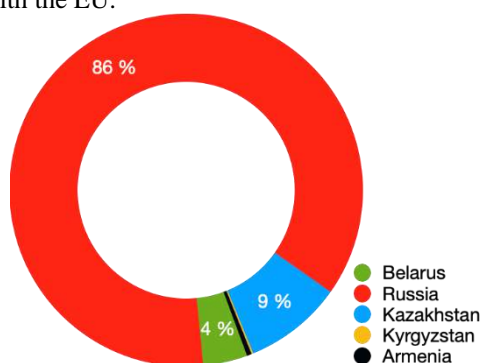
### 3 Results

Since 2008, we have been able to follow the cycles of growth and decline in trade between the EU27 and the EAEU. Until 2013, this development was determined by the recovery of consumer demand after the global financial and economic crisis, but also by the favorable dynamics of the prices of the fuel and energy complex, which plays an important role in exports of Russia and Kazakhstan.



**Fig. 1.** Foreign trade development between the EU and the EAEU, 2008–2019, in mil. of EURO  
Source: author's own calculations based on EUROSTAT, 2020

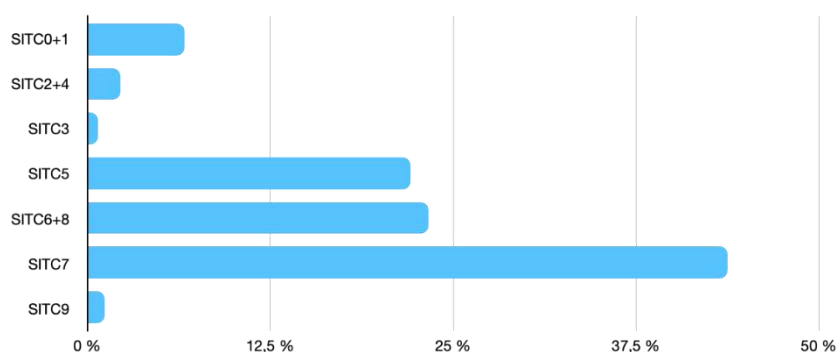
As Chart 1 shows, the European Union has a long-term negative trade balance with the EAEU. Since 2014, we can observe a decrease in trade turnover, which was mainly caused by a decline in EU imports. One of the reasons is the sanctions that have been imposed between the EU and Russia. Other effects that EU sanctions are responsible for are the import-substitution effect and the re-boost of agri-food production within the EAEU. Graph 2 shows the shares of individual EAEU countries in trade with the EU. It is Russia that holds the majority, followed by Kazakhstan and Belarus. Armenia and Kyrgyzstan account for only a minority (0.44 % and 0.16 %) of total trade turnover with the EU.



**Fig. 2.** Share of the EAEU countries in trade turnover with the EU in 2019

Source: author's own calculations based on EUROSTAT, 2020.

In recent years, there have been no significant changes in the export ratios of individual commodity groups. In 2019, machinery and transport equipment had the largest share in the commodity structure of EU exports to the EAEU with a share of 43.75 %.



**Fig. 3.** Commodity structure of EU exports to EAEU according to SITC in 2019

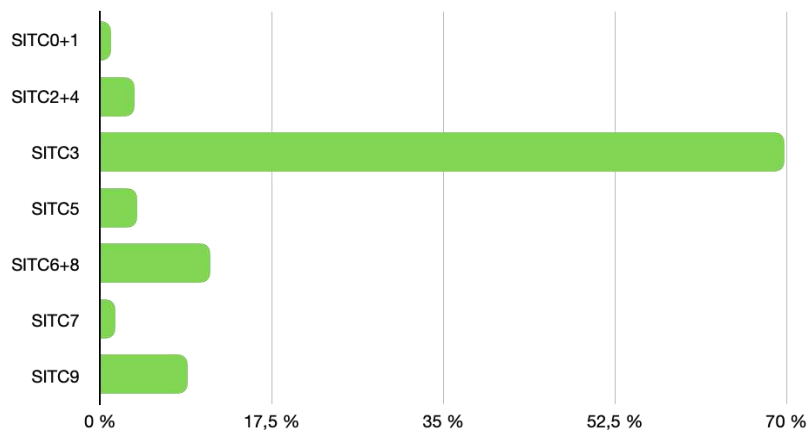
Source: author's own calculations based on EUROSTAT, 2020.

*Note:* 0+1 – Food, drinks and tobacco, 2+4 – Raw materials, 3 – Mineral fuels, lubricants and related materials, 5 – Chemicals and related products, n.e.s., 7 – Machinery and transport equipment, 6+8 – Other manufactured goods, 9 – Commodities and transactions not classified elsewhere in the SITC.



The following are other manufactured goods with a share of 23.32 %, and chemicals and related products with a share of 22.09 %. Mineral fuels, lubricants, and related materials (0.66 %), commodities, and transactions not classified elsewhere (1.19 %) and raw materials (2.23 %) have only a minor share in total exports.

The structure of EAEU exports to the EU differs significantly. In 2019, the largest share of EAEU countries' exports to the EU was accounted for by mineral fuels, lubricants and related materials, at 69.75 %. The share of exports of other manufactured goods is 11.27 % and commodities and transactions not classified elsewhere is 8.93 %. Compared to EU exports, the share of export of machinery and transport equipment is much smaller, at only 1.59 %. The groups of raw materials and chemicals and related products, each account for just over 3.5 % of EAEU's total exports to the EU. EAEU's Export of food, drinks, and tobacco is also lower compared to the export of the EU, with a share of 1.13 %.



**Fig. 4.** Commodity structure of EAEU exports to EU according to SITC in 2019. Source: author's own calculations based on EUROSTAT, 2020.

*Note:* 0+1 – Food, drinks and tobacco, 2+4 – Raw materials, 3 – Mineral fuels, lubricants and related materials, 5 – Chemicals and related products, n.e.s., 7 – Machinery and transport equipment, 6+8 – Other manufactured goods, 9 – Commodities and transactions not classified elsewhere in the SITC.

As the table of results of the interregional revealed comparative advantages shows, there is an asymmetry in foreign trade between the European Union and the Eurasian Economic Union. This is due to the different equipment of natural, human, and technological resources and the resulting specialization. According to Kašťáková and Baumgartner (2017), many geopolitical changes and economic factors such as security issues and global financial crisis also caused changes in revealed comparative advantages. The European Union has a comparative advantage in almost all groups in its trade with the Eurasian Economic Union. The exceptions concern three categories, namely raw materials, mineral fuels, lubricants and related materials and commodities

and transactions not classified elsewhere, in which the EU has a comparative disadvantage. On the contrary, it is in these sectors that the EAEU countries have strong revealed comparative advantages. The EU has a weak comparative advantage in groups chemical and related materials and food, drinks and tobacco. After 2014, when Russian sanctions were imposed on commodities of the EU agri-food sector, there has been a visible decline. Weak comparative advantages of other manufactured goods were throughout time reclassified to comparative disadvantage. Greatest revealed comparative advantages of the EU are in machinery and transport equipment. However, as we can see, at the beginning of the period under review, the revealed comparative advantages of machinery and transport equipment were strong, while by 2019 it had fallen to the level of moderate.

**Table 1.** RCA<sub>2</sub> – EU – EAEU in period 2008-2019

SITC	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0+1	2,582	2,707	3,104	2,791	2,510	2,699	2,342	1,896	1,690	1,902	1,795	1,773
2+4	-0,626	-0,218	-0,351	-0,157	-0,121	-0,065	-0,266	-0,337	-0,418	-0,401	-0,358	-0,439
3	-4,698	-4,386	-4,473	-4,236	-4,240	-4,417	-4,572	-4,353	-4,366	-4,469	-4,390	-4,537
5	1,527	1,804	1,781	1,737	1,700	1,722	1,675	1,611	1,695	1,793	1,805	1,756
6+8	1,069	1,273	1,082	1,164	1,286	1,352	1,165	0,867	0,659	0,691	0,712	0,727
7	4,086	3,799	3,944	4,016	3,937	3,934	3,778	3,267	3,186	3,383	3,549	3,314
9	-1,827	-1,491	-1,675	-1,849	-1,891	-1,833	-1,677	-1,649	-1,594	-1,960	-2,166	-2,012

Source: author's own calculations based on EUROSTAT, 2020.

Note: 0+1 – Food, drinks and tobacco, 2+4 – Raw materials, 3 – Mineral fuels, lubricants and related materials, 5 – Chemicals and related products, n.e.s., 7 – Machinery and transport equipment, 6+8 – Other manufactured goods, 9 – Commodities and transactions not classified elsewhere in the SITC.

The Grubel-Lloyd index expresses the size of intra-industry trade between the EU and the EAEU. The development of the index for the years 2008 to 2019 can be observed in table 2. Based on the analysis of the results, we can state that during the observed period there were significant changes in the case of some member groups in the intra-industry trade.

**Table 2.** GRUBEL-LLOYD INDEX – EU – EAEU in period 2008-2019

SITC	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>0+1</b>												
	0,231	0,207	0,152	0,206	0,248	0,208	0,291	0,428	0,461	0,401	0,490	0,437
<b>2+4</b>												
	0,472	0,634	0,554	0,627	0,673	0,705	0,603	0,565	0,577	0,569	0,527	0,562
<b>3</b>												
	0,010	0,014	0,012	0,015	0,016	0,014	0,012	0,014	0,016	0,014	0,013	0,013
<b>5</b>												
	0,546	0,444	0,473	0,496	0,483	0,470	0,499	0,532	0,459	0,438	0,486	0,443
<b>6+8</b>												
	0,745	0,654	0,768	0,738	0,651	0,616	0,713	0,865	0,912	0,915	0,979	0,887
<b>7</b>												
	0,056	0,075	0,069	0,065	0,066	0,065	0,078	0,129	0,126	0,108	0,106	0,113
<b>9</b>												
	0,170	0,230	0,185	0,155	0,159	0,170	0,191	0,192	0,223	0,154	0,111	0,150

Source: author's own calculations based on EUROSTAT, 2020.

*Note:* 0+1 – Food, drinks and tobacco, 2+4 – Raw materials, 3 – Mineral fuels, lubricants and related materials, 5 – Chemicals and related products, n.e.s., 7 – Machinery and transport equipment, 6+8 – Other manufactured goods, 9 – Commodities and transactions not classified elsewhere in the SITC.

Across all member groups, an increase in intra-industry trade is recognized. The largest increase in value occurred in a group of food, drinks and tobacco, by more than 50 %. Intra-industry trade between the EU and EAEU has the highest value in the group of other manufactured goods. The lowest values of intra-industry trade are in groups of raw materials and commodities and transactions not classified elsewhere.

## Conclusion

The European Union is entering a new era of existence. The second decade of the second millennium brings new circumstances to deal with. As a result of the economic recession caused by the COVID-19 pandemic, persistent threats are intensifying, such as the declining competitiveness of some member states, the growing position of China and the US in the global environment, the climate crisis and others. These conditions create the presumptions for the European Union to redefine its foreign trade interaction with third countries. Within the Eurasian continent, the Eurasian Economic Union can be considered an important partner. The European Union has a long-term negative trade balance with the Eurasian Economic Union. Russia is the largest trading partner within the EAEU. In terms of commodity structure, the EU imports the most mineral fuels, lubricants and related materials, which accounts for 69,75 % of total export in 2019. The European Union exports the most machinery and transport equipment, which accounted for up to 43.75 % of total exports in 2019, and in this commodity group, it

also has the greatest comparative advantages. Other sectors where revealed comparative advantages (although weak) were indicated, were chemical and related materials and food, drinks and tobacco. The EU has a comparative disadvantage in categories: raw materials; mineral fuels, lubricants and related materials; and commodities and transactions not classified elsewhere. On the contrary, it is in these sectors that the EAEU countries have strong revealed comparative advantages. In terms of the level of intra-industry trade, there were significant changes during the period under review. While in the case of the development of the revealed comparative advantages we could observe a declining trend, in the case of intra-industry trade we can observe an increase in almost all groups. Intra-industry trade between the EU and EAEU has the highest value in the group of other manufactured goods.

For the mutually prosperous trade relations between the EU and the EAEU, the geopolitical context needs to be corrected. At the same time, the transformation processes of the EAEU countries could serve as another stimulus for the growth of their trade.

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## Valuation estimates for three biggest Slovak insurance companies in comparison to their parent companies and biggest US insurance companies

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**Abstract:** The aim of the article is to value selected three biggest Slovak insurance companies in comparison to their mother companies as well as three biggest US insurance companies. The valuation is based on the latest financial indicators including revenues, earnings and price to earnings ratios. Subsequently are their valuations estimated also in five years horizon from 2015 to 2019 and compared to publicly traded insurance companies researched in this article. Many similarities with the parent insurance companies as well as biggest US insurance companies are observed. In the conclusion is noted that the valuations estimates increased driven mainly by Allianz insurance company from 2015 to end of year 2019 for three biggest Slovak insurance companies.

**Keywords:** valuation estimates, insurance companies

### Introduction

This article is aimed at valuation estimates for three biggest Slovak insurance companies in particular *Allianz* (subsidiary of German Allianz), *Kooperativa* (subsidiary of Austrian Vienna Insurance Group) and *Generali* (subsidiary of Italian Generali) and comparison to biggest US insurance companies in particular Metlife, American International Group and Prudential Financial. Different business indicators are analyzed including revenues, earnings, price/earnings (P/E), market cap and dividend yield. The selected insurance companies are notably different in their market caps as well as performance on the stock exchanges. Slovak insurance companies are not being traded on exchanges and are rather owned privately while their parent companies and US insurance companies are present on stock exchanges in Austria, Italy, Germany and United States.

## 1 Literature Review

Valuation estimate of the company is complex and complicated process that depends on many factors and is widely used for example in mergers and acquisitions. Business valuation is a process and a set of procedures used to estimate the economic value of an owner's interest in a business. Valuation is used by financial market participants to determine the price they are willing to pay or receive to effect a sale of a business. In addition to estimating the selling price of a business, the same valuation tools are often used by business appraisers to resolve disputes related to estate and gift taxation, divorce litigation, allocate business purchase price among business assets, establish a formula for estimating the value of partners' ownership interest for buy-sell agreements, and many other business and legal purposes such as in shareholders deadlock, divorce litigation and estate contest (Kwok, 2008).

Valuation process and chosen methods can significantly alter the valuation of the company creating differences in millions or even billions of dollar. In cases of legal disputes the court can appoint a forensic accountant as the joint expert doing the business valuation. In these cases, attorneys should always be prepared to have their expert's report withstand the scrutiny of cross-examination and criticism (Gottlieb, 2011). Before the value of a business can be measured, the valuation assignment must specify the reason for and circumstances surrounding the business valuation. These are formally known as the business value standard and premise of value (Shannon, Reilly and Schweih, 2000).

The standard of value is the hypothetical conditions under which the business will be valued. The premise of value relates to the assumptions, such as assuming that the business will continue forever in its current form (going concern), or that the value of the business lies in the proceeds from the sale of all of its assets minus the related debt (sum of the parts or assemblage of business assets).

There are three main standards of values (Abrams, 2001):

- Fair market value – a value of a business enterprise determined between a willing buyer and a willing seller both in full knowledge of all the relevant facts and neither compelled to conclude a transaction.
- Investment value – a value the company has to a particular investor. Note that the effect of synergy is included in valuation under the investment standard of value.
- Intrinsic value – the measure of business value that reflects the investor's in-depth understanding of the company's economic potential.

The financial statement analysis is an important part of business valuation and generally involves common size analysis, ratio analysis (liquidity, turnover, profitability), trend analysis and industry comparative analysis. This permits the valuation analyst to compare the subject company to other businesses in the same or similar industry, and to discover trends affecting the company and/or the industry over time. By comparing a company's financial statements in different time periods, the valuation expert can view growth or decline in revenues or expenses, changes in capital

structure, or other financial trends. How the subject company compares to the industry will help with the risk assessment and ultimately help determine the discount rate and the selection of market multiples (Vaquero, 2018).

It is important to mention that among the financial statements, the primary statement to show the liquidity of the company is cash flow. Cash flow shows the company's cash in and out flow.

The market approach to business valuation is rooted in the economic principle of competition: that in a free market the supply and demand forces will drive the price of business assets to a certain equilibrium. Buyers would not pay more for the business, and the sellers will not accept less, than the price of a comparable business enterprise. The buyers and sellers are assumed to be equally well informed and acting in their own interests to conclude a transaction. It is similar in many respects to the "comparable sales" method that is commonly used in real estate appraisal. The market price of the stocks of publicly traded companies engaged in the same or a similar line of business, whose shares are actively traded in a free and open market, can be a valid indicator of value when the transactions in which stocks are traded are sufficiently similar to permit meaningful comparison (Mercer, 2008).

The difficulty lies in identifying public companies that are sufficiently comparable to the subject company for this purpose. Also, as for a private company, the equity is less liquid (in other words its stocks are less easy to buy or sell) than for a public company, its value is considered to be slightly lower than such a market-based valuation would give.

When there is a lack of comparison with direct competition, a meaningful alternative could be a vertical value-chain approach where the subject company is compared with, for example, a known downstream industry to have a good feel of its value by building useful correlations with its downstream companies. Such comparison often reveals useful insights which help business analysts better understand performance relationship between the subject company and its downstream industry. For example, if a growing subject company is in an industry more concentrated than its downstream industry with a high degree of interdependence, one should logically expect the subject company performs better than the downstream industry in terms of growth, margins and risk (Trugman, 2016).

## **2 Aim and Methodology**

The aim of the article is to value selected three biggest Slovak insurance companies in comparison to their mother companies as well as three biggest US insurance companies. The valuation is based on the latest financial indicators including revenues, earnings and price to earnings ratio (P/E).

Since 1900, the average P/E ratio for the S&P 500 index has ranged from 4.78 in Dec 1920 to 44.20 in Dec 1999. However, except for some brief periods, during 1920–1990 the market P/E ratio was mostly between 10 and 20 (Shen, 2000).



The average P/E of the market varies in relation with, among other factors, expected growth of earnings, expected stability of earnings, expected inflation, and yields of competing investments. For example, when U.S. treasury bonds yield high returns, investors pay less for a given earnings per share and P/E's fall (Leibowitz, 1990).

The P/E ratio of a company is a major focus for many managers. They are usually paid in company stock or options on their company's stock (a form of payment that is supposed to align the interests of management with the interests of other stock holders). The stock price can increase in one of two ways: either through improved earnings or through an improved multiple that the market assigns to those earnings. In turn, the primary drivers for multiples such as the P/E ratio is through higher and more sustained earnings growth rates (Fengming, 2001).

All data used in the article are from these sources:

- Bloomberg – for 5 year comparison charts of selected performances as well as financial indicators (revenues, earnings, dividend yields, market caps, P/E ratios)
- Yahoo Finances – for financial indicators (revenues, earnings, dividend yields, market caps, P/E ratios)
- Finstat – for financial indicators of Slovak insurance companies (revenues, earnings)

### 3 Results

As the first thing were analyzed main business indicators revenues and earnings for the year 2019, last fully reported year to this date.

**Table 1:** Revenues and earnings for selected insurance companies, year 2019, in billions

bank (country)	revenues	earnings
Allianz (Slovakia), €	0.69	0.086
Kooperativa (Slovakia), €	0.63	0.037
Generali (Slovakia), €	0.24	0.010
Allianz (Germany), €	112.99	7.91
VIG (Austria), €	10.91	0.33
Generali (Italy), €	91.92	2.67
Metlife (USA), \$	69.62	5.90
American International Group (USA), \$	49.79	3.35
Prudential Financial (USA), \$	64.80	4.19
<b>median of 4 - 9</b>	-	-

Source: Finstat, Yahoo Finance, Bloomberg

Earnings are after tax figures. Slovak banks have average revenues of 520 million euro and 44 million in profit per year. Their average *earnings / revenue indicator* is 8,5%. Their parent companies have average revenues of 71,95 billion euro and average profit of 3,63 billion euro. Their *earnings / revenue indicator* is 5,0%. Selected US insurance companies have average revenues 61,41 billion dollar and profits of 4.47 billion dollar. Their *earning / revenue indicator* is 7,0%.

As the next step were looked at P/E ratio and dividend yield that can be seen in the table 2 below.

**Table 2:** Dividend yields and P/E indicator for selected insurance companies

bank (country)	dividend	P/E
Allianz (Slovakia), €	-	8.375
Kooperativa (Slovakia), €	-	8.375
Generali (Slovakia), €	-	8.375
Allianz (Germany), €	5.29%	10.26
VIG (Austria), €	N/A	7.58
Generali (Italy), €	3.87%	12.46
Metlife (USA), \$	4.99%	4.05
American International Group (USA), \$	4.31%	6.06
Prudential Financial (USA), \$	6.95%	9.17
<b>median of 4 - 9</b>	<b>-</b>	<b>8.375</b>

Source: Yahoo Finance, Bloomberg

Dividends for selected banks that are tradable on stock exchanges range from 3.87% (Generali) to 6.95% (Prudential Financial) with the median of 4.99% what is high dividend yield in comparison to state bonds. One insurance company with N/A have decided to suspend dividends as a response to Covid-19 pandemic.

Price to earnings ratio ranges from 4.05 (Metlife) to 12.46 (Generali) with a median of 8.38. This number is subsequently used to calculate valuation of selected Slovak insurance company in table 3.

**Table 3:** Market cap valuation for selected banks

bank (country)	P/E	market cap
Allianz (Slovakia), €	8.375	<b>0.718</b>
Kooperativa (Slovakia), €	8.375	<b>0.306</b>
Generali (Slovakia), €	8.375	<b>0.080</b>
Allianz (Germany), €	10.26	75.03

VIG (Austria), €	7.58	2.47
Generali (Italy, €)	12.46	20.43
Metlife (USA), \$	4.05	34.44
American International Group (USA), \$	6.06	25.92
Prudential Financial (USA), \$	9.17	26.23
<b>median of 4 - 9</b>	<b>8.375</b>	<b>-</b>

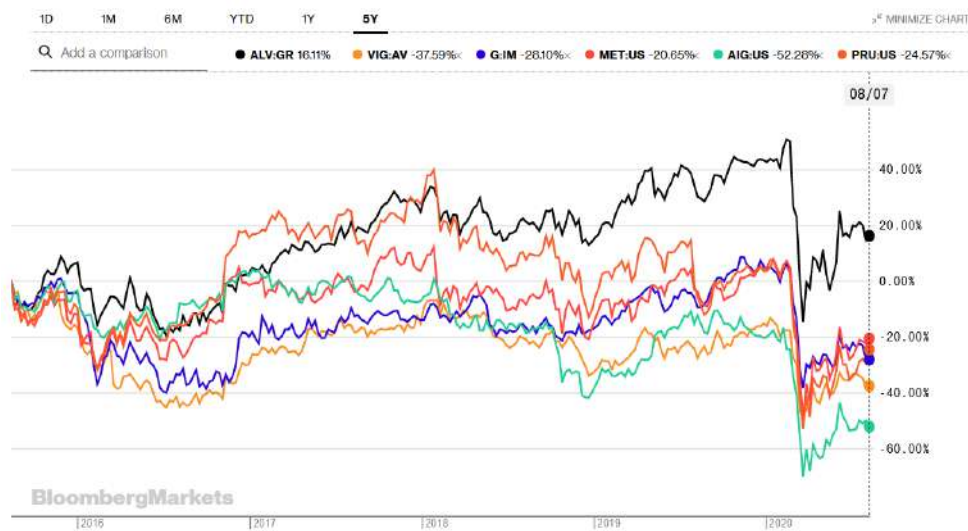
Source: Yahoo Finance, Bloomberg, own calculation

With median P/E ratio was calculated estimated Slovak insurance companies valuation. End of year 2019 P/E ratios were used as well as annual 2019 earnings with the formula  $P/E \text{ ratio} = \text{market cap} / \text{earnings}$ .

The estimated valuations are highest for Allianz with the value of 718 million euro, Kooperativa with the value of 306 million euro and Generali with the valuation of 80 million euro.

In the chart below are compared selected insurance companies from the analysis that are tradable on stock exchange. The average 5 year performance without dividends is -24.51%. Substantial drop in market value can be observed in all banks after Covid-19 global pandemic in early 2020. Only one insurance company have positive 5 year performance and five insurance companies are negative.

**Chart 1:** Five years market performance of selected insurance companies



Source: Bloomberg

## 4 Conclusion

As a next thing was looked at five years estimated valuation of three Slovak insurance companies in the analysis from 2015 to 2019. The revenues were in total increased by 33.1% from 1,169 billion to 1,556 billion euro. The earnings increased by 51,6% from 87 million in 2015 to 131 million in 2019.

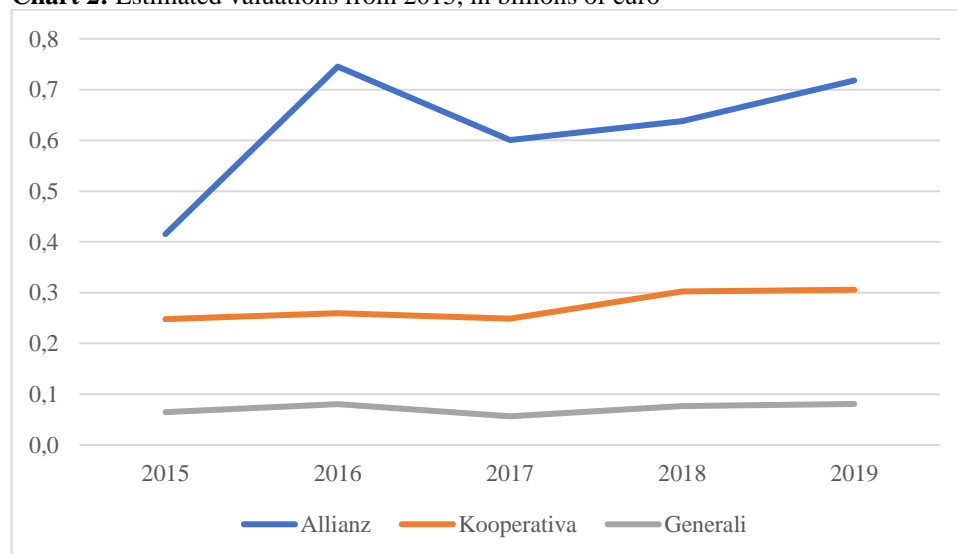
These financial results increased estimated market cap of Allianz by 72,7%, Kooperativa by 23,3% and Generali by 24,3%.

**Table 4:** Financial results of Slovak insurance companies, in euro and billions

year	Allianz			Kooperativa			Generali		
	revenues	earnings	market cap	revenues	earnings	market cap	revenues	earnings	market cap
2015	0.541	0.0496	0.415	0.456	0.030	0.248	0.172	0.008	0.065
2016	0.552	0.0890	0.745	0.460	0.031	0.260	0.192	0.010	0.080
2017	0.566	0.0717	0.600	0.468	0.030	0.249	0.203	0.007	0.056
2018	0.670	0.0762	0.638	0.618	0.036	0.302	0.221	0.009	0.077
2019	0.684	0.0857	0.718	0.631	0.037	0.306	0.241	0.010	0.081

Source: Finstat, own processing

**Chart 2:** Estimated valuations from 2015, in billions of euro



Source: Finstat, own processing

Fluctuations through years can be observed with the peak estimated value in 2019 with aggregated market cap for 3 insurance companies of 1,104 billion euro followed

closely by aggregated 2016 valuation of 1,085 billion euro. Aggregated market cap low of 728 million euro was estimated in year.

It can be concluded that according to last full year 2019 the most valuable Slovak insurance company is Allianz with the value of 718 million euro, Kooperativa with the value of 306 million euro and Generali with the valuation of 80 million euro.

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## **The Economic Transformation of Cities by Migrants/Refugees: A Case study of Hamburg from 2015-Present**

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**Abstract.** Cities across the world serve as transit hubs and destination points for migrants/refugees. The migration crisis that started in 2015 has led to an influx of migrants/refugees into cities across the European Union (EU). These cities have and continue to be at the forefront of migration and play a pivotal role in migrant/refugee integration. However, the discourse and policymaking on migration at the EU institutional and member state level focus on the nation-state, ignoring the relationship between migrants and cities. Relying on legal, political and economic literature, this paper aims to shift the focus of the migration/integration discourse to cities. It interrogates the claim that migrants/refugees are an economic burden to their host communities and posits that migrants/refugees can contribute to the economic transformation of cities if they are properly integrated. It specifically draws from the city of Hamburg in Germany as a case study, given that Hamburg has a long history of migrant/refugee reception and integration in Europe. The paper concludes that migrants/refugees are not an economic burden to their host communities. Cities stand to reap economic benefits in the long run if migrants/refugees are properly integrated.

**Keywords:** Cities, Economic transformation, Migrants/Refugees, Integration, Hamburg

**JEL classification:** F22, J15, J61

## 1 Introduction

Migration is a global phenomenon that affects all aspects of society. According to the International Organisation for Migration (IOM), we live in an era of unprecedented human mobility that has been markedly urban (IOM 2015:1). Migration has been held to be a key dynamic to the evolution of urban areas and contributes to shaping location, size, composition, and characteristics of the human community, as well as the features of the environment where the migrants live (Greiner & Sakdapolrak 2012). Statistics offer an insight into the urban dimension of migration: According to a 2018 data sourced from the United Nations Department of Economic and Social Affairs (UNDESA), 55% of the world's population live in urban areas. This is expected to increase to 68% by 2050 (UNDESA 2018). The influx of people to the European Union (EU) from the Middle East and Sub-Saharan Africa that began in 2015 has led to a dramatic increase in the number of city dwellers. This is due to the fact that refugees/migrants move to cities. However, refugees/migrants continue to be branded by some media outlets and some political actors as vulnerable, poor, benefit-dependent and a potential security, social and economic threat to their receiving communities. They have also been portrayed as carriers and bringers of pandemics. A well-known example can be traced back to 2015, when a former Polish Prime Minister and leader of the Law and Justice party while speaking at a rally, stated that migrants have already brought diseases like cholera and dysentery in Europe, as well as "all sorts of parasites and protozoa, which, while not dangerous in the organism of these people, could be dangerous here" (Cienski 2016). With the outbreak of the COVID-19 pandemic, such rhetoric was re-echoed by the Hungarian Prime Minister who in response to a radio interview question on why universities had been closed, but not schools, said that "*it is because there are lots of foreigners there. Our experience has taught us that primarily foreigners brought in the disease, and that it is spreading among foreigners*" ("Hungary's Orban blames foreigners" 2020). While it remains an undeniable fact that the first cases of COVID-19 brought to Hungary came with returning Iranian students, one should not lose sight of the fact that Mr. Orban is often the victim of the liberal media and is usually presented as the villain, whatever he says or does.

It should be highlighted that branding migrants/refugees in negative terms affect how local communities receive them. It also impedes their social inclusion into the receiving communities. It is believed within certain European political and social circles that refugees/migrants are an economic burden and a threat to European values and societies. This belief is typically underpinned by an ambivalence towards foreign culture and its advocates often refer to threats posed by some unfamiliar group of people to national and cultural identity and to community safety. This is no doubt a nationalist position. Advocates of this position, knowing their arguments would invite accusations of xenophobia or racism, use the language of economics to state their case. This is because the language appears more neutral than the language of nationhood and cultural identity (Parsons 2015). The nexus between the nationalist position and economic rationalization is a delicate one, as illustrated by the Australian media columnist Paul Sheehan who speaks of "*the Arab Muslim world... now exporting its failures*". He asserted that cost of accepting one million refugees by Europe is "roughly \$60 billion" (Sheehan 2015, quoted in Parsons 2016). It is interesting to note that no source is cited

for this figure. Given this situation, this paper aims to interrogate the veracity of the claim that migrants/refugees are an economic burden to their host communities. This paper focuses on cities. This is because cities serve as hubs for initial reception, transit and as the end destination refugees/migrants. Cities therefore have to manage refugee/migrant integration in the short, medium and long-term. However, within national as well as EU migration and integration discourse and policymaking, the focus has been on the impact of migration on the nation-state. By focusing on cities, this paper shifts the migration/integration discourse to an important, yet often ignored integration actor, i.e. Cities. The author explores how migrants/refugees have contributed to the economic transformation of cities. The city of Hamburg is used as a case study given that this city has historically been at the receiving end of migratory flows in Europe. The rest of the paper is structured as follows: section two presents a conceptual framework of analysis. This section strikes a distinction between migrants and refugees as used in the paper. Section three explores migrants/refugees' contribution to the economic transformation of the city of Hamburg while Section four concludes with a set of recommendations.

## 2 Conceptual Framework of Analysis

Often, those who favor restrictive immigration policies refer to individuals fleeing war and violence as “migrants” while those in favor of a more humane response adopt the term “refugees”. In the ongoing migration crisis, these two terms have been used synonymously, yet they hold distinct and different meanings which carry implications not only for data and research but also for legal obligations. For governments, this distinction is important due to the fact that countries deal with migrants under their own immigration laws and processes, and with refugees through norms of refugee protection and asylum that are both defined in national legislation and international law. Thus, confusing these two terms leads to problems for the population. So, who is a migrant or a refugee?

At the international level, no universally accepted definition of the term ‘migrant’ exists. Several attempts at definition have been made. According to the International Organisation for Migration (IOM), a migrant is “any person who is moving or has moved across international borders or within a State away from his/her habitual place of residence, regardless of (1) the person's legal status; (2) whether the movement is voluntary or involuntary; (3) what the causes of the movement are; or (4) what the length of the stay is” (IOM 2007. See also Butt 2017). This definition is broad as it bundles those fleeing persecution, wars, and violence and those traveling for work or study or other purposes into a single category. Per Article 1(1)(a) of the UN Convention on the Rights of Migrant Workers (1990), the term ‘migrant’ is used to cover all cases where the decision to migrate is taken freely by the individual concerned, for reasons of ‘personal convenience’ and without intervention of an external compelling factor (see IOM Glossary on Migration 2011).

The term ‘refugee’ equally defies a universal definition and therefore poses a problem. The refugee ‘problem’ is one of categorization, of making distinction (Haddad 2008). The first attempt at defining a refugee was made in 1951 when the United Nations (UN) adopted the Convention Relating to the Status of Refugees (hereinafter:



the 1951 Convention). This Convention provides a legal definition of the term and forms the cornerstone to current refugee policy. According to Article 1 (A)(2) of this Convention, a refugee is any person who “owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it”.

In citing individual persecution as the sole causal factor behind the acquisition of refugee status, it is evident that the 1951 definition is restrictive. Zolberg et al., demonstrate that the persecution criterion suggests the causal factors behind the refugee movement are entirely internal to states, yet this overlooks the fact that ‘persecution is related to broad historical processes in which complex internal and external forces interact’ (Zolberg et al., 1989:25). This shortcoming of the 1951 definition was corrected with the definition adopted by the Organisation of African Unity (now African Union (AU)) Convention Governing Specific Aspects of Refugee Problems in Africa adopted by the Heads of States and Government on September 10, 1969. The 1969 OAU Convention adopts the definition of the 1951 UN definition but goes further by stating in its Article 1(2) that, “the term ‘refugee’ shall also apply to every person who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country of origin or nationality, is compelled to leave his place of habitual residence in order to seek refuge in another place outside his country of origin or nationality”.

Emma Haddad, while accepting that “any definition of the term ‘refugee’ risks coming under attack for being a restricting, generalizing label that serves the purposes of certain actors at the expense of those being labeled”, defines a refugee as “an individual who has been forced, in significant degree, outside the domestic political community indefinitely” (Haddad 2008:41). This paper adopts Haddad's definition of a refugee. This because her definition acknowledges code (international and legal), category (domestic and administrative) and identity (individual and subjective), and points to the interlocking relationship between each domain. Her definition also “constitutes three assumptions about the ‘refugee’ concept: a degree of compulsion, an undermined temporal element, and an inherently political basis” (ibid).

Looking at the ongoing migration crisis and considering the distinction between migrants and refugees, it will be misleading to categorize all those attempting to illegally enter the EU through the Mediterranean Sea or through the Balkans or through Turkey as migrants or as refugees. It would be safe to say they are a mix, hence the use of “migrant/refugee” in this paper. Most people arriving at the shores and land borders of the EU are from countries mired in armed conflict (Syria, Iraq among others) and for whom international protection is needed. A small proportion of these people are from elsewhere, and for many of these individuals, the term ‘migrant’ would be correct. It must be stated that the use of both terms in this paper does not seek to equate migrants with refugees. These migrants/refugees have contributed to shaping among other things, the economic life of the city, as discussed in the next section.

### 3 The Economic Transformation of Cities by Migrants / Refugees: The Case of Hamburg

If one would recall, cities serve as transit hubs or destination points for migrants/refugees. Contrary to popular belief, migrants/refugees have the potential to contribute to the economic transformation of their host cities. Economic transformation differs across cities due to the difference in the size of migrant/refugee inflows, and it can be long-term or short-term. Short term transformation depends on whether a migrant/refugee transits or stays; is granted protection status or is rejected. It also depends on the person's profile, as well as the host nation's economic structure and capacity to integrate the newcomers. It should also be recalled that, the task of integration falls to cities. Therefore, for there to be a long-term transformation, integration is key. Migrants/refugees come with knowledge and experience of value to their host cities, are dedicated to learning new skills, and if well integrated, can contribute to transforming the economic fabric of a city in two inter-related ways:

- i. fill in labor and skill gaps in cities with ageing population; and
- ii. create employment.

These two dimensions shall be examined in detail in the following subsections. However, before doing so, it is worthy of note that the term 'economic' may have broader or narrow meaning. Studies that use the narrow definition conceptualize economic impact or transformation in purely quantifiable ways, such as comparing tax revenues with health and social security expenditures. Studies that use broader definition conceptualize economic impact not only in these financial terms but also in terms of unpaid work, contribution to social and community capital, filling labor market niches, sending remittances to families and communities overseas (Hugo 2011). This paper adopts the broader definition. It is also worth mentioning that while policymakers must inevitably deal with the short-term consequences of immigration decisions, the real impacts unfold over generations (Liebig 2006). Thus, many of the benefits of migration accrue to second generation, whereas first generation tends to bear the cost (Carrington, McIntosh and Walmsley 2007). Varying timescale therefore constitutes a challenge in assessing the economic transformation of cities by migrants/refugees, given that if one uses a shorter time scale, say for example anything less than 20 years, the findings will be that migrants/refugees are a burden, whereas if a longer time scale is used, the result will be different ( net contribution).

#### 3.1 Refugees/Migrants Fill in Labor and Skill Gaps

According to a 2014 study titled '*Refugees Economies: Rethinking Popular Assumptions*', authored by Alexander Betts, Louise Bloom, Josiah Kaplan and Naohiko Omata, the presence of refugees boosts a local economy significantly as a result of

additional purchasing power, the creation of employment and the provision of human capital (Betts et al., 2014). The authors explained that: *“Refugees around the world engaged with markets.... Refugees engage in consumption, production, exchange, entrepreneurship and development of capital markets.... When they are given a right to work, access to capital, educational opportunities, they are likely to have the greatest impact”* (Betts et al., 2014: 4). Without disagreeing with Betts et al., this paper maintains that current the inflow of migrants/refugees into European cities are a source of labor, and the successful and timely integration of these migrants/refugees will save these cities from problems caused by an ageing labour force and declining birth rate in these cities. Therefore, to maintain Europe’s economic growth, an injection of young workers is desperately needed. To avoid this stagnation, the Organization for Economic Cooperation and Development (OECD) posits that it is imperative for the EU to add 50 million people to its workforce by 2060 (Matsangou 2015).

The above position supports the claim earlier made by Audrey Singer that, *“cities need two things to stay strong: economic activity and population. Refugees provide both”* (Singer 2012). The city of Hamburg, has been quick to realize this, has opened its doors to migrants/refugees and has taken steps to ensure their participation in the labor market, which is the most significant factor favoring long-term integration into society. Herbert Brucker, a researcher at the Institute for Employment Research, in an interview with *Deutsche Welle* in 2014, asserted that *“an estimated 1.5 million skilled immigrants are needed to sustain Germany’s pension system, and by 2060, two workers will be needed to support every retired person in Germany”* (Matsangou 2015). Thus, Germany is relying on the migration to shield itself from impending economic collapse. In 2015, Germany received over 1.1 million refugees who were later distributed, following the Königsteiner Schlüssel quota system, among the federal states. Based on this quota system, in 2015, Hamburg was allotted 2.53% of the total number of refugees admitted into Germany during that period (Katz, Noring & Garrelts 2016), a number which will go to fill in the labour and skills gap created by declining birth rates and ageing in this city. The fact that refugees/migrants are a source of labour to German cities has been underscored by German political figures such as the former Economy Minister – Sigmar Gabriel, who, in 2015, told parliament that *“if we manage to quickly train those who come to us and to get them into work, then we will solve one of our biggest problems for the economic future of our country: the skill shortage”* (quoted in Copley 2015 ).

It should be mentioned, by 2018, 71,000 migrants/refugees arrived in Hamburg and 39,000 were living in the city (Sprandel 2018). There is an absence of data on the number of refugees currently living in the city. Therefore, one can only assume that the numbers have increased, given the economic and cultural attractiveness of the city, as well as the city’s *“Willkommenskultur”* (Welcoming culture) and the role played by civil society to help migrants/refugees integrate. According to the Officer for Citizen Participation at the Central Coordination Unit for Refugees (ZKF) in Hamburg, *“it takes about 5 years for a full integration of refugees/migrants into Hamburg labor market. This is because the refugee/migrant first and foremost must learn German and secondly, do vocational training. Nevertheless”,* he continued, *“their integration into labor market in the city is already happening. Of the number of migrants/refugees taken in by the city, 10-12% of them has already found some form of employment”* (Hamdan,

personal communication, June 2018). Though this represents a small fraction of the total number of refugees in the city, it can be safely assumed the figures are bound to rise within the next five years.

It should be borne in mind that migrant/refugee integration into labor market is made possible by their host cities in partnership with academic, business, and civil society actors who are well placed to connect these refugees/migrants with further training or placement. This process of recognition of foreign earned qualification and experience is key. Thanks to the Hamburg's Law on the Recognition of Foreign Professional Qualifications (Hamburger Gesetz über die Anerkennung ausländischer Berufsqualifikationen – HmbABQG), Hamburg has created not only the legal right to be provided with advice, but equally established a scholarship program so that people can take advantage of the opportunities provided by law. By directly involving employer associations in the design and implementation of recognition procedures, a groundwork is laid for their support when it comes to training and hiring. For example, the Hamburg Chamber of Crafts is working with the German Federal Institute for Vocational and Professional Education (BIBB) on a program that certifies refugees who are fully qualified in certain professions but lack the documentation required to practice in Germany.

With the ongoing COVID-19 pandemic, Germany is turning to its migrant and refugee communities for help in dealing with the pandemic. Anticipated shortages of medical staff and farm workers for this year's harvest signals jobs may be opened up to those who normally are not permitted to work. The city of Hamburg launched an appeal for people with medical and nursing training, including students and experienced nursing aids, to work as volunteers. Many responded to the call (MacGregor 2020).

### **3.2 Migrants/Refugees Create Employment Opportunities in Cities**

Migrants/refugees create employment opportunities in two ways: through setting up a business that creates wealth, employ local residents and stimulate investment, and through their mere presence in large numbers, stimulating the creation of jobs for local residents as communities strive to accommodate and care for them. These two situations are examined in the following paragraphs.

The mere presence of refugees in large numbers in a city boosts consumption and encourages investment. When migrants/refugees spend their wages, they boost demand for the people who produce the goods and services they consume. Take for example the housing sector: When migrants/refugees started arriving in large numbers in cities across Europe, these cities faced enormous challenges, specifically regarding reception, accommodation. To address these concerns, cities had to embrace complexity and innovate continuously. For example, when migrants/refugees started arriving in Hamburg in 2015, the local government had to identify additional sites for the construction of migrant/refugee accommodation. By June 2017, 112 sites and a total of 28, 249 had been identified (Wolfe 2018). Construction of migrant/refugee accommodation in both residential and non-residential areas (such as parks, parking lots and commercial sites) immediately began, but were delayed by lawsuits from many rich neighbourhoods who wanted to keep migrants/refugees out. The government of

Hamburg then started locating housing sites in poorer neighbourhoods with the hope that residents could or would not be able to legally oppose the settlement of migrants/refugees in their communities. Therefore, the distribution of migrants/refugees in Hamburg is disproportionately skewed towards poorer neighbourhoods (Wolff 2018). Whatever the case, the construction of housing units for migrants/refugees in the city created employment for local residents a substantial number of locals gained employment in the construction sector. It should be mentioned that initial housing units are usually provided for free until the time when the migrant/refugee's application for asylum has been approved and to secured gainful employment. Then, they have to leave the housing units for follow-up housing sites or if they can afford, to flats/apartments or houses where they pay rents. This in a way boost demand for housing, as well as drive up the price of housing, thus contributing to the housing crisis in Hamburg. A brief note on how this affects the urban landscape of Hamburg is necessary here.

As the population of the city grows, a sufficient number of flats are required to meet growing demand. The city has taken it upon itself to build 5000 to 6000 new apartments each year. The spatial vision of the city relies on major growth industries of the city to strengthen its role as a driving force of economic dynamic (Hafencity University of Hamburg & Shubert 2015). This economic dynamic is carried by a number of small and medium sized businesses, some of which are owned by migrants/refugees or cater to the needs of migrants. Creative economies like media, music and design have been held to be initiators and at the same time milieu defining for the city (ibid). The city has established certain quarters such as Ottensen and Karoviertel which offers such a milieu to certain groups of people. However, there issues of displacement and gentrification still remain crucial.

Around the world, it is an undeniable fact that refugees face significant restrictions on their economic lives. Most of them are not allowed to work and for those who are, there are other challenges: language, non-recognition of foreign diploma, discrimination, etc., which all pose barriers to finding a job. Migrants/refugees also face additional challenges in registering businesses and accessing banking facilities. However, this has not stopped them from setting up businesses, sometimes in the informal sector (self-employment) in cities across the world, especially in Hamburg. Migrants/refugees are often entrepreneurial as they face the need to set up and establish themselves in a new environment. Migrants already make special entrepreneurial contribution to the German economy (source) which adds impulse to the start-up activities of the economy of Hamburg (Source). Hamburg is one of the leading cities for entrepreneurial activities in Germany due to its excellent advisory offers and support measures provided by the Chamber of Commerce and Chamber of Trade, the Employment Agency (Agentur für Arbeit), Jobcenter and other well-established institutions like Arbeitsgemeinschaft Selbständiger Migranten e.V. (ASM) and Unternehmer Ohne Grenzen e.V. (UoG). Migrants/refugees in Hamburg have taken advantage of these advisory offers and support measures to set up businesses, mostly concentrated on food-groceries and restaurants, thereby creating jobs not only for themselves, but equally for other migrants and native labour. For example, a 2004 survey of 427 immigrant businesses in Hamburg revealed that on average, 31 percent of employees are family members. Furthermore, a majority of ethnic entrepreneurs

claimed to employ mostly their co-ethnics (Burgbacher 2004). Current statistics are lacking, yet one can only assume that this figure has increased. Evidence of migrants/refugees transforming the economic, social and urban landscape of Hamburg can be found in the multitude of small shops, notably grocery shops and restaurants, owned and operated by migrants/refugees of Middle Eastern, Turkish and African descent found around the city. These businesses provide goods and services which native entrepreneurs are not likely to offer and serve both migrant/refugee and local clientele. Take for example, the increasing number of *Made in Syria* products in Hamburg, popular among Syrian refugees absorbed by the city. These products include a wide range of nuts, sweets, sesame pastes, clothes, vertical grills used to make shawarma meat in diners and hair removal wax. According to a Syrian refugee and businessman, “people want the very same things they used to use in Syria. The German market is full of similar products from Turkey, but Syrians want Syrian goods” (quoted in Nasr 2017). This has led to a gradual revival in Syrian exports to Germany, as exports rose from EUR 15.5 million in 2016 and totaled EUR 8 million in the first five months of 2017 (ibid). One observation can be made from this: immigrant/refugee entrepreneurs may have expert knowledge on specific demand or specific sources of supply relating to foreign products. It stands to reason that migrant/refugee entrepreneurs may therefore expand the range of goods and services in a city, and by extension, a country, hence influencing bilateral trade and expanding consumer choice. Indirectly, this may benefit local/native entrepreneurs as they may concentrate more on activities where they have specific comparative advantages (The Economist 2000).

Not only have migrants/refugees set up businesses which have created employment opportunities in the city of Hamburg, they (from a geographical perspective) have also added vitality to streets and rundown neighbourhoods in city. As proprietors of small businesses, they have a stake in the prosperity and safety of their neighbourhoods and as such, have given certain sectors “a new lease of life” (Sassen 2001). However, one should be cautioned against concluding that all the small businesses owned and operated by migrants/refugees in Hamburg were set up by those migrants/refugees absorbed by the city from 2015. These businesses may be products of globalization absent the migration crisis. Businesses set up by refugees also extends to the IT sector. It is therefore evident that enterprising refugees start new businesses that create wealth, employ locals, make the economy more dynamic and adaptable and boost international trade and investment.

To end this section, one should bear in mind that the setting up of businesses by migrants/refugees in cities is not possible without the support of city authorities themselves and civil society. Cities have come up with a wide range of programs aimed at assisting those migrants/refugees interested in setting up businesses to do so. Such programs may offer services such as mentoring, professional networking or information sessions on designing a business plan or securing funding. For example, as mentioned above, in Hamburg, the Chamber of Commerce and Chamber of Trade, the Employment Agency (Agentur für Arbeit), Jobcenter and other well-established institutions like Arbeitsgemeinschaft Selbständiger Migranten e.V. (ASM) and Unternehmer Ohne Grenzen e.V. (UoG) provide advisory services and support measures to entrepreneurial migrants/refugees interested in setting up businesses. Also, the (potential) economic transformation of cities by migrants/refugees largely hinges

on among other factors, the demographic set up of the inflow. An influx of young individuals brings in youth, vitality, labor and skills as it will boost the size of the workforce and population, stimulating consumption, investment, and economic growth.

## 4 Conclusion

Migrants/refugees are sometimes portrayed as a burden on European societies and resources. From the preceding analysis, it is safe to conclude that such depiction of migrants/refugees is one-sided. In the short-term, they are a burden given that cities have to invest in their integration. Therefore, cities bear the cost of integration in the short-term. However, in the long run, once the migrants/refugees are properly integrated, benefits accrue from their participation in the economic life of their host cities. As demonstrated, migrants/refugees can in the long run make significant and essential contribution to the economic transformation of their host cities. In other words, the economic transformation of cities by migrants/refugees do not happen overnight. It takes time. Unfortunately, these contributions go unnoticed. The time has come for refugees/migrants' potentials to positively transform the economic fabric of their host cities to be acknowledged by European politician, the media and public. Cities need migrants/refugees and migrants/refugees need cities. Therefore, for cities to benefit from the ideas, skills and resources of migrants/refugees and be transformed in a positive dimension, it will be imperative for EU state officials to take the following into account:

- Improve cities' access to EU funding, both for long term initiative and crisis response. One of the key challenges facing cities is that of access to funds to assist newcomers especially when facing acute economic or migration pressures. Given that integration and employment policy remain largely within the domain of national competence in many EU member states, the EU currently allocates a huge chunk of its funds for labor market integration to national, rather than local authorities. This results in cities facing lengthy processes in soliciting EU fund through their national governments, or they sometimes cannot access EU funding for their integration activities when such do not match the integration priorities of their states. To address the bottleneck faced by cities in accessing EU integration funding, it is necessary that enhanced consultation and concertation across different levels of governance on integration priorities be established. Alternatively, the EU could explore whether cities could be allowed to directly access some form of emergency financing for reception, integration or labor market services, without compromising funding for ongoing or long-term activities in this area (Hooper, Desiderio & Salant 2017:26).
- Make better use of migrants/refugees' entrepreneurship support as a key in labor market integration measures. Entrepreneurship may serve as an alternative pathway to economic and social integration for newcomers who possess skills and qualifications not easily transferrable to the host-city or country. Those young adults who could not be enrolled in long vocational training paths, entrepreneurship or Information Technology training oriented

towards the creation of innovative businesses may offer great potential. For the other groups, for example, older adults who ran small businesses in their country of origin, more traditional form of entrepreneurship may provide an important entry point for integration into the local economy and community. It cannot be refuted that a plethora of migrant/refugee entrepreneurship support measures (public and private) have and continue to flourish over the past years at the local level, and more recently, the EU has made an effort to identify and disseminate best practices in this area. However, the EU should increase its support for migrant/refugee entrepreneurship at the local level, including by helping to develop or expand initiatives that apply best practices, for example, city-to-city mentoring (Hooper, Desiderio & Salant 2017:25-26).

- Give cities a seat at the policy making table. One of the complaints often heard from city officials is that they lack critical input when it comes to policymaking despite having to receive and integrate large number of migrants/refugees. In other words, they are relegated to play second fiddle to state policies on issues for which they bear the brunt. It is about time cities are given real political power to participate in policy making. Even where steps have been taken in this direction, more still needs to be done. The German federalism already benefits from the close, intimate relationship between the federal government and individual states. This federalist system benefits cities given that three of the 16 states are city-states. However, this system lacks a direct vertical line of communication and collaboration from large cities to the federal government. In this case, it will be vital to establish pilot projects between the federal, state and local governments to develop consensus policy responses to difficult themes or challenges and to assess periodically the cost-sharing between different levels of government with regard to distinct activities (Katz, Noring & Garrelts 2016).

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## Russian public debt on the international credit market

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**Abstract.** The role of international credit cannot be characterized unequivocally, since it plays both a positive and a negative role in the development of the country's production. The article highlights the trends and dynamics of the state external debt of the Russian Federation. The paper assesses the effectiveness and safety of Russia's foreign debt policy. Trends in the development of credit relations in Russia in the international credit market in the medium term are considered.

**Keywords:** external borrowing, public debt, credit

**JEL classification:** *H63, E61, E5*

### 1 Introduction

A normally functioning system of international borrowing and lending allows its participants to increase the production of national and world products. However, in practice, the operation of this system is far from perfect. This is evidenced by recurring recurring global debt crises.

Such crises begin with the fact that a country or a group of countries declares that it is unable to pay its external debts or that its debt has been canceled. The facts of bankruptcy and default upset the balance of the international credit market, complicate the processes of lending and borrowing. When individual violations take on massive proportions, another global debt crisis begins.

External borrowings increase the resources of the country's economic development, but the loans received must be serviced.

If the country increases the volume of external borrowing and (or) the interest rates on loans increase, then the costs of servicing the external debt grow. Under normal conditions, external debt is serviced by foreign exchange earnings from the export of goods and services. Sometimes, in order to timely pay off its external debt, a country is forced not only to increase the export of its products, but also to reduce the cost of importing foreign goods. In some cases, external debt is serviced through new borrowings from abroad [17].

Any country with a high level of debt sooner or later faces an aggravation of the external debt problem. The emergence of a strong motivation to refuse payments on external debt is associated with the state of the balance of borrowing operations or the underlying transfer (i.e. the difference between the net capital inflow and the amount of interest on the entire external debt).

The aggravation of the problem of servicing external debt can occur under the influence of many circumstances:

- 1) the country's accumulated debt becomes excessively large;
- 2) the inflow of long-term capital attracted on preferential terms decreases, and the attraction of short-term loans on market conditions increases, which results in an increase in the interest rate;
- 3) difficulties in regulating the balance of payments due to deterioration in the terms of trade;
- 4) a general decline in production or a negative external shock (a sharp change in prices, interest rates, or the exchange rate);
- 5) the country loses the confidence of foreign creditors, the volume of loans decreases;
- 6) capital flight from the country due to the current economic and political situation.

With a high level of indebtedness, the government has the only way to avoid bankruptcy - to turn to the International Monetary Fund (IMF) stabilization program [6]. The lengthy, often humiliating for the debtor country, the stabilization policy suggests:

- abolition or liberalization of foreign exchange and import controls; depreciation of the local currency exchange rate;
- carrying out a tough internal anti-inflationary program, including control over bank loans, government control over the state budget deficit by cutting spending and increasing taxes and prices, refusing to index wage rates, and encouraging free markets;
- opening the economy to the world economy and encouraging foreign investment [4].

## 2 Methodology and calculations

The main criteria for assessing sovereign external borrowing are based on the IMF recommendations:

- the ratio of external debt to GDP;
- the ratio of external debt to export volume;
- the ratio of debt payments to the total expenditures of the country's budget [5].

In world practice, the total external debt in relation to GDP is used as an estimate and distribution of debtor countries into three groups based on the debt weight. The critical value of debt is 60% of GDP. The higher this ratio, the more the government spends not on developing the country's economy, but on fulfilling its obligations on external borrowing.

Harvard professor Carmen Reinhart considers similar critical values of the degree of dependence of the economy on debt [11]. Based on the analysis of the debt crisis, they calculated the threshold for the ratio of total debt to GDP at the level of 90% [15].

The country's economic growth rates decreased by 1% or more in the years when this indicator was exceeded [12].

For the period 2014-2019 and at present, the volume of the external public debt of the Russian Federation is in the range from 2.64% to 3.99% of GDP (Table 1), which is a low indicator of the economy's dependence on debt.

**Table 1.** Volume of external public debt of the Russian Federation to GDP, 2014-2019

Index	2014	2015	2016	2017	2018	2019
External public debt, billion \$	54,36	50	51,21	49,83	49,16	54,16
GDP, billion \$	2056	1364	1283	1578	1630	1610
Ratio of external public debt to GDP, %	2,64	3,67	3,99	3,16	3,02	3,36

Source: compiled by the author based on the source [7]

The ratio of external public debt to GDP increased from 2014 to 2017 at a time when the volume of external public debt was decreasing. This is due to the fact that in 2015 and 2016, the size of GDP declined significantly, while the volume of external public debt did not undergo these dramatic changes in relative terms [16].

The second indicator for assessing public debt is the ratio of external debt at the end of the year to the country's exports over the last year. The norm for this indicator is the amount of external debt that does not exceed 100% of the country's exports for the corresponding year.

This indicator is in the range from 10.94% to 14.64% during the reporting period and does not exceed the threshold values (Table 2). This means that the level of the external public debt of the Russian Federation is optimal and even has a so-called "safety margin" of more than 80% [17].

**Table 2.** The external public debt of the Russian Federation to the volume of exports, %

Index	2014	2015	2016	2017	2018	2019
External public debt, billion \$	54,36	50	51,21	49,83	49,16	54,16
Export volume, billion \$	496,8	341,5	281,8	358	449	470,1
Ratio of external public debt to export volume, %	10,94	14,64	11,17	13,92	10,95	11,52

Source: compiled by the author based on the source [7]

The third indicator for assessing external debt is the ratio of payments to repay the external debt to the country's GDP. This evaluation criterion characterizes the weight of the budgetary debt. In other words, it allows you to see how much GDP is spent on servicing external debt, and not on developing the economy.

This indicator reflects the insignificant degree of the debt burden on Russia's GDP in the range of 0.12–0.2% of GDP for the period 2014-2019 [10]. This, in turn, means that Russia's external public debt does not have a strong impact on the development of the Russian economy at the moment (Table 3).

**Table 3.** Ratio of external public debt payments to GDP, %

Index	2014	2015	2016	2017	2018	2019
GDP, billion \$	2056	1364	1283	1578	1630	1610
Public debt payments, billion \$	103,3	160,4	162,3	175,2	99,79	186,72
Ratio of external public debt payments to GDP, %	5,02	11,76	12,65	11,10	6,12	11,60

Source: compiled by the author based on the source [15]

The strategy of Russia's debt policy at the present stage is aimed at reducing the volume of funds raised in the foreign capital market. The reason for this direction of external borrowing was the financial sanctions of the West countries against Russia [8].

In addition, it is worth noting that external borrowing is currently unprofitable, since the volatility of the ruble exchange rate is high. The growing dollar exchange rate against the ruble contributes to an increase in the costs associated with servicing the state debt, since in addition to income on bonds (eurobonds), the state will have to pay the difference in the dollar exchange rate. Therefore, it is possible that the attraction of government borrowing in the coming years will be limited due to a decrease in demand from the financial sector, continued sanctions against Russia and the risks of deteriorating borrowing conditions.

Summing up, we can note a tendency towards an increase in the state debt of the Russian Federation. The growth of external public debt until 2018 was caused by the acquisition of sovereign debt securities denominated in rubles by foreign investors, as well as by attracting debt financing from foreign companies that are associated with Russian structures. At the same time, by 2021, external public debt will continue to grow, however, with an increase in the cost of servicing it, thereby maintaining the position of a safe "green zone". Considering the domestic public debt, one can also see a tendency towards its growth, which is due to a set of measures aimed at stimulating the country's economic growth. Thus, in the medium term, Russia retains the opportunity to further build up its external debt to stimulate economic growth.

### 3 Conclusion

A new direction in Russian economic policy was the return of Russia to the foreign borrowing market after an almost 12-year hiatus. The main reason for this was the growing budget deficit. The total volume of external loans this year, according to the data of the Bank of Russia, as of July 1, 2020, amounted to 477.2 billion dollars [2].

An analysis of the current state of the world financial market gives reason to believe that Russian Eurobonds, being stable investment-grade foreign loans, will be in high demand. These potential investors include international funds, which make up their portfolios mainly of highly liquid risky assets, as well as numerous investment companies that invest in reliable assets, which are government debt instruments [14]. From this we can conclude that among international investors, mainly from the USA and Europe, the demand for Eurobonds placed by the Russian government is quite high, which guarantees the attraction of the planned funds.

The stable investment rating of Russia creates favorable conditions for the placement of Eurobonds [16]. The investment grade "BBB" ratings assigned by

international rating agencies Standard & Poor's and Fitch are mainly due to the significant volume of gold and foreign exchange reserves [5]. According to this indicator, Russia is in third place in the world - after China and Japan [13].

Currently, there is a transformation of the debt relations of the Russian Federation with international financial organizations, which is due to the fact that Russia is striving to create new geopolitical alliances that allow solving, among other things, financial issues related to the use of borrowed funds. In this regard, it should be noted that there is a tendency towards an increase in the number of subjects of debt relations with the participation of the Russian Federation at the expense of financial organizations of a regional scale and relatively new geopolitical unions, for example, the Eurasian Development Bank, the Eurasian Fund for Stabilization and Development, the Eurasian Economic Union (EAEU) [3], and the New Development Bank of BRICS, etc. [9]. These international financial organizations are becoming more effective against the background of insufficiently effective IMF policy in recent years [1].

At the moment, even a decrease in the level of oil production and a decrease in oil prices, as well as the expected reduction of the Russian economy by 4.8% due to the COVID-19 pandemic, does not harm Russia's debt rating at the moment. Due to the epidemic of coronavirus infection, the Russian economy will face a deep recession in 2020, followed by a partial recovery in 2021, but the final economic losses due to the pandemic remain unclear. The risks of participation, place and role of Russia in the international credit market are increasing due to the current political problems in Belarus related to the presidential elections. However, we believe that the Russian economy must cope with the economic challenges of debt government policy through a flexible exchange rate and fiscal balance.

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# Great Lockdown: Main Characteristics in Perspective<sup>1</sup>

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**Abstract:** Less than twelve years after the Great Recession, the global and European economies are facing another unprecedented economic crisis, referred to as the Great Lockdown. It manifested in 2020 with significant contractions to economic growth, sharp decline in economic activity combined with increase in unemployment. This article describes the latest developments, takes a stock of policy response as well as it summarises possible lessons learned from previous crisis periods. As the crisis is still on-going and subject to uncertainty, this article does not strive to make any final judgement.

**Keywords:** economic crisis, recession, Great Lockdown.

**JEL classification:** E65, G01, N14, O11.

## 1 Nature of the crisis: Stylised facts

In second quarter of 2020, the world started facing a medical emergency related to coronavirus (COVID-19) pandemic. In order to counter the spread of the COVID-19 virus, countries around the world have enforced lockdowns, travel restrictions and border closures of varying degrees and duration. Restrictions first began to be applied in China, followed by other Asian countries, and later also Europe, Americas and Africa. By early April, more than half of the world's population were subject to containment measures at the same time.

As a result, the European and the global economy entered a sudden recession in the first half of this year. A large part of the economy was shut down for several weeks and in most of the cases only essential businesses have been allowed to remain open. Given the severity of containment measures across the world, the collapse of global trade and the confidence shock, the pandemic has caused the largest global recession in the history. When looking at GDP components, private consumption,

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<sup>1</sup> The article should not be reported as representing the views of University of Economics in Bratislava or any other institution the author has been associated with. The views expressed and mistakes made remain of the author.



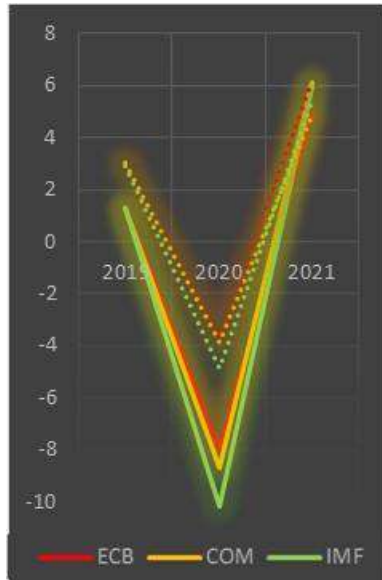
investments as well as net exports declined sharply. Global GDP is projected to fall by 4.9% in 2020 (IMF), after its growth of over three percent was forecasted a few months ago.<sup>2</sup> The euro area economy will contract even more, between 8% (ECB) and 10.2% (IMF) in 2020 (Figure 1), while the headline inflation will continue to move around zero in the coming months.

A recovery is projected for 2021, however the outlook is surrounded by considerable uncertainty. As majority of countries started with gradual easing of lockdown restrictions over the summer, a sharp rebound of activity, consumption and employment has been observed.<sup>3</sup> The recovery has been supported by rapid and large-scale monetary, fiscal, supervisory and labour market policy measures, with the aim to limit the economic scars, reduce job losses and bankruptcies and avoid real-financial feedback loops. The global economic growth is projected at 5.4% in 2021 (IMF), while the euro area is expected to recover at an annual growth rate of 5% (ECB) to 6.1% (COM) in the following year (see Fig. 1).

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<sup>2</sup> IMF projected in its October World Economic Outlook a growth of 3.4% in 2020 for the world economy.

<sup>3</sup> This was confirmed by high-frequency indicators, such as electricity consumption, credit card payments or GPS-based mobility indicators, which started to converge back to pre-crisis levels.



**Fig. 1.** Euro area and World (dashed) real GDP growth forecasts.

Source: ECB Macroeconomic Projections (September 2020), European Commission Summer 2020 Interim Economic Forecast (July 2020), IMF World Economic Outlook Update (June 2020)

Note: Forecasts are not strictly comparable given their finalisation in different point in time and thus based on different assumptions about COVID-19 pandemics. Moreover, ECB and COM world projections exclude the euro area and the EU respectively.

The recovery remains very fragile, dependent on balancing between opposite objectives of health concerns and economic growth. With experience gained during the initial wave, more targeted, geographically localised and less economically disruptive containment approaches are being used, such as massive testing, tracing and isolation of contacts. Still, the fear of recurring outbreaks and related lockdowns are weighing on mobility as well as on confidence of consumers and businesses, hindering thus the global growth. At the same time, the increased trade costs and uncertainty about confinement measures are slowly changing the global trade patterns, in particular with the objective to diversify global suppliers and avoid mono-dependency as well as to re-shore production to reduce the length of global value chains. The forecasts expect incomplete recovery, given the uncertainty of medical situation, depth, length and evolution of the pandemics and its ultimate economic implications. Against this background, it is expected that the economic growth in 2021 would not be sufficient to offset the losses of 2020. Moreover, the full recovery could be expected only once a permanent medical solution with an effective and available vaccine is found.

The curve of the recovery remains uncertain. It was originally expected that the crisis would lead to a V-shaped growth, thus that a sharp decline in economic activity would be followed by a strong rebound. Currently, a U-shaped scenario is considered as more likely, where the recession would last longer and the rebound would be slower. Furthermore, Buti (2020) mentioned a scenario of a 'Victorian bathtub', where a period of stagnation would be followed by a long timid recovery. In case of a strong resurgence of the pandemic, leading to a second lockdown, a W-shaped scenario could become a reality for some countries. Such a situation will very likely lead to prolonged weak activity, increased insolvencies and substantial worsening of the labour market conditions, possible

behavioural changes of economic agents as well as implications for financial stability.

## 2 Large differences across regions and economic sectors

The COVID-19 pandemic is a truly global crisis, with the recession affecting all regions and countries. According to the IMF (June 2020), the Great Lockdown will result in contraction of 8% for the group of advanced economies in 2020 and of 3% for emerging and developing countries (down by 5% without China).<sup>4</sup> It is very likely that the on-going crisis will result into the deepest recession in advanced economies since the Second World War and the first output contraction in the group of emerging and developing economies in at least last sixty years. It follows that for the first time since the Great Depression, advanced economies, middle-income countries as well as developing economies will be in recession at the same time.

Yet, the aggregate numbers mask a number of subtle differences. The World Bank projects that East Asia and the Pacific will grow by a scant 0.5%, while all other regions will contract: South Asia by 2.7%, Sub-Saharan Africa by 2.8%, Middle East and North Africa by 4.2%, Europe and Central Asia by 4.7%, and Latin America by 7.2% in 2020. The differences across individual regions and countries reflect the evolution of the pandemic and the effectiveness of its containment, variations in economic structure, reliance on external financial flows and pre-crisis growth trends. The crisis has taken the highest toll on the economic growth in countries where the pandemic has been the most severe and which rely heavily on global trade, tourism, commodity exports and external financing.

The economic recovery is also uneven across different economic sectors. During the lockdown, major exporters were hit hard by the global drop in demand for automobiles and investment goods as well as by the disruption of global and regional supply chains (e.g. in machinery and chemical sectors). Exporters of energy or industrial commodities also experienced strong decline in growth and unprecedented decline in prices, e.g. of petrol. Furthermore, travel and tourism restrictions led to the collapse of exports of hospitality and transport services and social distancing and lockdown measures have taken a toll on entertainment and art industries. With the lifting of restrictions, the economic recovery has been strong in manufacturing sector, while several service sectors lag behind and their full recovery could be expected only once a cure to COVID-19 is found. This is in particular true for sectors such as arts, entertainment, accommodation, tourism, transport and travel (see Box 1).

Large differences could be observed also across Europe. All euro area countries recorded very negative quarterly growth rates in the second quarter of 2020. The European Commission expects that Germany as well as Central Europe will suffer a smaller downturn in 2020 than Southern-European countries and that they would

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<sup>4</sup> The projections of the World Bank are of the very similar magnitude – a contraction of 7% for advanced economies and of 2.5% for emerging market and developing economies. (World Bank Global Economic Prospects, June 2020).

recover sooner. This asymmetric behaviour could be explained by a combination of different factors. First, many Southern-European countries experienced strong wave of pandemics and introduced stringent lockdown measures. Second, the structure of the economy impacts the overall economic situation. Countries with larger industrial sectors, e.g. Germany and central European suppliers, are likely to recover more quickly while countries relying on services will face a very timid recovery, given the low consumer confidence and strict safety protocols. Southern-European countries, such as Greece, Spain, Italy, Portugal or Croatia have a sizeable amount of tourism and leisure, for which the full recovery is only expected once effective medical treatment of the virus is found. Third, the asymmetric reaction will be further impacted by the high public debt levels in the Southern Europe, which does not provide sufficient fiscal space to withstand the shock.

**Box 1. COVID-19 pandemics and specific industries**

*Tourism and travel industry* have been strongly affected by the COVID-19 pandemic. Both business and vacation travel have come to an almost complete standstill since spring 2020, owing to travel and entry restrictions and quarantine regulations. The industry is expected to suffer from the pandemic in the long-term, due to loss of confidence and behaviour changes of economic agents. For example, it could be expected that face-to-face business meetings would continue to take place more often with video conferencing, while there will be less appetite for exotic holidays in distant countries.

*Aviation industry* has suffered from the travel bans and quarantine measures. Data from the flight tracking service Flight Radar 24 shows that number of flights took a huge hit globally as of March-April and it is recovering very slowly since. There are also expectations that changes in the behaviour of both private and business customers could have long-term negative effects on the business.

*Retail industry* could be characterised by very diverse outcome. The closure of shops and further hygiene measures have severely affected the brick-and-mortar retail shops. On the other hand, online retailers benefited during the lockdown period from the reduced competition. In case of repeated deterioration of health conditions, consumer behaviour could permanently alter, to the detriment of brick-and-mortar shops.

*Automotive industry* has suffered severe damage from the COVID-19 crisis, affected by the procyclical negative consumer sentiment. During the 2008 financial crisis, demand was stimulated by government measures such as car scrappage schemes, however similar measures are not present in the on-going crisis. The automotive industry's recovery from this crisis can be expected to take longer than it did in the past.

*Oil and commodity industry* also took a strong hit. Demand for oil fell down as lockdowns across the world kept people inside. Demand for metals and transport-related commodities

(such as rubber and platinum used for vehicle parts) has also tumbled. With the relaxation of the travel restrictions in some countries, prices regained some ground.

*Construction industry* is expected to increase on the back of public demand for infrastructure projects, in order to support the economy.

*Pharmaceutical sector*, which is traditionally not very sensitive to economic cycles, will also gain out of the crisis, in particular suppliers of masks, ventilators or COVID-19 treatment. As observed by Bloomberg, share of a number of pharmaceutical companies, which develop and test potential COVID-19 vaccine has skyrocketed on the hopes that the vaccine will be approved and distributed in large scales.

### **3 Governmental response: Finding a balance between health and economic concerns**

Policy actors around the world have put together large-scale rescue packages to ensure the survival of their economies. The timely, decisive and coordinated actions of different authorities, including health authorities, central banks, fiscal, regulatory and supervisory authorities both at national and supranational level, has proven to be the appropriate line of defence to contain the virus outbreak and offset the economic impact of the pandemic. Any policy measures are aiming at balancing between health protection measures and actions to stimulate the economy. The overall package of policy measures is significantly larger than their equivalents in the 2008 financial crisis, which could be explained by the scale of the impact on the real economy.

The central bank actions concentrated on monetary policy and credit easing interventions and on injecting liquidity into financial markets. Following the COVID-19 outbreak, global financial conditions tightened at unprecedented speed, market volatility spiked and borrowing costs increased, while historically large capital outflows were observed in emerging market economies. To safeguard financial stability and in order to prevent any adverse feedback loops, central banks have eased monetary policy, with the aim to make borrowing cheaper and to encourage spending to boost the economy. Moreover, they undertook new liquidity actions, including the coordinated move of major central banks to provide dollar-swap liquidity. Central bank policy actions in emerging economies had to address the capital flow reversals and commodity shocks and applied monetary easing policy including through first time use of unconventional policies.

In the euro area, the European Central Bank announced in March measures amounting to 7.3% of Euro Area GDP, which was further increased in June. The ECB introduced a new round of Asset Purchase Programme (APP, 120bn), followed by a new temporary Pandemic Emergency Purchase Programme (PEPP, EUR 750bn), which was further increased in June (by EUR 600bn to total of EUR 1350bn). For both programmes, purchases are conducted in a flexible manner, allowing for fluctuations in the

distribution over time, across asset classes and among jurisdictions.<sup>5</sup> Furthermore, it made available up to EUR 3 trillion in liquidity via its refinancing operations, decided to purchase commercial papers of sufficient credit quality and to expand the eligible collateral in its refinancing operations, with the objective to increase the flow of credit to companies and to real economy.

At the supervisory front, several ‘flexibility’ measures were applied with the objective to avoid any amplification of the real economy shock (see Box 2). In particular, temporary capital and operational relief measures were announced by supervisors, e.g. allowing banks to temporarily hold less funds as a buffer for difficult times. Banks were also given more flexibility on supervisory timelines, deadlines and procedures. Banks are expected to use the freed-up funds to absorb losses and to support the economy, and not to pay out any dividends.

**Box 2. Role of the banking sector during COVID-19**

Unlike 2008 financial crisis, the financial system is expected to support the economic recovery. The current crisis did not originate in the financial system. On contrary, the policymakers expect the financial system to be part of the solution, by sustaining the lending to the economy. The financial sector is not immune to the shock, but it is expected to be able to help absorb the shock, rather than amplify it. Policy measures have been taken with the objective to sustain borrowing conditions after the outbreak of the pandemic and to avert any large financial amplification channels.

The sharp tightening in financial conditions, heightened funding stress and repricing in risky assets since the outbreak of COVID-19 pandemics have tested the resilience of the financial sector. Financial institutions have entered the crisis with strong capital and liquidity positions. For example, the Common Equity Tier 1 (CET1) ratio of EU banking sector reached 14.9% at end-2019 on average and the Liquidity Coverage Ratio (LCR) almost 150% in q1-2020, thus well above the regulatory requirements. However, there is large diversity across the financial institutions and some entities, which entered the crisis with low capital levels and riskier exposures, might face some challenges going forward.

The pandemic has the potential to severely affect the financial sector for a long period of time. With high dependency on economic cycles, the crisis has amplified profitability concerns for the financial sector, in particular in Europe with already weak profit situation pre-crisis. Moreover, it could be expected that asset quality of the banking sector will deteriorate and a growing number of non-performing loans going forward. Furthermore, the non-banking sector has been impacted to a larger extent than the banking sector by the on-going crisis. This is evident in particular with respect to liquidity issues the non-banking sector is facing, e.g. related to redemptions for asset management companies or to limited capacity of the non-banking sector to react to daily variations margin calls requested in

<sup>5</sup> The PEPP is available in all EA jurisdictions, including Greece, with the ECB highlighting that the crisis is exogenous and detached from economic fundamentals. Furthermore, while the benchmark allocation across jurisdictions will continue to be the capital key of the national central banks, no 33% limit of any country’s debt will apply.

derivatives transactions. Given the uncertainty about the duration and deepness of the crisis, it is important to closely monitor different pockets of the financial distress, including banking and non-banking sector.

Fiscal stance of majority countries is considered as highly expansionary in 2020. Strong fiscal stimulus has been implemented at national level, which included increased health spending, jobs and income support, transfers and subsidies to affected firms and households, tax and social security relief or debt holidays. A number of authorities introduced also measures to temporarily increase the risk-bearing capacity of the banking sector, e.g. by providing loan guarantees and imposing moratorium on outstanding loans to SMEs. Most of the pandemic-related measures are of temporary nature and will expire by end-2020. Discretionary fiscal policy has been sizable in advanced economies. Emerging markets have deployed smaller fiscal support, constrained to some extent by limited fiscal space. Furthermore, a unique challenge confronting emerging markets this time around is that the informal sector, typically a shock absorber, has not been able to play that role under containment policies and has instead required support. Taken together, budget deficit and debt ratios of majority of countries are expected to increase significantly in 2020, due to fiscal emergency measures as well as negative cyclical component, given the macroeconomic situation.

In the EU, ambitious fiscal measures by EU national government have been complemented by an EU recovery package. It amounts to EUR 2364.3 billion, consisting of European safety net for workers and businesses (EUR 540 billion), the Next Generation EU fund (EUR 750 billion) and the long-term 2021-2027 EU budget, so called Multiannual Financial Framework (MMF). Moreover, EU structural funds were redirected to tackle the COVID-19 crisis as well as EU 2020 budget has been amended twice, to cover additional medical expenses (e.g. to purchase medical supplies or support the development of COVID-19 vaccine). Furthermore, maximum flexibility was allowed in the application of EU rules. More specifically, European fiscal rules have been suspended, in order to accommodate exceptional spending.<sup>6</sup> The EU also adopted temporary state aid rules, which allow EU Member States to financially support companies and citizens who are struggling due to COVID-19 pandemics.

For the first time, a common budgetary instrument at European level will be used to complement fiscal stabilisers at national level. Next Generation EU (NGEU) will raise money on the financial markets, taking the advantage of its strong credit rating. For this, it will temporarily lift the resources ceiling, thus the maximum amount of own resources the EU could raise during a year. The ceiling is 1.2% of the aggregate gross national income (GNI) of all EU Member States, and it was increased to 2%. The money will be repaid via new EU resources, relying on levy on big tech companies, tax on non-recycled plastics and a carbon price on imports from countries with lower climate ambitions. Importantly, a significant part of the package is supporting the European Green Deal, so that 30% of the overall EUR 1.8 trillion will be ring-fenced for climate-related spending. Environment, together with digitalisation, have been set as important objectives (see Box 3).

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<sup>6</sup> European Commission triggered the General Escape Clause of the SGP.

**Box 3.** Crisis as an opportunity: European Green Deal as a growth and recovery strategy

The COVID-19 crisis constitutes an unprecedented shock on many fronts, including for the environment. During the confinement, many production sites were temporarily closed and global travel came to a virtual standstill. This has led to a reduction of CO<sub>2</sub> emissions so that they are expected to be 4-7% lower in 2020 than the pre-crisis estimates, an unprecedented drop not observed over last 120 years.<sup>7</sup> Still, in order to revert global temperature increase by 1.5 degrees Celsius above pre-industrial levels, in line with 2015 Paris Agreement, global emissions would need to drop by almost 8% for next 10 years.<sup>8</sup>

The pandemic has shown that fundamental structural changes to the global economy are needed for preventing climate change. Reducing economic activity is not sufficient. The crisis has also learned us two major lessons, namely that we could be exposed to far-reaching damages by a lack of prevention and of early action in the face of a global shock that threatens both our lives and economy (e.g. pandemics or global warming) and that in a globalised world, inaction in one part of the world can lead to disruptive spillover effects in other parts. (Schnabel 2020). Climate change is a much greater challenge than the pandemics.

The appropriate policy response to the growing risk of climate change is to rebuild the economy after the pandemic with climate neutrality objective in mind. The European Green Deal has for its objective to make the climate neutral by 2050, thus to ensure a target of net-zero greenhouse gas emissions in the EU by 2050. The plan of the Next Generation EU is giving priority to green investment in the recovery packages, together with digital transitions, which are both key to relaunch the European economy.

## 4 Great Lockdown in a perspective

The Great Lockdown has naturally evoked comparisons to the previous crisis, in particular the Great Recession of 2008 or the Great Depression, which began in 1929. The commonalities manifest in sharp decline in economic activity combined with equally sharp increases in unemployment. Every crisis is unique and there are a number of elements which distinguish the Great Lockdown from previous crisis periods. Without trying to be exhaustive, since the crisis is still on-going with very uncertain trajectory, the following summarises elements, which are striking.

*Origins of the crisis.* The 2008 financial crisis began with disruption to the financial markets and only spread to real economy after a certain time delay. On the other hand, COVID-19 crisis was borne outside of the global economic system. It represents foremost a medical emergency, which has had a radical effect on the real economy. With the lockdown measures, it has put the real economy out of action immediately, with both supply and demand affected simultaneously. While 12 years ago, the financial

<sup>7</sup> Le Quéré et al. (2020), “Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19 forced confinement”, *Nature Climate Change*, 18 May 2020

<sup>8</sup> UN Environment Programme (2019), *Emissions Gap Report 2019*



sector was the source of the problem, it is expected to lead the recovery during the ongoing crisis, by providing lending to the economy (see also Box 2).

*Scale of the crisis.* COVID-19 is a truly global crisis, set to leave most countries severely affected. Previous crisis were often concentrated in a specific region. Even in the case of 2008 financial crisis, which is considered as a global crisis, contractions in GDP were largely limited to high- and middle-income countries, whereas many low-income countries experienced only mild reductions in income growth, if any at all. This is in stark contrast to the expected effects of the current crisis, where high-income and low-income countries alike will be in a recession and no country or country group will escape this crisis unscathed.

*Severity of the crisis.* All-in-all, COVID-19 is expected to lead to much deeper recessions at both the country and global level than that of the Great Recession. During the second quarter of 2020, around 85% of the global economy and more than a half of the global population were in lockdown for several weeks. With a 12-week shutdown of the economy on average, the severity of the decline in economic output, employment and consumption were far greater than at the onset of any other crisis. Such a situation is without historical parallel. Even the global financial crisis ago had more modest effect on global output. For the first time since the Great Depression, both advanced and emerging markets will be in recession in 2020.

*Dynamics of the crisis.* The particularity of the current crisis is its speed and its radical and abrupt effect it has had across the world. With the lockdown measures, it has put the real economy out of action immediately. As majority of countries started easing lockdown restrictions over the summer, a sharp rebound of activity, consumption and employment has been also observed. Although uneven across the economic sectors, the speed of this turnaround is in dramatic contrast to the previous crisis.

*Strong impact on service sectors.* The impact on the service sector is also rather unique. In typical crisis, it is the manufacturing sector, which is most affected, due to decline in investments. At the same time, the effect on services is usually more subtle, since consumption is usually less affected. This time around, however, the contraction in services has been larger than in manufacturing during the lockdown. This is true for both emerging and advanced economies. Also, given the fact that this is a health crisis, consumers might change behaviour in order to minimise social interactions. In particular services of travel and hospitality struggle to regain demand. This will have effect on economies relying on such services, e.g. tourism-dependent countries.

*Substantial and balanced policy response.* The recovery has been supported by rapid and large-scale policy measures, which is also unprecedented, compared to previous crisis. Monetary measures have been complemented by forceful fiscal responses at both national and international levels. This has been critical in alleviating the impact on the labour market and on banks' lending. Contrary to previous crisis, where the fiscal policy was lingering behind the decisive actions of monetary authorities, there is an aggregate policy mix in this crisis, in which fiscal and monetary policy reinforce each other in supporting the recovery.

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## **Increasing of social transfers efficiency – important challenge for state in recent transforming global economy**

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**Abstract.** This paper deals with issue of poverty reducing by increasing of social transfer efficiency in EU and Slovak Republic. At the beginning, there is a recent situation global security and economy described. In further text there are mentioned and characterized key trends and issues in global economic and security point of view. Author depict the necessity of establishing an effective tool in fighting against the poverty and risk of poverty in relation to securing of global socio-economic and security stability as the main precondition of sustainable global development within recent global economy transformation in to the economy based on AI technologies known as 4.0 industry revolution. Next there are depicted and analysed statistical data of the risk of poverty in EU and SR. Based on these data, there is a social transfers` efficiency in EU and SR calculated and analysed.

**Keywords:** Poverty, Risk of Poverty, Social transfers` efficiency, Regional disparities.

**JEL classification:** H55

### **1 Introduction**

The current development of the world is possible to characterize by increasing of the existence and influence of various kinds and types of crises. This fact seriously affects the process of achieving and keeping the world stability and security as the primary precondition for acceleration of the socio-economic development of the world or just only the selected states integration units or world regions.

Increasing number and diversity of crises which have significant influence to the socio-economic development of the world and its individual components is caused mainly by the growing number of risks and their multidimensional synergic destabilizing effects.

In recent conditions of transforming world economy and security environment, there exist a real need to improve effective tools for reducing number of people living at risk of poverty. Any kind of poverty in large scale can be source of social instability. This one can enlarge itself into the huge global social economic and security crisis. It means that the poverty is becoming important issue in terms of global socio-economic stability and security. Spreading of poverty among the world population has the real impacts to socio-economic and security stability of the world as well as in its main regions.

This all leads to necessity of widening of basic security and economy frame. All of the mentioned facts are reasons for increasing of importance of state regulations aimed to setting up the proactive social and economic arrangements to support balanced socio-economic development in all part of the state, world region, or world itself.

All this should be accompanied by the efficient using of reactive measures aimed to prevent selected groups of population from risk of poverty.

## **2 Key issues of the world economy and security increasing of necessity for empowering of state role in importance**

Recent situation in world economy creates a necessity of empowering the fight against the poverty as one of the biggest sources of social, economy and security, local as well as global crises.

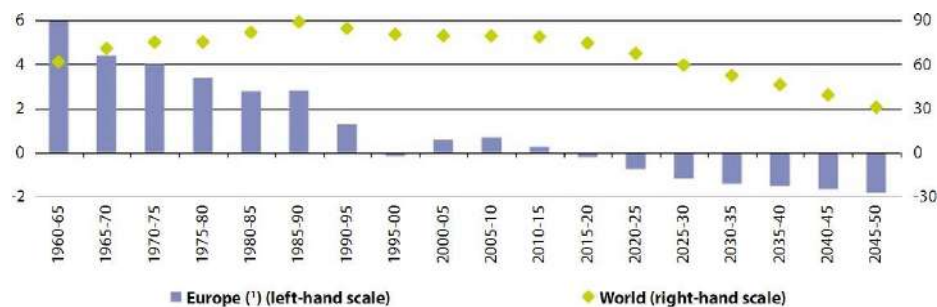
As the key factors destabilizing the socio-economic and security, as well as the political situation in the world can be considered the following issues:

- **Depletion of strategic natural resources and environmental degradation**
- **The demographic implosion** and imbalance in demographic characteristics among the main world regions and countries.
- **The crisis of the global financial system** and particular crises in various world countries or integration units
- **Transforming of global economy to AI society (process known as 4.0 industry revolution)**
- **Increasing of regional disparities in socio-economic development of world regions.**

Key fact which threatens the global stability is absence of global natural resource management. This can lead to numerous conflicts and social imbalances within the main world regions.

The other important issue relevant to the world security level is problem of world demographic implosion and imbalances in demographic characteristics among the world regions. In relation to the demographic implosion it is possible to confirm a real serious impact of disparities in demographic trends among the world regions or states to the world security. The main issues related with these factors are positive and negative multidimensional effects of the international migration processes to the world stability and also the problems with sustainability of the recent level of living conditions, e. g. due to the problems with sustainability of pension schemes in numerous countries, which are serious impacted by the demographic implosion.

Differences in demographic trends together with disparities in socio- economic development and the environmental degradation among the countries or world regions are enforcing the volume of international migration. This can without effective global migration management lead to decreasing of global security level due to the possible number of social, economic, and military crises in involved countries and regions. For supporting our view of demographic implosion and its future impact to the world security, as well as the impact of differences in demographic trends among the world regions, we can show next two figures. In the figure 1 there can be seen a demographic implosion of the world and also the Europe. In that figure there can be seen a really massive impact of ageing to the world population, but more to the European population. This can lead to increasing of economic inactive people and it can result to the need of migration from the other regions due to the sustainability of pension schemes and productivity of European economics. Ageing is real challenge in relation to fighting



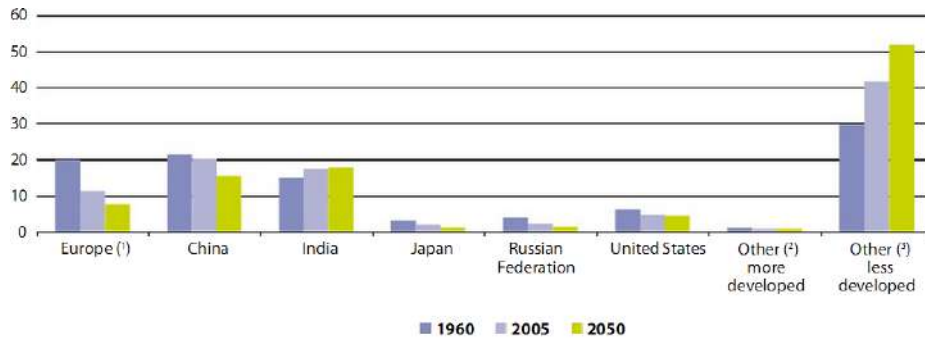
(<sup>1</sup>) EU-27, Albania, Andorra, Belarus, Bosnia and Herzegovina, Croatia, Faeroe Islands, Iceland, Liechtenstein, the former Yugoslav Republic of Macedonia, Republic of Moldova, Montenegro, Norway, the Russian Federation, Serbia, Switzerland and the Ukraine.

Source: United Nations, Population Division of the Department of Economic and Social Affairs

**Fig. 1.** European and world average annual population change in 1960-2050, million. Source (Eurostat 2010)

against to poverty and social, economy and security rising due to its high level. Increasing of number of economic inactive people caused by ageing of the world is serious issue, which should be solved by increasing of social transvers` efficiency or by creating of conditions for longer economic activity of older people. This should not be realized at the expense of their health state.

In the figure 2 there can be seen differences in demographic trends in selected world regions. This can also enforce the migration processes with their risks. We can see that except the volume of migration the other problems can be seen in cultural, and religious values compatibility among the migrants and major population. This can lead to numerous conflicts in various areas of state security.



<sup>(1)</sup> EU-27, Albania, Andorra, Belarus, Bosnia and Herzegovina, Croatia, Faeroe Islands, Iceland, Liechtenstein, the former Yugoslav Republic of Macedonia, Republic of Moldova, Montenegro, Norway, the Russian Federation, Serbia, Switzerland and the Ukraine.

<sup>(2)</sup> Excluding Europe, Japan and the United States.

<sup>(3)</sup> Excluding China, India and the Russian Federation.

Source: United Nations, Population Division of the Department of Economic and Social Affairs

**Fig. 2.** Average annual change of population in selected world region in 1960-2050, million.

Source (Eurostat 2010)

Problem of crisis of global monetary system can be found in reducing of disparities in socio- economic development within the world countries and regions, transition of world economic system to the full-value money standards and anti-debt legislative.

### 3 Poverty as a social risk

Based on the basic principle of crisis dynamics we can say that poverty can be thought to be very dangerous social risk with potential to drive a crises of small number of individuals upward to the whole state or more (national and international) size with many negative and possibly fatal impacts both to the involved individuals as well as to the directing system of state or integration unit of states. This can be caused mostly by the many various negative aspects of poverty to the civil and state security and by their potential of spreading horizontally as well as vertically across the operational and strategic subject and areas of the socio-economic systems.

“In the past, there has been much debate on absolute and overall poverty but in recent years it has been widely accepted that poverty is relative to the place and time you live in. Most official definitions of poverty use relative income to measure who is in poverty; an income threshold is set and those who fall below it are seen to be ‘in poverty’. The key UK government measures take 60 per cent of median income as the poverty line.”(PSE 2020) “The alternative approach to defining poverty is to look at direct measures of deprivation rather than using income as a proxy for poverty. Looking at deprivation allows a wide range of aspects of living standards to be included.”(PSE 2020)

“Historically, poverty has been related to income, which still remains the core of the concept today. It has evolved from the 19th century idea about ‘subsistence needs’ –

what a person needs to survive, to the mid-20th century conceptualisation of lacking 'basic needs', extending the subsistence idea by also including basic facilities and services such as healthcare, sanitation and education, to the late 20th century understanding of poverty as 'relative deprivation', including of income and other resources, as well as social conditions." (Ludi, E. – Bird, K. 2007)

According to the Chambers it is possible to divide poverty definitions in to the five groups:

- Income poverty (or its common proxy, consumption poverty).
- Material lack or want: besides income, this includes absent, limited or low quality assets (such as shelter, clothing, furniture, personal means of transport, radio, etc.) It also includes inadequate access to services.
- Capability deprivation, referring to what we can or cannot do, or can or cannot be. This goes well beyond material lack or want to include human capabilities, such as skills and physical abilities, and also self-respect in society.
- Multidimensional deprivation, with material lack or want as only one of several mutually reinforcing dimensions.

(Chambers, R. 2006: p.3- 4)

In simplification, it is possible to conclude, that there exist two basic approaches to management of the poverty as serious risk endangering of individual and societal economy and security.

First is concept of seizing of poverty as an income deprivation (passive approach aimed to secure individuals from the income deprivation by some social transfers).

Second is concept of poverty as a social exclusion (This approach defines the poverty as an existence of some barriers for individual from full self-participation on the social processes ( in wide meaning of that word) This approach can be seized as proactive oriented to the wide community capacities and possibilities to integrate excluded individual back into the full social participation. The key role is played in this approach by the community aspect and self-activating aspects. This approach thinks about the poor human as about the social, not only "economic" being.

It is necessary to say that for effective managing the risk of poverty both of mentioned approaches should be combined according the individual and societal specifics of situation, in which the man can be or is threatened by the risk of poverty.

For better understanding to the risk of poverty indicator: based on Eurostat definition we can say following: "At risk-of-poverty are persons with an equalized disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equalized disposable income (before or after social transfers)," (Eurostat 2020, a).

In the next table no.1 we can see a development of indicator number of people at risk of poverty in SR and EU before and after social transfers. This table creates a basis for calculating an efficiency of social transfers in relation to prevention of EU and Slovak population to risk of poverty. According to the data in table 1 it can be stated, that the number of people threatened by risk of poverty before social transfers in the EU was declining in whole time interval of the years 2012 to 2018. This indicator dropped from value 24, 8% in 2012 to 21, and 8% in 2018. Total difference of selected indicator within the explored time interval was 3% It seems to be caused by relative positive



economic development, as well as by the policy of “cheap money” reachable for the households.

In Slovak Republic, the monitored indicator had declining tendency too. It decreased from 20.5% in 2012 to 16.3% in the 2018. Opposite to EU the difference in development of monitored indicator can be seen in the year 2017 and 2018, when the monitored indicator was decreasing in EU level from 22.4% in 2017 to 21.8% in 2018, but in the Slovak republic, it stayed stabilized at the level of 16.3% in both mentioned years. The level of monitored indicator in Slovak Republic during the mentioned period was impacted positive economic development in automotive sector. The EU level of monitored indicator was affected by the economic problems in other EU countries.

Table 1 Risk of poverty in EU and SR before and after social transfers in the years 2012 -2018

People at risk of poverty or social exclusion percentage of total population							
year	2012	2013	2014	2015	2016	2017	2018
European Union	24.8	24.6	24.4	23.8	23.5	22.4	21.8
Slovakia	20.5	19.8	18.4	18.4	18.1	16.3	16.3
People at risk of poverty after social transfers percentage of total population							
year	2012	2013	2014	2015	2016	2017	2018
European Union	16.8	16.7	17.2	17.3	17.3	16.9	17.1
Slovakia	13.2	12.8	12.6	12.3	12.7	12.4	12.2

Source: (Eurostat 2020 b, c)

Development of indicator At risk of poverty after social transfers is relatively instable in the EU. It was at relatively stable level in the year 2012 and 2013, when it reached a level 16.8% in 2012, resp. 16.7% in 2013. Then it increased to the 17.2% in 2014 and it was stable at the level 17.3% in the years 2015 and 2016. This was caused by recovering EU economy from Greek debt crisis. In the years 2017 and 2018 this indicator reached a values 16.9% and 17.1%.

In comparison to the EU, the development of monitored indicator was in SR little bit different. It was decreasing during the year 2012 to 2015, when it dropped from 13.2% in 2012 to 12.3% in 2015. After this period, monitored indicator increased to 12.7% in 2016 and then in period to the year 2018 it decreased to 12.2%.

#### 4 Efficiency of social transfers to the risk of poverty reduction

As a result of some kind of simplification we can count and analyse the efficiency of social transfers (as important part of passive approach to the reducing of poverty by the monetary poverty reducing tool) just like the difference between the number of people threatened by the risk of poverty before and after social income transfers. In this point of view it is possible to see following tables as a simple try to analyse the efficiency of social transfers in reducing of poverty in its narrow and income deprivation meaning. In context of upper lines the conflict with proactive social exclusion approach to the poverty can be discussed here. According to my opinion the phenomenon of poverty cannot be seen and solved in some radical views and limits between glorifying of the capabilities of societal aspects of communities to solve all aspects of poverty in time and by the right way. It is possible to deny the glorifying of just only the power of money (governmental transfers) to secure the right and in time solution of the poverty. In next table no. 2 it is possible to see the values of social transfers' efficiency in reducing number of people threatened by risk of poverty in percentage of total population in EU and in SR in the years 2012-2018. According to this table we can see, that efficiency of social transfers in EU was decreasing in whole monitored period. It dropped from 8% in 2012 to 4,75 in 2018.

Tab. 2: Social transfers' efficiency in reducing number of people threatened by risk of poverty in percentage of total population in EU and SR in the years 2012-2018

Social transfers efficiency in reducing number of people threatened by risk of poverty in percentage of total population							
Year	2012	2013	2014	2015	2016	2017	2018
European union	8	7,9	7,2	6,5	6,2	5,5	4,7
Slovakia	7,3	7	5,8	6,1	5,4	3,9	4,1

Source: based on author's calculations

This decreasing trend shows either that the structure and amount of social transfers in EU level is not equivalent to its real need in relation to the worse economic and social situation in EU and World economy in monitored period.

In Slovak Republic the situation in development of monitored indicator was little bit different. Social transfers' efficiency was decreasing within the years 2012 to 2014.

In this period it dropped from 7,3% in the year 2012 to 5,8% in 2014. Then the monitored indicator rised to the 6,1% in 2015. This may be seen as a result of political cycle in Slovak republic. Increasing of amount of social transfers in that year is result of social policy priorities affected by the fact of coming parliamentary elections in 2016. After the year 2015 a monitored indicator had a decreasing trend. It was declining finally to the 4,1% in 2018.

In next table no. 3 there can be seen a social transfers' efficiency delta analysis results. Simply it can be said that the table no. 3 shows year to year change of monitored indicator in the period 2012-2018. According to this table, we can state that the delta

changes of monitored indicator at the EU level was relatively stable. Most of the year to year changes of social transfers' efficiency was about -0,7% or -0,8%. Just in the year 2012 to 2013 it was -0,1% and in the years 2015 to 2016 it was just only -0,3%. Development of delta changes in monitored indicator within the selected period was in Slovak Republic much more instable and changeable in comparison to EU.

Tab. 3: Delta analysis of social transfers' efficiency in reducing number of people threatened by risk of poverty in percentage of total population in EU and SR in the years 2012-2018

Delta analysis of social transfers efficiency in reducing number of people threatened by risk of poverty in percentage of total population						
Years	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
EU	-0,1	-0,7	-0,7	-0,3	-0,7	-0,8
SVK	-0,3	-1,2	+0,3	-0,7	-1,5	+0,2

Source: based on author's calculations

It was much more decreasing between the years 2012 to 2013 and 2013 to 2014, when it dropped into the level -0,3 and -1,2 as a result of the debt crisis in EU and its consequences to economy of Slovak Republic. Then it rapidly increased between the years 2013 and 2014 to +0,3 in next two periods was year to year change decreasing to -0,7 between years 2015 and 2016 and into -1,5 between years 2016 and 2017. In next year to year period change it rised to +0,2. It was a result of positive development of GDP and other macroeconomic indicators in years 2017 and 2018.

In next table no. 4 there can be seen the development of social transfers 'efficiency in reducing the number of people threatened by risk of poverty as a percentage of number by Risk of poverty threatened people in EU and SR in years 2012 to 2018.

Tab. 4: Social transfers' efficiency in reducing the number of people threatened by risk of poverty as percentage of number by the Risk of poverty threatened people in EU and SR in the years 2012-2018

Social transfers efficiency in reducing the number of people threatened by risk of poverty as percentage of number by the Risk of poverty threatened people							
Year	2012	2013	2014	2015	2016	2017	2018
European union	32,26	32,11	29,51	27,31	26,38	24,55	21,56
Slovakia	35,61	35,35	31,52	33,15	29,83	23,93	25,15

Source: based on author's calculations

According the data in table no. 4 we can state, that monitored indicator in EU was decreasing in whole selected period. It dropped from level 32,26% in the year 2012 to 21, and 56% in 2018

In Slovak Republic the trend of development of monitored indicator was not so stable.

It was decreasing in period 2012 to 2014, when it declined from 35, 61% in 2012 to 31, and 52% in 2014. Then it rised to 33, 15% in 2015. Then it has decreasing trend to 2017 when it dropped finally to 23, 93%. In 2018 it rised to 25, 15%.

It can be stated that the efficiency of social transfers in reducing number people threatened by risk of poverty as a percentage of number by the risk of poverty threatened people was in SR little bit higher than in EU. Although the efficiency of social transfers in reducing a number of people threatened by risk of poverty as part of total population was higher in EU than in SR. This can be interpreted as a confirmation of higher living standard and social benefits in EU than in SR, but it also says that the social transfers in EU a much more widely conceptualized and not so linked to solving a poverty of the most poverty part of population.

Approaches to the reducing number of people living at risk of poverty may be based on increasing and optimizing of the volume and structure of social transfers as a passive measurement focused to fight against a poverty, or they can be based on proactive creating of positive conditions for socio-economic development and efficient national income redistribution. From this point of view it is necessary to connect development of social transfers` efficiency with development of GDP.

The development of GDP in selected period 2012 to 2018 as a delta year to year change is depicted in next table 5. Shortly it can be stated that this indicator has in EU a rising trend in the years 2012 to 2015. The most rising periods in relation to this indicator were years 2015 and 2017 when this indicator reached 2, 4%, resp. 2, 8%. In Slovak Republic this indicator reached highest values in 2015 and 2018, when it rised to 4, 8% and 3, 9%. In this point of view we can state that rising of GDP was faster in SR than in EU and despite the fact, that much lower volume of GDP was used to social transfers, The use part of GDP to social transfers was much more efficient in reducing number of people threatened by the risk of poverty in SR than in EU.

Tab.: Real GDP per capita, year to year percentage change in EU and SR in the years 2012-2019

Real GDP per capita year to year percentage change								
year	2012	2013	2014	2015	2016	2017	2018	2019
European Union	-0.7	0.0	1.6	2.4	2.0	2.8	2.1	1.5
Slovakia	1.9	0.7	2.8	4.8	2.1	3.0	3.9	2.4

Source: (Eurostat 2020, d)

In comparison to the change of GDP per capita in Table 5 it can be stated that changes of GDP did not have a direct relation to the efficiency of social transfers. That means real responsibility of the governments EU and SR for adopting effective allocation of transfers aimed on the more efficient reduction of the risk of poverty in population EU and SR. There can be stated a real need of activating people and communities to act against individual poverty, but there still will be the number of people who will not be able protect themselves against the risk of poverty because their objective status and opportunities solve their poverty by them.

## 5 Conclusions

At the end it is possible to say that presented analysis showed real difference of monetary power of Slovak economic compared to the EU level in solving the risk of poverty. Despite this fact were social transfers in Slovak Republic much more efficient in reducing the number of people threatened by risk of poverty. Generally it can be stated that efficiency of social transfers should be rised some about to 50 % to secure the most of population threatened by poverty. Rest of the poverty threatened population can be secured against the poverty by the family cooperation.

Due to mentioned facts we can state, that poverty is real and important phenomenon impacting of recent global, regional as well as local social and economy stability.

It is necessary increase an efficiency of redistributive mechanism of public expenditures in to an active measures labour market and infrastructure as a preconditions of socio-economic development, as well as to the passive social transfers to people threatened by risk of poverty.

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## Situation of Low Interest Rates and its Impact on the Use of Bank Loans

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**Abstract.** Among the current trends in corporate finance, debt source of financing predominate, especially bank loans. Many companies use loans as an appropriate part of their financial structure. The scientific-research issue in the case of these sources focuses mainly on low interest rates, which have a significant impact on their use. Interest rates have been falling every year since the financial crises in 2008. For these reasons, interest in loans is high and will continue to prevail in subsequent periods. The European Central Bank will keep interest rates at historically low levels until inflation in the euro area reaches 2 %, which is not expected in the coming years. Maintaining low to negative interest rates over the long term adversely affects financial stability and many banks have begun to take action. The aim of this paper is to provide insight into the use of bank loans in companies and the impact of the current situation of low interest rates on this debt source.

**Keywords:** enterprise, bank loans, low interest rates

**JEL classification:** E43, G21, G30

### 1 Introduction

Loan financing is one of the most widely used debt sources among companies. A common reason why companies choose debt sources is that they allow them to finance growth projects that enterprises could not finance from their own sources. They allow the company to grow faster and the company can also use its own financial sources for the other purposes, e. g. for cash payments to sellers, which allows increase the rating of the company. Bank loans are rather available to larger and proven enterprises that have demonstrable profitability and creditworthiness. In Slovakia, they are used mainly by medium-sized companies to finance their development needs. On the other hand,

smaller companies and start-ups will turn to specialized institutions from which they can obtain finance.

Since 2008, a period of low interest rates has started in Europe. This period began with the global financial crisis, which was triggered by the collapse of the US bank Lehman Brothers in 2008 and the European sovereign debt crisis in 2010. Many central banks have cut interest rates close to zero in an effort to combat these events. The effects of these crises are still reflected in low inflation and subdued growth, which the European Central Bank seeks to solve through low to negative interest rates.

Following the crisis in 2010, large differences in nominal interest rates developed across euro area countries. Interest rates in the countries of Southern Europe and Ireland significantly increased between 2010 and 2013, while rates in Germany and other top-rated countries fell. [1] Differences in nominal interest rates have caused even greater differences in real interest rates. However, the divergence gradually decreased.

### **1.1 Methodology**

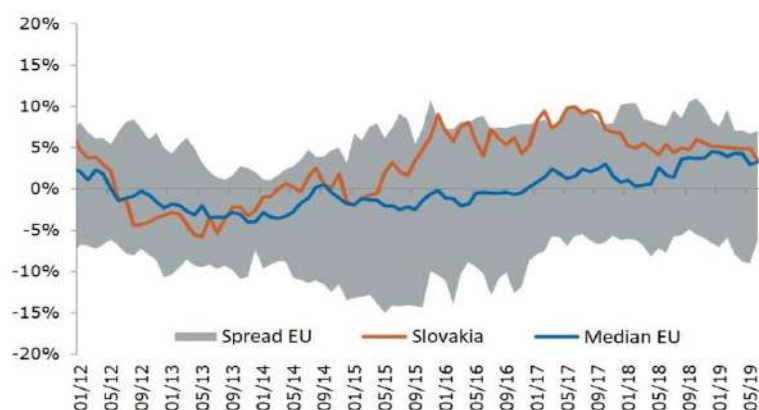
The paper contains partial results of our work, as the overall research has not yet been completed. The aim of the paper is to point out the state of loan financing in Slovakia and to analyze the development of interest rates that affect the use of this source of financing. Selected scientific methods such as analysis, synthesis, induction, deduction and generalization were used for elaboration. We relied on available domestic and foreign literary and internet sources. The data in the paper are drawn mainly from the National Bank of Slovakia, which provides comprehensive information about the development of interest rates and the drawdown of bank loans. They are supplemented by forecast from the European Central Bank.

The structure of the paper is as follows. The second chapter contains a theoretical background about the state of financing through loans in Slovakia and information about credit conditions of banks, which affect the availability of loans for enterprises. The third chapter focuses on the development of interest rates. We present the reasons for the current situation of low interest rates and also forecast of rates for the future. This is followed by a discussion with more detailed information about the whole research and conclusion.

## **2 Current state of financing enterprises through loans in Slovakia**

The turbulent development of international business environment force enterprises to increase efficiency of activities, minimize expenses, increase profit and satisfy the demands of customers to get quality product or service immediately. [12] Strategic use of financial sources is the key to success of any business. The role of the banking sector in obtaining sources of financing is clear and irreplaceable, because bank loans are among the most used debt sources of financing. Long-term sources are essential for a company to operate, develop and build its competitive advantage over other companies. Long-term loans increase the flexibility of an investor's limited capital by allowing it to be split into multiple investments and minimizing the immediate impact on the

company's cash flows. Interest rates are usually lower than for short-term loans, because long-term loans are often secured by an asset, which reduce the risk of a bank willing to offer a better interest rate than in the case of an unsecured loan.



**Fig. 1.** Year-on-year growth in corporate loans and its comparison with EU countries. [5]

Slovakia is one of the 3 countries within the European Union whose corporate sector shows the highest debt-to-equity ratio. Based on the chart, we can see that Slovakia reached the median level of the European Union in the first half of 2019. At the beginning of the year, loans grew at the same rate as in 2018, namely 5 %, but in June 2019 the year-on-year growth was only 3,5 % and in July 3,3 %. [5] Not all sectors declined, in some the volume of loans increased. The highest level of loans provided in the third quarter of 2019 was in the area of industrial production (20,1 %), real estate (19,5 %), wholesale and repair of motor vehicles and motorcycles (16,1 %). [7] A significant recovery occurred in the commercial real estate sector, which stagnated at the turn of 2018 and 2019. However, in the first half of 2019 the growth dynamics was above the sectoral average and formed a substantial part of the growth in loans to non-financial enterprises. On the contrary, there was a significant drop in construction, retail, information and communications.

In relation to interest rates, loans up to 1 mil € were at almost the same level as in the euro area (3,7 % p.a.) in 2012. Loans over 1 mil € were slightly higher (2,6 % p.a.) compared to the euro area (2,9 % p.a.) . Nevertheless, the volume of total loans this year remained above the median of the European Union. At the end of 2012 and the beginning of 2013, we can see the only decline in the volume of loans in Slovakia above the median on the chart. In this period, interest rates were around 4 % p.a. for loans up to 1 mil € and 2,2, % p.a. for loans over 1 mil €. A significant increase in corporate interest in loans began to manifest from the beginning of 2016. Interest rates began to fall more clearly (3,2 % p.a. – loans up to 1 mil €, 1,7 % p.a. – loans over 1 mil €). This was followed by relatively the same development until the middle of 2018, when Slovakia gradually approached the median of European Union. However, interest rates did not change significantly and in 2019 were around 3,3 % p.a. (loans up to 1 mil €) and 1,8 % p.a. (loans over 1 mil €). [10]



As stated by the National Bank of Slovakia, the end of the first half of 2019 brought a slowdown in the growth of corporate sector loans. Investment loans and loans to private enterprises had a substantial impact on the decline in the dynamics of corporate loans. Demand for loans has been affected by private sector concerns about further developments in the economy. [5] The rest of 2019 was also in gradual decline.

The established trend of a gradual slowdown in lending activity from 2019 continued only in January of this year, while the following months brought greater increases to the total volume of corporate loans. [9] The reason for the deepening of the attenuation was the COVID-19 pandemic, which was also reflected in this area. This was most pronounced in lending to small and medium-sized enterprises, for which the availability of loan financing has deteriorated. On the other hand, the interest of companies in drawing credit lines has increased. This led to an increase in total loans, which was mainly caused by large enterprises. However, these were only selected sectors, such as industry, accommodation services and car sales. This increase in short-term financing is highly concentrated and can be considered the first manifestation of the coronavirus crises in corporate lending. [9]

## **2.1 Loans conditions by banks**

Within Europe, banks' loan standards fell at the end of 2019. They overcame predictions that they would not change them. European banks have lowered standards and criteria for approving mortgages and corporate loans. The changes occurred in the third quarter and remained unchanged until the end of 2019. The ECB has already approved widespread incentives in the wake of the economic slowdown and growing fears of a recession, in the hope that by discounting the loans it provides to commercial banks, they will lend to the real economy even in times of weak economic growth. [14] Despite the fact that banks often complain about negative interest rates and their negative impact on loans growth, it was the negative rate for overnight deposits that contributed to the increase in the volume of loans. Demand for mortgage and consumer loans is projected to increase, but demand for corporate loans should remain unchanged.

In Slovakia, on the other hand, loan conditions were tightened in 2019, but for mortgage loans which entrepreneurs use rather sporadically. The situation is different in the corporate sector. Because of cooling of the economy, corporate loans grew at a slower pace. The debt-to-equity ratio is one the highest in the European countries, despite the decline. The result is a decrease in this indicator compared to the end of 2009 by 4 p.p. to 87,3 %. [6] Loans growth in 2019 first slowed down and then rise sharply by the end of the year. The reason is also the fact that companies can secure financing otherwise than a bank loan. The National Bank of Slovakia also states that the cooling of the offer has not yet translated into a more significant tightening of loan standards. For several consecutive quarters, banks have been setting expectations regarding the economic situation and prospects of the industry or company, including the creditworthiness of the company as factors with negative impact on credit standards. [6]

As a result of the coronavirus crisis and the increased interest in credit lines especially among large companies, there was a reduction in the supply of loans from banks. The main reason is the willingness of banks to provide loans in times of crises, but also the measures taken by the government. In addition to tightening loan standards, interest margins and the number of rejected loan applications increased. From the perspective of the credit standards themselves, there has been a tightening in all categories – amount of loan or credit line, required security, covenants and well as the maturity of loans. The tightening has not yet affected interest rates. [9]

### **3 Impact and development of interest rates**

The Slovak banking sector is dominated by a business model based on accepting deposits and providing loans. Trading is only a small part of activities. For this reason, banks are dependent on interest income, and therefore interest rates have a direct impact on their interest margins. Rychtárik (2017) distinguishes three periods of operation of business models in Slovakia:

- 1. period (2005 – 2011) – average interest rates were above euro area level, which enabled the banking sector to make higher profits,
- 2. period (2012 – 2015) – fall in interest rates to the euro area average; the profitability of the banking sector has been ensured through dynamic loan growth,
- 3. period (2016 – present) – legislative changes have prompted banks to retain clients, and so interest rates were depressed, which also reduced the profitability of the banking sector. [13]

#### **3.1 Causes for low interest rates**

The last financial crisis, which began in 2008 in the USA, was first resisted by Europe, but later its influence began to manifest itself in the euro area. The global economy has slowed, prices have risen sharply and inflation has grown. Despite the threat of an inflationary spiral, the European Central Bank has been undecided to cut interest rates. The crisis has deepened and caused a global credit crisis that has worsened access to finance for investors, households and entrepreneurs. The biggest impact of the crisis was manifested after the collapse of the investment bank Lehman Brothers. In Europe, a contingency plan has begun, under which banks have had to maintain larger capital reserves.

However, these problems started much earlier. Most analysts say that in the long-term perspective, this financial crisis was triggered by the wrong policy of low interest rates that the Fed, led by Alan Greenspan, chose after 2000. [4] Banks cut interest rates and relieved lending criteria at the instigation of a government that sought to prevent a global economic recession. The criteria gradually decreased until interest rates fell to 1 %, which led to madness in lending money. Investors made risky investments and banks has liberal attitude to provide loans. A price bubble formed, which peaked in 2005. The sobering eventually came in 2006, when FED raised interest rates to 5,25 %. [4] Interest

in loans fell and banks began to fail. It was not just the problem of the United States. The European Central Bank did also stimulus activities and reduced interest rates to support the French and German economies.

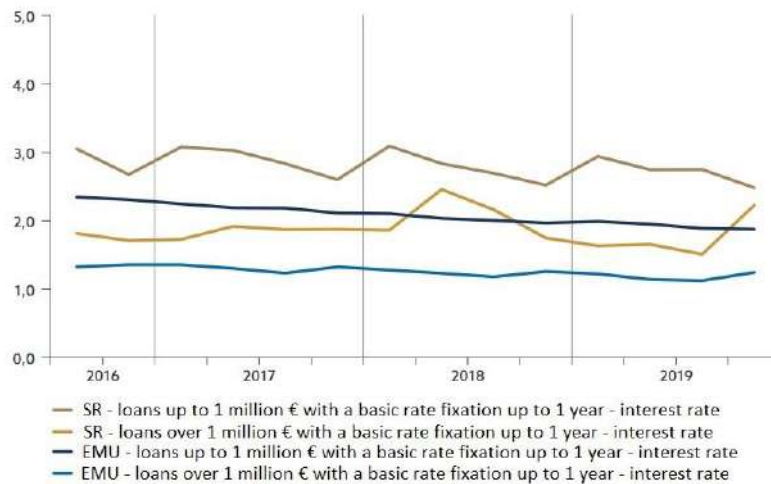
2009 was a critical year, as the worst results of financial indicators were achieved. Gross domestic product in the euro area declined. In an effort to stop the economic decrease, the European Central Bank has cut interest rates to a historic low of 1 %.

### 3.2 Current state of interest rates

In addition to the competition between banks, the European Central Bank also has an impact on the level of interest rates in Slovakia. At present, competition between banks is fierce. If one of the banks also tried to raise interest rates and thus their interest margins, a competing bank would take the opposite step, lowering interest rates to gain or retain a client. The European Central Bank, in turn, makes decisions about base rates that influence the decision of commercial banks. The key interest rate is considered to be the rate called Main refinancing operations. The change in official interest rates affects the interest rates on loans and deposits that banks set for their clients. By the end of 2008, interest rates were announced by the National Bank of Slovakia, but with the changeover to the euro, this task was transferred to the European Central Bank in 2009.

In 2018, a stable growth rate of corporate loans was recorded due to strong demand. This reflected the favorable economic situation and also the low level of interest rates. However, the first half of 2019 brought a slowdown in loan growth because of concerns about further economic development. The National Bank of Slovakia states that, interest rates on corporate loans did not change significantly during the first half of 2019 with value 2,45 % in June 2019. Looking beyond peripheral countries (Ireland, Greece, Malta, Cyprus), interest rates on loans from domestic banks are the second highest, but comparable to the Baltic countries. [5]

The chart below shows a comparison of interest rates in Slovakia and the euro area from 2016 to 2019. The chart indicates that the Slovak banking sector is one of the countries with higher interest rates. During the first half of 2019 the number of countries in which interest rates have risen has increased from two to six since 2018. The average interest rate on guaranteed loans remained unchanged year on year at average value 2,2 % p.a. The interest rate on new loans “total” provided to non-financial enterprises fell by 0,1 percentage point and in comparable period of 2019 reached an average value 2,0 % p.a. [8] In the last quarter of 2019, the greatest interest from companies was for short-term loans up to 1 year and loans up to 1 million €. The average interest rate for loans up to 1 million € was 2,5 % p.a., which is higher than euro area average (1,9 % p.a.). There was a decrease in the total volume for loans over 1 million. These loans had also a higher interest rate (2,2 % p.a.) than in the euro area (1,3 % p.a.).



**Fig. 2.** Interest rates on new loans to non-financial corporations comparison Slovakia and the euro area (% p.a.). [8]

In the first half of 2019, banks achieved increasing interest income in the corporate sector, due to the growth in the volume of loans as well as the growth in interest profitability. The halt in the decline in interest rates can be evaluated positively in terms of future sufficient coverage of risk margins, because banks narrow the range of interest margins, not only for average but also for riskier loans. Due to coronavirus crisis, banks have to reckon with higher costs the year, especially for credit risk, and they must also prepare for a decline in loan growth.

Interest rates have an important impact on financial stability. At present, interest rates are being cut again not only by the US but also by the European Central Bank. The European Central Bank keeps interest rates at zero to negative in order to stimulate and support the economy. And it will do so until inflation in the Eurozone reaches 2 %, which will take several more years. Keeping interest rates low in the long run has a very negative impact on financial stability. For this reason too, there are threats of another financial crisis, which should appear in the coming years. The next global financial crisis will hit in 2020, warns investment bank JPMorgan. 2020 may be the worst decade in US history triggered by a contagion from the global credit crisis. [15]

In the current situation of the coronavirus pandemic, the European Central Bank has decided not to raise interest rates, but to improve the conditions for providing long-term loans to banks.

### 3.3 Forecast of interest rates for the future

According to the June Eurosystem experts projections in 2020, the average level of short-term interest rates should reach -0,4 % in 2020, 2021 and also in 2022. [2] The three-month EURIBOR rate is used to measure short-term interest rates. Compared to

the March 2020 projection, these technical assumptions include the same interest rates. Compared with the projections made in December 2019, market expectations regarding interest rates were adjusted downwards only in 2022, where the interest rate shifted by 10 basis points. We can see this development in the table below.

**Table 1.** Technical assumptions of interest rate development. [2] [3]

	June 2020			March 2020			December 2019		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
<b>Three-month rate EURIBOR (in % p. a.)</b>	-0,4	-0,4	-0,4	-0,4	-0,4	-0,4	-0,4	-0,4	-0,3

The European Central Bank will keep interest rates at historically low levels until inflation in the euro area reaches 2 %. Inflation is expected to reach only 1,3 % by 2021, which is still well below the central bank's target. In addition, banks are still lowering interest rates on deposits, which are currently in negative numbers. The bank is trying to support the economy with low and negative interest rates. ECB president Mario Draghi announced a 10 basis point reduction in the deposit rate to -0,5 % from the previous -0,4 %. [11] The impetus for the reduction was a resumption of the decline in inflation in the euro area to 1 %.

With a negative interest rate, financial institutions are required to pay interest to the central bank on the deposit of excess reserves. The central bank thus penalizes financial institutions for holding cash in an effort to increase lending to companies and households. Some banks in Europe have already introduced negative interest rates for large depositors. In Slovakia, banks do not currently use them, but they are preparing for them in the future. The first bank should be UniCredit Bank, which plans negative interest rate deposits for depositors who have more than 100 000 € deposited in the bank. It is very likely that this trend will be followed by other banks and corporations.

## 4 Discussion

Whereas we still working on the research, in the paper we have presented partial results of the work, which are more or less based on already existed analyzes. These will form the basis for our research. In our research, we will focus on defining the impact of low interest rates on the allocation of assets in manufacturing companies and thus demonstrate a possible correlation between the current situation of low interest rates and investment decisions of companies. The subject of the research will be manufacturing companies from three selected industries, namely the automotive, electrotechnical and information and communication industry. The reason for choosing these sectors is their current importance within the country's economy and the potential for their development towards the future. We are currently working on the selection of suitable companies for research, through the examination of financial statements and

the use of financial analysis methods. The result should be a sample of 30 companies, in which we will examine the correlation between the current situation of low interest rates and investment decisions of companies, so that we can formulate appropriate conditions and periods of development in financial markets that work to achieve quantitative or qualitative result of companies.

## 5 Conclusion

In Slovakia, the role of the banking sector is irreplaceable, as bank loans are among the most used debt sources of corporate financing. Interest in corporate loans is growing every year. The reason is the state of the banking sector, where prevail high competition between banks and low interest rates. Interest rates are at historically low levels and are not expected to rise significantly in the coming periods. The reason is the decreasing inflation, which is below the set limit. For these reasons, it is appropriate to analyze whether the current conditions of low interest rates affect the investment decisions of companies. Based on the analysis of a sample of selected Slovak companies, it is possible to examine the correlation between the current situation of low interest rates and investment decisions of companies.

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## Study of IoT and its perspectives in practice.

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**Abstract.** The article deals with the use of intelligent technologies in teaching the management of smart homes, smart cities using the open-source platform Arduino, based on the ATmega microcontroller from Atmel and a graphical development environment based on the Wiring environment. Using this technology, it is relatively easy for students to get closer to the IoT area and outline the possibilities of its economic advantage. Due to the fact that we are only introducing this area at our department now, we have developed a teaching aid that will introduce students to the possibilities of working with a microcontroller, its programming, connecting a wide range of sensors and powerful devices in the form of various types of motors, lights, pumps, etc. With the help of the teaching aid, we can simulate real situations taking place in houses and the reactions of a smart house to them, while we can take measurements of how much energy we save if a smart device takes care of our comfort. During the development of the teaching aid, we worked closely with the company iManagement s.r.o., which has long been dedicated to the development of devices using the open-source Arduino platform.

**Keywords:** IoT, Smart home, Arduino.

**JEL classification:** M15

### 1 Introduction

In the past, the primary function of the Internet was communication. The Internet has allowed users to interact with each other. Most people still use the Internet to communicate and obtain information. Users can log in to e-mail or social accounts that they have on the Internet and through them they can communicate with each other, send photos, videos, etc.

The Internet of Things (IoT) extends this purpose - the connection - to the inhuman. The same Internet technology, which sends packets of information from one IP address to another and allows people to collect and send information, may have similarly connected small devices for collecting and sending information. The easiest way to



define IoT is a collection of different devices connected to the Internet. The Internet of Things (IoT) is now widely known to the general public and is generally used to refer to any device connected to the Internet, where each device can communicate with others via the Internet and store feedback information to a central node. The history of IoT is debatable, no one can tell for certain where and when it started, but today we see it in everyday life in the form of smart phones, computers as well as smart refrigerators, or in the home, for example, simply turning on the lights. Basically, if something works on electricity, it can be connected to the web. To sum up, the Internet of Things is now found from households to all sectors of the economy and is still expanding as more and more companies realize the great benefits of this technology.

With the increasing availability of faster and more reliable broadband, and especially with the expansion of 5G networks many devices will be equipped with a standard WiFi connection. The Internet of Things is already penetrating our daily lives and changing our habits. Cars can sync with appointment and scheduling calendars, and smart assistants turn shopping into conversations. Sophisticated weather monitoring systems monitor natural disasters, give warning of impending earthquakes, tsunamis, hurricanes, tornadoes, and floods.

So far, the most engaging Internet of Things application can be found in an industry where artificial intelligence (AI) is fundamentally changing the way we do business. IoT is increasingly focusing on interconnected factories, assets, and industrial ecosystems. The data generated by the connected devices can provide the company with essential information, such as the real-time performance of the assets, how agile the supply chain is and how the products are used. They can even predict the risks of when and under what conditions can something go wrong. Such data management and analysis platforms can help process sensor and machine data from connected assets in real time, helping to predict key results. Manufacturers are able to improve the production process and the entire logistics. Several different sensors help monitor production processes, detect errors in time, smart cities help reduce waste and energy consumption, etc. IoT devices also have many uses for consumers. We can use smart TV to share, for example, videos from our mobile phone. But the house can also be connected to a mobile phone for other reasons. For example, it can be used as a remote control and user interface to adjust heating, heat recovery, fire warning, or to control lights, dim-outs, or other devices.

The scope of the Internet of Things is constantly expanding, and smart home assistants are experiencing a boom. It is for this reason that we decided to create a teaching tool, through which students can get acquainted with this issue and transform their knowledge into practice.

## **2     Arduino Development Environment**

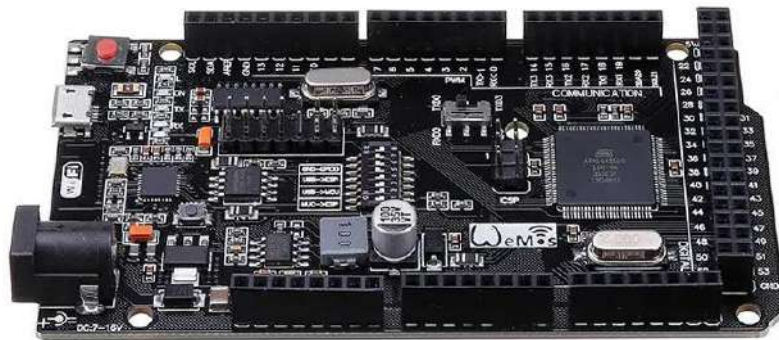
Arduino is an open-source electronic platform based on Atmel's ATmega microcontroller and a graphical development environment based on the Wiring platform. This platform was created at the Ivrea Interaction Design Institute as a simple tool for rapid prototyping aimed at students without deeper knowledge of electronics

and programming. Using Arduino, it is possible to read inputs from various sensors, send messages, display measured data, or activate them on the device outputs, set their values, or publish them on a suitable operator interface.

Thanks to these features, this platform has attracted a lot of fans who bring new ideas and solutions every day, which also makes it easier for beginners to develop their devices. A very rich source of information is available at the [arduino.cc](http://arduino.cc) website, which is a homepage of all Arduino enthusiasts, people who are interested will find many tutorials, trainings, a community forum and last but not least, Arduino IoT Cloud, whose use could be a continuation of this project. This project is also inspired and draws on a wealth of published ideas.

From the point of view of students' teaching there is a lot of literature available in English, but also two very good publications in Czech. The first is: "Arduino – Uživatelská příručka" [1] and the second, which is additionally free to download in pdf format, is: "Průvodce světem Arduina", 2nd edition [4]. These publications have also served in the development of the teaching aid.

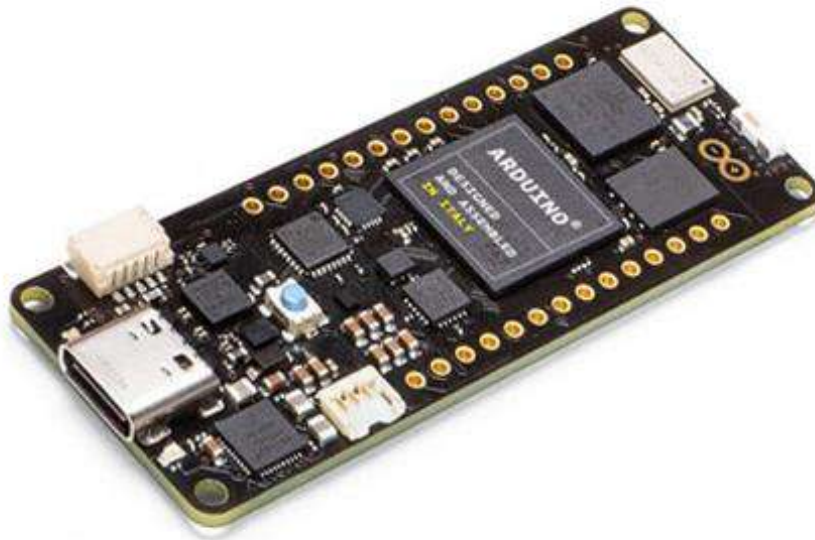
As Arduino became a phenomenon among developers, it began to change to accommodate new needs and challenges, offering a variety of clones from simple 8-bit boards to products for IoT applications. In this work, we experimented with the Arduino Mega2560, which we connected with the WiFi module ESP8266-01 and the WeMos board, which includes both devices on a single board (see Fig. 1).



**Fig. 1.** WeMos Arduino MEGA2560 with built-in WiFi ESP8266 - own elaboration.

An advantage is also the development environment, which works on various operating systems from Windows OS, through Mac OS to Linux. For complete beginners, there are even puzzles-like development environments that enable even a child learn to program Arduino easily. In addition, the open-source platform allows you to create your own Arduino clone with additional modules to create a target device, which can significantly reduce project costs. But even if the developer will use Arduino, or its countless clones, it will still be a very cheap platform, costing a few tens of euros at the most.

Until recently, the disadvantage of Arduino was that it could only be used for study and experimentation purposes, but this platform could not be used in areas where very reliable equipment is required, such as healthcare and many industries. This changed a short time ago when certified hardware was launched that is ready for a manufacturing process designed for demanding industrial control, AI and robotic applications. It is a new Arduino Portenta H7 (see Fig. 2) programmable using high-level languages and AI when performing low-latency operations.



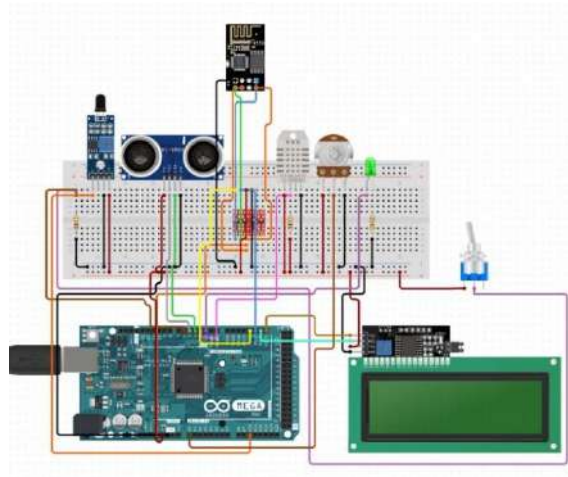
**Fig. 2.** Arduino Portenta H7 - own elaboration.

With two asymmetric cores to simultaneously run high level code such as protocol stacks, machine learning or even interpreted languages like MicroPython or JavaScript along with low-level real time tasks. The new device also has a significantly expanded number of inputs and outputs compared to the previous Arduinos. To make it easier to connect the mobile internet of things, Arduino has introduced SIM plans for easy global mobile internet of things for Arduino IoT Cloud projects. The Arduino SIM card is ideal for connected devices on the road or in areas without a reliable Wi-Fi connection. The Arduino MKR family offers a range of microcontroller boards with integrated connectivity options, including the Arduino MKR NB 1500 - which includes 5G-ready LTE Cat-M and NB-IoT support. [2]

### 3 Teaching aid

To develop the teaching tool for IoT, we used the online development environment on the domain <https://www.circuito.io/> to test its advantages and the possibility of its use in further expansion with new modules. Working with it is very simple. [3] The user only chooses the type of Arduino and from the number of available modules he chooses the ones he wants to use. For demonstrational purposes of this article (see Fig. 3) the following modules have been added to the Arduino Mega2560:

- infrared flame sensor
- ultrasonic sensor
- WiFi ESP8266-01
- humidity and temperature sensor
- rotary potentiometer
- green led diode
- power switch
- lcd display 20x4 I2C



**Fig. 3.** Circuit diagram created on circuito.io.

We designed the learning tool to be variable and easy to change and add modules, so the software contains parts of the code for more of them. By simply uncommenting and loading the code to Arduino and connecting the module, it becomes functional.

The online development environment is also very helpful in creating sample codes, as it immediately creates sample code for each added module that a person simply downloads and edits with the Arduino IDE. (see Fig. 4)



```

AnalogInput | Arduino 1.8.12
Súbor Editovať Projekt Nástroje Pomoc

AnalogInput$

// Include Libraries
#include "Arduino.h"
#include "DHT.h"
#include "ESP8266.h"
#include "NewPing.h"
#include "LiquidCrystal_I2C_PCF8574.h"
#include "Potentiometer.h"
#include "RGBLed.h"
#include "Button.h"

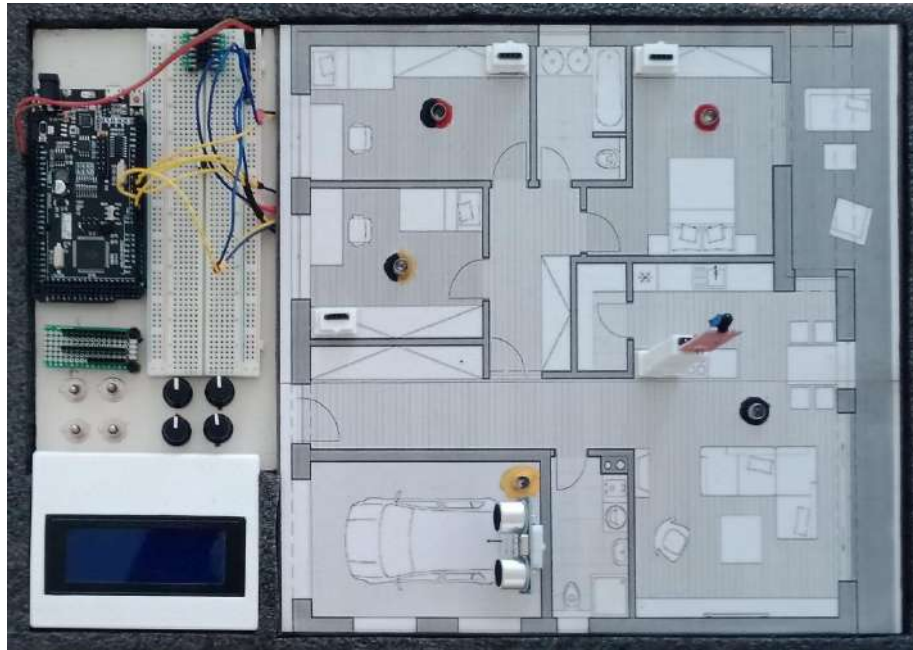
// Pin Definitions
#define DHT_PIN_DATA 5
#define HC_SR04_PIN_TRIG 7
#define HC_SR04_PIN_ECHO 6
#define IRFLAME_5V_PIN_AOUT A10
#define POTENTIOMETER_5V_PIN_SIG A0
#define RGBLED_PIN_B 2
#define RGBLED_PIN_G 3
#define RGBLED_PIN_R 4
#define TOGGLESWITCH_PIN_2 8

// Global variables and defines
// =====
// ***** ENTER YOUR WI-FI SETTINGS *****
//
const char *SSID = "WIFI-SSID"; // Enter your Wi-Fi name
const char *PASSWORD = "PASSWORD"; // Enter your Wi-Fi password
//
// =====
char* const host = "www.google.com";
int hostPort = 80;
// There are several different versions of the LCD I2C adapter, each might have a different address.
// Try the given addresses by Un/commenting the following rows until LCD works follow the serial monitor prints.
// To find your LCD address go to: http://playground.arduino.cc/Main/I2cScanner and run example.
#define LCD_ADDRESS 0x3F
// #define LCD_ADDRESS 0x27
// Define LCD characteristics
#define LCD_ROWS 4
#define LCD_COLUMNS 20
#define SCROLL_DELAY 150
#define BACKLIGHT 255
#define rgbLed_TYPE COMMON_ANODE

```

**Fig. 4.** Sample code generated on circuito.io.

We have designed the prototype of the teaching aid itself (see Fig. 5) to show a plan view of an imaginary house with an LED in each room. They are lights that can be controlled remotely via a web interface or also switched using a sensor in automatic mode. They can be supplemented with other elements such as various motors, relays, solenoids, etc. A 20x4 I2C LCD display is also added to the set to add functionality.



**Fig. 5.** Prototype of the teaching tool - own elaboration.

The smart home model was used because it allows for testing a number of different sensors, which can be used in other areas as well. Sensors of temperature, humidity, precipitation in meteorology, for example, sensors of various gases in industries, heart rate sensors, or ultrasonic sensors in healthcare. The parking sensors on cars can be used just as well to monitor the occupancy of car parks in cities. The ideas that we can implement in a smart home can therefore be used in a wide range of human activities and needs. If we expand the source code, or connect measuring devices, we can also monitor the real savings on our interface, which we will get thanks to the intelligent management of our imaginary house. After being translated into practice, students can in the future, based on the acquired information and habits, program energy-efficient houses, which will also greatly enhance the experience of using such houses.

In order to control and monitor the learning tool wherever there is an internet connection, we have created a simple PHP website using MySQL, which records sensor values and displays them in the "operator panel" while it also enables setting up devices, switch on or off and also send a message to the lcd display (see Fig. 7).

To connect to the database, a simple `database_connect.php` file is created, in which we must enter the database server address, user name, password, and database name. This information is usually obtained from the hosting provider for our domain. Depending on the location of the teaching aid, we need to change the Arduino file, where it is necessary to define the WiFi SSID and its password.

**IoT in practice - teaching aid**

**Boolean control**

Active ID	Light control 1	Light control 2	Light control 3	Light control 4	Light control 5
99999	OFF	ON	OFF	ON	ON

**Numeric controls**

Actuating device 1	Actuating device 2	Actuating device 3	Actuating device 4	Actuating device 5
0 <input type="button" value="CHANGE"/>	150 <input type="button" value="CHANGE"/>	0 <input type="button" value="CHANGE"/>	0 <input type="button" value="CHANGE"/>	0 <input type="button" value="CHANGE"/>

**Send Text**

Text:

**Boolean Indicators**

Active ID	Indicator 1	Indicator 2	Indicator 3
99999	Active	Active	Active

**Integer Indicators**

Received number 1	Received number 2	Received number 3	Received number 4
327	1212	3233	1313

Fig. 7. Web interface – control panel - own elaboration.

## 4 IoT in practice

Access to low-cost sensors, microchips, the development from ipv4 to ipv6, and the constant development of connectivity and cloud processing technologies have become the foundation of IoT. In addition, we should mention advances in artificial intelligence, machine learning and deep learning. These are all the basic pillars that have made what we know today as the Internet of Things possible.

Thus, we can simply classify the Internet of Things as the ability of devices to communicate with each other without human intervention. Such functionality allows continuous monitoring and measurement of various elements via a data network connected to the Internet. Thanks to such a system, it is possible, for example, to find out when a device, or its component will need to be repaired or replaced. Another option is to turn things into service providers.

Sensors and microchips are installed in specific devices and from there the collected data is transferred to an application that is connected to the Internet, this data is stored, processed, analyzed, and shared in the cloud. The Internet is not always needed for



communication between two devices, it can also be done via private networks and Bluetooth systems. After the "things" collect the data through their sensors, they are grouped and transmitted to an interface where the user can make decisions remotely. The features of this technology become even more interesting when combined with machine learning algorithms. After a few inputs, the devices are able to learn and analyze behavior, and therefore make their own decisions based on user preferences. Here, as well, home management systems are a great example of how this works. Devices such as electronic gatekeepers, thermostats, TVs, audio equipment, etc., are equipped with sensors and the data they collect are evaluated by an application in which the user can choose his preferred settings such as room temperature, favorite programs, music, home arrival time, etc. With these inputs, devices gradually begin to learn about the preferences and routines of their users, and over time, decision-making becomes automatic. Thermostats are beginning to adapt to the ambient temperature that the user likes best, the TV turns on the user's favorite programs, audio devices recognize the music genre and the times when they should turn on according to the user's preference. In this way, the performance of tasks is adapted through machine learning.

## 5 Conclusion

The range of things that can be interconnected is plentiful, so there are many options for IoT. The use of technologies such as IoT is becoming a necessity in industrial facilities. Industries are increasingly introducing these technologies into their operations and are gradually finding new uses for them.

Thanks to the high interconnectedness of these elements, we now have control over metrics that help predict failures and problems in the production line, making the troubleshooting process faster and more flexible. With a sensor-powered database, we can then have the information to find an alternative and explore management processes with maximum efficiency to avoid possible errors.

The Internet of Things is already used in various areas of industry and can be commonly used to carry out logistics management, soil quality monitoring, production data acquisition, product status, traffic management in smart cities. These are just a few examples of areas that use intelligent data networks and explore its functionality in their processes.

A good example for gaining an idea of the rate of increase in the use of the Internet of Things in recent years is the increase in access to smart city technology, where systems connect entire cities, manage their electricity grids, supply chain and public maintenance processes. Healthcare is also one of the areas where there are high expectations for the spread of IoT sensors.

We can say that the use of IoT systems is already very common and will soon be a prerequisite for industry. Norton estimates that 11.6 billion devices will connect to the Internet by 2021, and by 2025 this number should exceed 21 billion IoT devices. It is now up to the industries to adapt to the new scenario and to strive to improve the processing capacity of this data generated by the devices, and it is also necessary to look for new forms of use and optimization to achieve better performance and results.



Nowadays, there are many technologies that are part of the Internet of Things, such as self-driving cars, smart homes, smart cities, and various artificial intelligence applications. They simplify our lives and bring us luxury, but at the same time they are becoming a threat to Internet security. Many devices have default passwords that cannot be changed because these devices have only basic controls, but no interface to change settings. Such elements of the Internet become a potential back door to the entire local network to which they are connected. Tighter regulations and tighter security controls will play an important role in our future of the Internet of Things. There are also ethical questions about the use of IoT. The more devices we use for our activities, the more sensors that will monitor our ways and habits, the more privacy will be compromised. In any case, the Internet of Things is becoming an integral part of our everyday life and needs to be addressed, hence we have created this learning tool to help students try out different input and output modules, discover weaknesses and imperfections, design new solutions and investigate their impact and threats on users themselves.

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## Communication Policy of a Company

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**Abstract.** New technologies, such as internet, are leading businesses to move from mass communication to specific communication, as well as to individual dialogue with individual customers and other stakeholders. Important decisions for achieving an effective communication policy of the company are important to choose the target group of customers; determine the objectives of the communication; to present the idea of a report that will be communicated; identify effective communication tools; submit a budget for the implementation of the communication; choose the right combination of communication mix; have results under control and also manage the entire integrated communication process. The aim of the theoretical research is to point out the importance of communication policy through literature and scientific articles, and its importance in marketing. With the theoretical article, we draw attention to the fact that the communication policy of the company is influenced by the constant changes of modern times. It is only in the interests of businesses to adapt to changes in order to remain competitive.

**Keywords:** marketing, marketing mix, communication policy

**JEL classification:** M31, M37

### 1 Introduction

Marketing is considered to be a matching process, that joins the customer needs and the capabilities of a company. The main importance of marketing is to create and provide unique value to customers and build a sustained competitive advantage.[18]

Modern marketing requires more than just the development of a quality product, its attractive price and availability. Companies should mainly focus on communicating with all potential stakeholders as well as the general public. For most companies, the problem is not the communication itself, but rather to define the idea of communication, to whom to dedicate it and how often. [14]

Chaong claims, that a marketing mix is originally from the microeconomic theory from the “single P”, by which we mean the price. McCarthy considers the marketing

mix as a tool for transferring marketing planning into practice. [7] The marketing mix consists of advertising, sales promotion, public relations, personal sales and direct marketing. The product itself has a certain style, price, shape, color of packaging, method of packaging, the mentioned elements communicate with buyers. In fact, every contact with the brand creates an impression that can affect the customer's view of the company. For this reason, the entire marketing mix must be integrated to provide consistent information and enable strategic placement. [14] So the marketing mix is not considered as a scientific theory, but as a conceptual framework, that is formed by principal decision-making managers during configuring offerings to suit consumers' needs. Mentioned tools can be used to develop long-term strategies as well as short-term tactical programs. [5]

Nowadays, successful businesses just do not ask, "How can we reach our customers?" but unlike in the past, they mainly ask themselves, "How can our customers reach us?" Sellers use a variety of communication tools to stay in constant contact with their customers. However, newer technologies in particular are coming to the fore, such as internet, which is encouraging more and more businesses to move from mass communication to more targeted communication, and to individual dialogue with customers and other stakeholders. In order for the communication policy to work effectively, it is important to realize, that it is necessary to identify the target group of customers in the first place; set communication goals; to propose the idea of a report to be communicated; select appropriate communication channels; determine the total budget needed to realize the communication; decide on the right combination of communication mix; measure the achieved results and ultimately manage the integrated communication process. [14]

In the following theoretical research, we will focus on the company's communication policy as a sales tool. Through literature and scientific articles, we determine the basic concepts, thanks to which we will better understand the mentioned issues.

## **2 Literature Review**

The term communication policy can be understood as a comprehensive system of communication methods and means through which the company can influence the shopping behavior of customers in order to realize the goods on the market. [23] In the literature we also come across a term sales promotion policy. [27]

Communication policy serves to support the marketing process. It is used to inform potential customers and business partners about the availability, benefits and costs associated with the company's products and services and to manage relationships with mentioned key stakeholders. [19]

Communication policy is implemented, according to the marketing literature, thanks to several components that together form a communication mix. [20] The internal composition of the communication mix can be structured in various ways and the choice is based on the hierarchy of importance, action parameters of individual tools, the relationship of complementarity and substitution, as well as the flexibility of their

use. [15] The basic components of communication policy in the marketing mix are shown in the following figure.



**Fig. 1. Components of communication policy in the marketing mix**

Source: according to Labská, H.: Marketingová komunikácia. Vydavateľstvo EKONÓM, Bratislava (2014).

In addition to the basic tools mentioned above, event communication also belongs to the communication mix. We also know event marketing under the name event marketing, or experiential marketing, which seems to signal future new tools of the communication mix. Event marketing provides marketing information in conjunction with participation in a prepared event, usually targeted at the experience of survival. [12]

According to Karlíček and Král, the communication mix includes seven main communication disciplines. These include advertising, direct marketing, sales support, public relations, event marketing sponsorship, personal sales and online communication. Each communication discipline includes more or less communication tools (or media) from which companies can choose. Often, one primary medium or tool is specified, and only then several secondary media or tools are selected. The choice of communication mix is influenced not only by communication goals, but also by the character of the market in which the company operates. For example, companies selling in consumer markets typically communicate with consumers in a combination of television advertising and sales promotion. [13]

According to Foret, the communication mix is traditionally based on the following four basic tools: advertising, as a paid form of extensive and impersonal presentation

of the offer in the media; o sales promotion, which are short-term incentives to increase product purchases; o public relations as the creation and development of good relations with the public, mainly through active publicity in educational environments; o personal sales represented by direct personal communication with potential customers. Since the 1990s, promotion has been reinforced by a range of tools and principles of direct marketing and, where appropriate, by the use of electronic means, including internet. [10]

Although the individual opinions of the authors differ slightly, they pursue the same goal, where marketing communication represents a controlled persuasion of target groups about the benefits of the products or services offered. [12]

### **3 Aim and Methods**

The aim of the theoretical research is to point out the importance of communication policy as a sales tool through literature and scientific articles. It also points out its importance in marketing.

The subject of the theoretical research are individual tools of communication policy, which help in the sale of products and services. We focus mainly on sales support, public relations, advertising, direct marketing and personal sales. We will use available domestic and foreign sources to analyze the topic, which describe the individual tools in more detail. With the help of the obtained information we get to the theoretical elaboration of the issue.

To develop a theoretical search, we used basic scientific methods such as: analysis, synthesis, generalization, comparison, as well as induction and deduction. From the obtained information, we have created a significant base of theoretical knowledge about the company's communication policy.

By elaborating the mentioned issue, we came to the following research questions:

- What are the goals of the company's communication policy?
- What tools does the sales promotion communication policy have?
- What is the impact of using the Internet on product sales?

We answered the research questions in the following part of the theoretical research.

### **4 Results**

The role of communication policy is to influence the customer so that sales barriers are removed. It offers extensive information to individual customers about products in order to convince them that the offered products will satisfy their needs. Communication policy has several functions. It points out how individual products are used, how they are handled, in order to bring businesses to the attention of consumers. It helps to integrate the company's brand into the company, to place it on the market in a faster and more efficient way. If a company does not have a sufficiently developed communication policy, it is exposed to excessive competition in the market, which leads to markets becoming opaquer for the company. [31] Therefore, in the next part of

the theoretical research, we will answer research questions in which we will address exactly what communication policy should look like as a tool for selling products and services.

- What are the goals of the company's communication policy?

Goal setting is always one of the most important managerial decisions. It must be based on strategic marketing goals and clearly aim to strengthen the company's reputation. Other factors influencing the setting of goals is the character of the target group on which the communication policy is focused, as well as the stage of the life cycle of the product or the brand itself. The traditional goals include:

1. providing information
2. creating and stimulating demand;
3. product differentiation;
4. emphasizing the benefits and value of the product;
5. stabilization of turnover;
6. building and growing a brand;
7. strengthening the company's image.

The basic function of the communication policy is to inform the market about the availability of the selected product or service, to provide all target groups with a sufficient amount of relevant information. A significant part of the activities is currently focused mainly on providing information to potential customers. The primary goal of most activities is to create and subsequently increase demand for a brand of a product or service. Successful communication support can increase demand and sales without the need for price reductions. This type of communication often goes into the field of education, whether medical, economic or otherwise; for example, stimulating demand for organic products as part of a healthy nutrition campaign, or stimulating demand for wellness services as part of a modern lifestyle. By product or business differentiation we mean the concept of differentiation from the competition. The homogeneity of the offer means that the customer considers products of a certain category to be identical regardless of the manufacturer, such as soaps, shampoos. In this case, companies have little chance of managing and purposefully influencing variables such as product price. However, differentiation allows more freedom in marketing strategy, especially in pricing policy. The prerequisite is a long-term and consistent communication activity that teaches customers the unique features of the products or the company itself. The aim is to build positive associations in the minds of consumers, which they associate with the product or company brand. Emphasis on the utility and value of a product means showing the benefit of owning a product or receiving services. In this way, a product or service can also gain the right to higher prices on a given market. The combination of characteristics (benefits and values) that usually represent well-known brands entitles a group of producers to set prices that are usually too high for products that do not yet have such tough competitive conditions in newly formed markets. More and more retail outlets are shaping their faces and focusing on a certain layer of customers, offering them a better targeted product to suit their specific needs and desires. Turnover is not a constant. Changes in sales are mostly due to seasonal

purchases, cyclical or irregular demand. For the manufacturer or distributor, the irregularity of demand, during the year, means the pressure to increase production, storage and other costs. The aim of the communication policy is to compensate for the mentioned fluctuations as much as possible and thus to stabilize the above-mentioned costs in time. Communication policy creates brand awareness, strengthens brand knowledge, influences customers' attitudes towards the brand in terms of creating unique and favorable associations. The result is the creation of a positive brand image and a long-term relationship among the brand and the target group of customers. The image of the company significantly influences the thinking and actions of customers, even the whole public. This creates ideas and opinions about the company, and on the basis of them they act, for example, prefer or ignore the products of a certain company. Strengthening the company's image requires unified and consistent communication of the company in the long run. It is recommended to use the same symbols that create positive associations in the minds of customers and to anchor the corporate brand to the keywords that customers associate with the brand. An example is the car manufacturer Volvo, which is associated with the word "safety". [25]

We can therefore generalize the ideas to the opinion, according to Labská, that the goal of communication policy is mainly to influence behavior. Every business wants to provide information that activates customers to choose and purchase products. For this reason, efforts are focused on encouraging existing attitudes, in order to build preferential behavior to change past attitudes of the target market. [15]

- What tools does the sales promotion communication policy have?

The tools of the communication mix include: advertising, sales support, public relations, personal sales and direct marketing. One of the most used and widespread tools of the company's communication policy is advertising. It is also considered one of the oldest sales activities. With the development of communication and information technology and the market, it has evolved into its current form. Advertising is still undergoing major changes. We consider the basic fact that customers demand more possibilities of interactivity and integration from communication tools. This is based on the fact that customers are currently much more demanding and want to have more information and suggestions from manufacturers and retailers in their purchasing decisions. By advertising we can understand a paid, impersonal form of communication through various media, especially mass action. Advertising plays a major role especially in creating and also strengthening awareness of the brand or product, with the intention of making a positive decision to the target group of customers. Various traditional advertising means are used to spread advertising, namely mass media such as radio, print, TV, outdoor advertising such as posters or billboards, leaflets, logos, advertising signs, as well as new e-advertising means related to the digital revolution and smart technologies such as social networks, blogs, video sharing sites, discussion forums, mobile devices and more, within the B2C and B2B context. [24,26,28]

Due to the oversaturation of customers with advertising and the growing interest of consumers in sales, the importance of another communication tool is growing - sales support. Sales promotion is a short-term business incentive causing immediate or more incentive to buy, as they are usually challenging. Sales support can take various forms,

namely consumer competitions, price advantages, free samples, additional attractive offer, at prices at the level of own costs, customer clubs, loyalty programs, etc. [6,17,30]

Another tool is personal selling, which ensures the acquisition of the customer through a direct and personal (face to face) dialogue between the buyer and seller. This form of communication policy is considered to be the most convincing, but also the most financially demanding. Unlike advertising, it allows immediate feedback. When overcoming sales problems respectively to support sales, it is possible to use steps leading to the construction of a positive corporate image using the following tool of communication - public relations, or otherwise called public relations. In a broader sense, we can understand the relationship with the public, not only the relationship to potential or existing customers, but the relationship to all market entities and interest groups of the company. The main task of public relations is, in particular, to increase the image and improve the image of the company in the eyes of the public through various measures of communication policy, thus indirectly stimulating demand for products. The measures within the mentioned area of communication policy include:

- financial support for public affairs (sponsorship, charitable donations),
- systemic provision of information to the public (annual reports, press conferences),
- communication with the media,
- publishing of business magazines, etc. [20]

The direct marketing tool within communication primarily uses telephone communication, number shipments, websites, email and other methods of impersonal contact, ensuring flexible delivery of information and obtaining direct responses from customers and a survey of their opinions. The mentioned form of communication has a huge potential especially in connection with the Internet and e-commerce. [20]

We can come to the conclusion that the classic tools of communication policy include personal sales, advertising, sales support, direct marketing and public relations. Some authors also enrich the five tools with event marketing and sponsorship.

- What is the impact of using the Internet on product sales?

Currently, the use of internet in the field of product sales is receiving significant attention and due importance, especially due to the enormous potential to develop this area of business. Today, the internet is considered as an integral part of humanity, as well as businesses, which serves mainly as a mean of communication, entertainment and business opportunities. [20]

According to Fedorko, the Internet represents one of the most revolutionary changes in the field of communication. It is not only a new revolutionary tool of communication, but also a fundamental revolutionary tool for communication. The Internet is the first medium to enable communication among multiple entities ("many-to-many"). [9]

According to Slevin, the Internet is a global network of interconnected computer hardware and software systems that enables storage, retrieval, circulation and processing of information and communication in time and space. [29]

The Internet is therefore considered to be a medium whose global impact on trade, marketing and communications has not yet been surpassed by any other type of



medium. Through development, the availability of the spread of the popularity of the connection, the Internet has become an important part of individuals, businesses, organizations and communities. [8]

Confronted with traditional communication media, it provides better targeting of the communicated message. It also has a rich set of communication tools, which we divide into two groups. The first group presents traditional forms of e-marketing communication, which include: website, contextual advertising, banner advertising, search engine advertising, PPC advertising, E-catalogs, e-mail marketing, public relations. The second group of new forms of e-marketing communication includes: related websites, affiliate programs, professional portals and discussions on the Internet, microsites, advergaming, viral marketing, blogs and social networks. [8]

The internet is a space for creating communities. This is the so-called social networks. Community / social sites such as Instagram, Facebook, Youtube, Twitter, LinkedIn, etc., are formats in which communication is created by the users themselves. Platforms give them the opportunity to discuss with each other, participate in various projects, activities, etc. From the point of view of communication policy, they enable companies to create product / company profiles on community servers, organize informal market research, obtain a database mainly used for advertising purposes or supervise the discussion of products / brands. Social networks are not only a way to communicate with individual customers, but also a space for the implementation and monitoring of communication among customers, while bringing customers a significant influencing role. [11,16] Customers rely on each other to obtain authoritative information about offers and adopt common influential behaviors to mitigate perceived risks and reduce their reliance on corporate communications. [2] For example, online reviews play an important role as the main source of information about services and products. [1,21,32] The interaction of customers can lead to their negative behavior through online networks. [2]

According to Cambridge dictionary, social networks allow people to communicate with each other and share information. Businesses are increasingly using social media to market their products. [4]

Social networks are common part of life in Slovakia as well, but commercial and state institutions are increasingly aware of the need for communication through them. While it's still not the case that social networks aren't sales-oriented, they strengthen the image. We can therefore say, that it is not about advertising, but rather about public relations. [22]

The popularity of social networks is growing every day, not only among the young population, but also among the older economically active population. Social networks connect communication, contacts (personal and business), create a space for the existence and sharing of blogs, videos, emails, chat and applications and opinion groups. Within marketing, they enable highly effective use - they help attract new customers, strengthen contact, build positive relationships with the public, also promote products, news, brand promotions, etc. [3] In the future, social networks are expected to become a new sales channel, currently used mainly in various types of marketing. Social networks are the focus of those business entities that tend to new ways of

communication and offer those products or services that have the ability to attract Internet users. [8]

Based on the mentioned statements, we can conclude that for companies the use of the Internet is an inseparable part of everyday life, and at the same time they build a strong competitive advantage through it, not only in the field of marketing. It is up to every business to be effective, through the internet, being able to sell their products and services. Social networks represent a potential that is expected to form a strong sales channel in the future. Whether companies will take advantage of this opportunity and adapt to the changing marketing environment is a question that only they will be able to answer.

## 5 Conclusion

Through professional literature and scientific articles, we have defined communication policy as a sales tool, thus fulfilling the main goal of the theoretical research. We have also provided answers to these questions, highlighting the objectives of communication policy; described more in detail the individual communication tools and their place in communication policy; and finally, we drew attention to the need for companies to use the internet in a modern marketing environment. In theory, we have pointed out that if businesses are to remain competitive in the future, they will need to operate online. An example is the current situation with the Corona virus (COVID-19), which has caused most businesses to stop. A significant part of sales is realized online. Based on the mentioned facts, we can say that companies cannot operate without modern elements of communication policy. They must look for a way to further development, and that is the Internet and the potential of social networks.

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## The importance of Eco-innovations with focus on eco-innovation index

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**Abstract.** The population of the planet is growing exponentially, and this brings with it greater demands to secure this population. This is associated with greater production, which burdens the planet and damages the environment. Nowadays is important to focus on sustainable development and making environmental positive progress. This progress can be done by companies, states, households, or anybody who has interest in making this world a better place. We can achieve this progress through eco-innovation, which plays a very important role to protect the environment. Benefits of the environmental innovation are visible during the production of a good or its aftersale use. This paper contains clarification of the concept of eco-innovation, its importance in today economic and environmental situation, barriers to faster deployment and development of eco-innovation for companies, drivers that could accelerate the introduction and development of eco-innovation and eco-innovation index.

**Keywords:** Eco-innovation, Green-innovation,

**JEL classification:** F6, Q5

### 1 Introduction

“The key to achieve a sustainable development strategy lies in balancing the relationship between economy and environment.”[1] Under the term Green innovation or Eco-innovation is meant that enterprises produce new services or products, or processes which ones deal with environmental issues. It has the positive impact on the environment. Environmental consequences will be reduced through new environmental products and processes.

## 2 Eco innovation

According to the European Commission, eco-innovation is any innovation aimed at making significant and visible progress towards the goal of sustainable development, by reducing environmental impacts or achieving a more efficient and responsible use of natural resources, including energy.

Green-innovations or Eco-innovations have been dealt with by experts only in the 90s of the 20th century and society, respectively national and supranational authorities only in the first decade of the 21st century.[4]

Eco-innovation is all a measure of the relevant actors (companies, politicians, trade unions, associations, churches, private households) which:

- develop new ideas, behaviors, products and processes, apply them or introduce them, and
- which contribute to reducing the environmental burden or ecologically specified sustainability objective. [7]

They are in essence a selection of suitable materials, processes and distribution methods that we use with less energy, less natural resources, and complexly with less burden on the environment. Studies in several countries of the world or regions (including the EU territory) show that in general approximately 55-60% of the realized innovations bring so-called innovation environmental benefits, resp. benefits that contribute to sustainability and sustainable growth. This implies that eco-innovation is already an integral part of innovation activities both within and outside businesses (eg public institutions or individuals). The relevant criterion for determining whether innovation is eco-innovation is that its use is less harmful to the environment than the use of the alternatives concerned. The goal of eco-innovations is to develop new products and processes that provide customers and business value, but have proven to reduce environmental impact. Eco-innovations can be created by companies, individuals or non-profit organizations. They can be of a technological nature by applying more efficient processes or by using alternative sources. Organizational Innovation - by incorporating changes into how society works to make it more efficient, or can be social innovations in terms of making changes in the way individuals or groups communicate with each other in an effort to become socially responsible for sustainability.

Creation and diffusion of eco-innovations are realized through two basic forms, they can be policy-driven or market-driven. In many cases, eco-innovation is induced by economic policies. Through the adoption of specific legislative measures (technical standards, limits or environmental taxes), economic and political authorities influence the pro-innovative behavior of enterprises as key players. The second (market-driven) approach is based on the idea that a better environmental approach to business and eco-innovation improve business competitiveness. It distinguishes several categories of eco-innovation. The most widespread group consists of so-called complementary eco-innovations, which have a limited systemic impact and additionally add to existing

production or consumption models and improve the environmental performance of customers. Integrated eco-innovations (in the form of cleaner technological processes or products) contribute to changing production and consumption processes in businesses (eg energy efficiency, resource efficiency, recycling or substitution of the use of toxic materials). Alternative product eco-innovations (based on radical technological discontinuity such as the use of renewable energy sources or bio-agriculture) are based on new theories, equipment or processes. Macro-organizational eco-innovations (eg a new way of urban planning) take the form of new organizational structures. The last category is eco-innovation, which has a general purpose, derived from the use of information and communication technologies, biotechnology and nanotechnology. The rate and extent of degradation of the quality of the environment has caused the increased need for more intensive involvement of the state's regulatory function. There are several ways in which the state (or multinational entity) creates positive or negative incentives for eco-innovative behavior of businesses and consumers as key drivers of change. The regulator can create barriers to the use of unwanted technologies or products (eg content of certain substances used in production or consumption, limitation of technological processes, etc.). The second way is to determine the specific quality parameters of the products (eg the required minimum amount of recycled component in the product). The third way is to create new markets for innovation (eg regulatory measures in the area of limiting emissions, supporting the construction of alternative transport systems, or currently supporting the promotion of renewable energy sources, etc.). Finally, it is regulatory measures that require the substitution of an existing product as an environmentally sound alternative. [6]

## **2.1 The importance of eco-innovations**

In recent years, in the business environment, in particular among global leaders in various areas of manufacturing and services, issues and challenges related to the so-called "globalization" have come to the fore responsible entrepreneurship based on the long-term sustainability of production with regard to raw materials, climate change or the well-being of employees and the environment in which they operate. These challenges thus have a fundamental impact on the way in which these companies operate and lead to a gradual change in the way they do business. At the same time, society-wide changes have resulted in new market, customer and market demands for sustainable development, including environmental protection and resource efficiency. Therefore, there is a growing need to find alternative approaches that could help solve problems related to sustainable business development, while offering opportunities for growth, cost reduction and competitive advantage. Eco-innovation is an approach to meet the requirements to identify key challenges and opportunities for sustainability and then use them to manage change across society and its value chain. The relationship between eco-innovation and business performance is linear dependence and mutual benefit. At the same time, eco-innovations bring the company resp. business and society considerably higher cumulative added value than the so-called ad hoc interventions to improve processes and products. Innovative behavior of companies is an important element of competitiveness:

- reduce energy and material requirements per unit of production and increase economic growth with decreasing energy and material consumption,
- delivers new value-added products and services to consumers,
- opening up new business opportunities,
- reduce environmental and health risks associated with economic development,
- stimulate investment in science and research.

At the same time, the benefits of competitiveness are an added value of eco-innovations for businesses themselves. In addition to the above, eco-innovations also create added value in increasing the company's profitability within the value chain itself, increasing its productivity and technical capacity, as well as access to attractive investments.[4]

## 2.2 Barriers and drivers of eco-innovation in SME

Eco-innovation has so far penetrated markets relatively slowly, with the exception renewable energy sources as a result of energy and climate policy.

**Table 1 Barriers to faster deployment and development of eco-innovation for companies from the most serious to the least serious [4]**

Rank	Barriers
1.	Uncertain market demand
2.	Uncertain return on investment or too long payback period eco-innovation
3.	Lack of funds within the company
4.	Insufficient access to existing subsidies and tax incentives
5.	Existing legislation and structures that do not provide incentives for eco-innovation
6.	Lack of external funding
7.	Reducing energy consumption is not a priority for innovation
8.	Technical and technological binding restrictions (eg old technical infrastructure)
9.	Lack of properly trained staff and missing technological possibilities of the company
10.	The market is dominated by established companies
11.	Reducing the consumption of raw materials is not a priority for innovation
12.	Limited access to external information and knowledge, including lack of well-developed technical support services
13.	Lack of suitable business partners
14.	Insufficient cooperation with research institutes and universities



Barriers to eco-innovation include the inability of market prices to accurately reflect environmental costs and benefits, inflexible economic structures, infrastructural and behavioral constraints and harmful incentives and subsidies. Between other aspects that hinder the spread of eco-innovation are insufficient information and certainty in the markets. Although many of these obstacles are similar to as innovative enterprises generally face tend to be much more serious for enterprises that focus on eco-innovation.

As you can see in the table 1, the most serious barriers to faster deployment and development of eco - innovation for companies are uncertain market demand, uncertain return on investment or too long payback period eco-innovation and lack of funds within the company.

**Table 2:** Drivers that could accelerate the introduction and development of eco-innovation [4]

Rank	Driving forces
1.	Expected future increase in energy prices
2.	Current high energy prices (as an incentive for innovation, reduction of consumption energy and costs)
3.	Current high raw material prices (as an incentive for innovation, reduced consumption raw materials and costs)
4.	Good business partners
5.	Securing or increasing an existing market share
6.	Access to existing subsidies and tax incentives
7.	Technological possibilities and management capabilities of the company
8.	Increased market demand for organic products
9.	Expected shortage of raw materials in the future (as an incentive to develop innovative substitutes that are less demanding on raw materials)
10.	Good access to external information and knowledge, including services technical support
11.	Expected future regulations setting new standards
12.	Limited access to raw materials
13.	Applicable regulations, including standards
14.	Cooperation with research institutes, agencies and universities

Among the most important drivers that could accelerate the introduction and development of eco-innovation are expected future increase in energy prices, current high energy prices and current high raw material prices.

### 2.3 Eco innovation index

Through Eco-Innovation Index is seen how well each Member State perform in different dimensions of eco-innovation compared to the EU average. [2]  
Index contains 16 indicators grouped into five dimensions:

- eco-innovation inputs
  - governments environmental and energy R&D appropriations and outlays
  - total R&D personnel and researchers
  - total value of green early stage investments (per capita)
- eco-innovation activities
  - enterprises that introduced an innovation with environmental benefits obtained within the enterprise
  - enterprises that introduced an innovation with environmental benefits obtained by the end user
  - ISO 14001 registered organizations
- eco-innovation outputs
  - eco-innovation related patents
  - eco-innovation related academic publication
  - eco-innovation related media coverage
- resource efficiency
  - material productivity
  - water productivity
  - energy productivity
  - GHG emissions intensity
- socio-economic outcomes
  - exports of products from eco-industries
  - employment in eco-industries
  - turnover in eco-industries [5]

The situation with Slovakia is still not good though the years and has the index below the EU average and belongs to group of countries catching up with Eco-I. The best score obtained in year 2016.

But in two indicators is Slovakia above the EU average: turnover in eco-industries and ISO registered organizations.

**Table 3: Eco-innovation index score (2014-2018 Slovakia and EU average) [5]**

	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Slovakia</b>	61	61	79	74	68
EU average	100				

**Table 5: Selected eco-innovation indicators in 2018 [5]**

<b>Indicator</b>	<b>Slovakia</b>	<b>EU average</b>
turnover in eco-industries	179	100

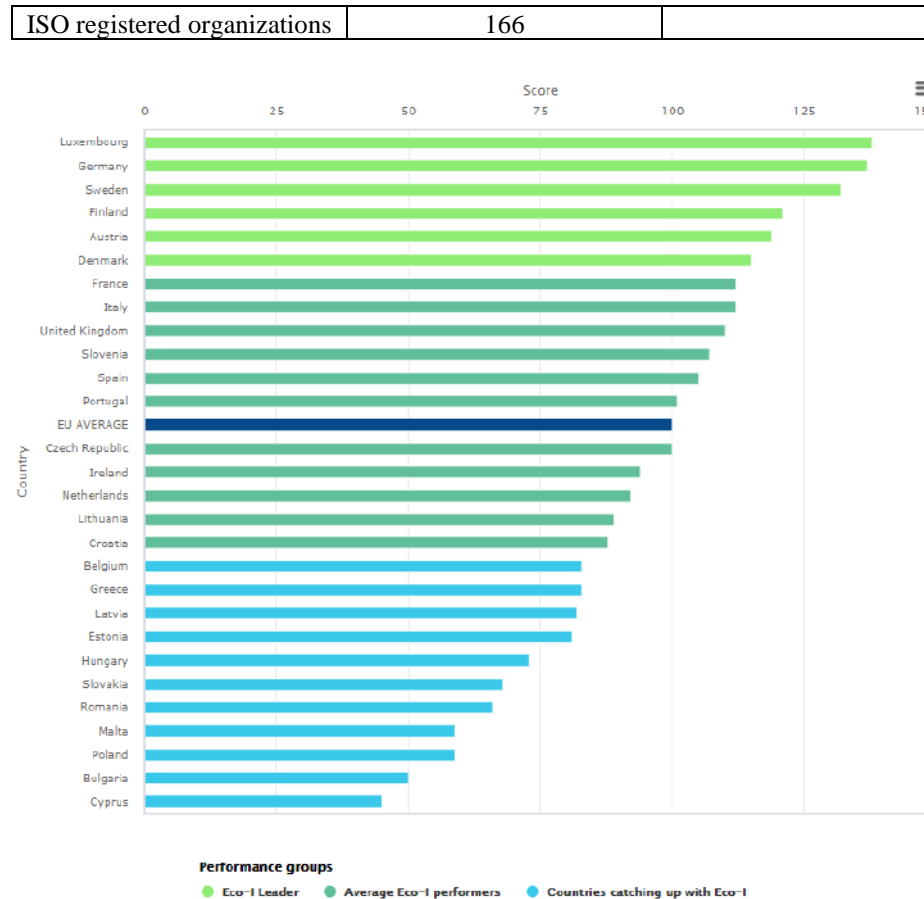


Figure 16: Eco-innovation index (2018) [5]

In 2018 was the Eco-I Leader Luxembourg with best score 138. EU average score is 100. Slovakia placed 23rd with a score of 68 and is included in group of countries catching up with Eco-I.

### 3 Conclusion

Eco-innovation represents a new driving force for the development of modern economies based on knowledge, innovation and the creation of higher added value in combination, resp. in symbiosis with the surrounding environment. Environmental technologies benefit trade and help create new jobs.

Green-innovation needs to be accelerated to boost productivity and efficiency and resource competitiveness and help protect the environment. Growing serious environmental problems and limited resources are leading to global growth demand for green technologies, products and services and enable the emergence of organic sectors. Accelerated introduction and dissemination of organic innovation in the market will

lead to enhanced environmental impact and resilience within the whole economy, while these innovations will be cost-effective efficiency and will be good for business and society as a whole.

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## **Virtual Influencer - an Overview of the Industry**

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**Abstract.** During the last few years, Influencer Marketing has been the buzzword for a lot of marketers. Nevertheless, the concept of influencers is not new and can be traced back to the early 20th century. More and more companies are now replacing “traditional ways” of attracting customers’ attention with people and organizations who have a specific level of social influence in their field to increase the transparency and loyalty of their products.

In order to analyze the chances and risks this new way of marketing brings for companies, it is vital to understand its origin and background.

This paper gives an overview of the development of influencer marketing and points out the potential risks and opportunities it might have for companies.

**Keywords:** Social Influencer, Marketing Industry

**JEL classification:** *M 37, M 31,*

## 1 Introduction

The rise of the Internet has opened up diverse new opportunities for companies to communicate and engage with customers. More and more channels were created aiming at attracting customers' attention and presenting them with various products. The classic advertising strategies (e.g. TV spots) are fading into the background, thus it is important to analyze what methods for attracting consumers function today (Whiting & Williams, 2013).

With the development of social media channels such as Facebook, Twitter and Instagram, companies were forced to rethink their marketing strategies and adapt to the new world of social media. The traditional way of marketing, which follows a top-down strategy, where the initiative is always taken by the company itself, needed to be shifted to a bottom-up approach, which uses social media channels and software to create value for a customer, by finding out about his/her needs and satisfying them accordingly (Tuten & Solomon, 2017).

This paper deals with a specific approach in marketing, namely Influencer Marketing. As one of the marketing trends for 2020 is going to be virtual influencer marketing, the goal of this paper is to analyze the current influencer marketing strategies, the chances and risks it holds for companies and to find out how the virtual influencer marketing trend developed and what its meaning is for the marketing industry as a whole.

## 2 The Background and Evolution of Influencer Marketing

The start and the evolution of the "influencer trend", as we know it today, has been a contentious issue among scholars. While some argue that its existence started a very long time ago, others believe that true influencer marketing started with the rise of Instagram (Gay, Charlesworth, & Esen, 2007).

In order to understand the evolution of this type of marketing, it is necessary to clarify what the term "influencer" means.

According to Abidin (2016), influencers are "people who have built a sizeable social network of followers on social media and are regarded as trusted tastemakers in one or several niches".

Further, Sudha & Sheena (2017) differentiate between paid and earned influencers. While the paid influencers are hired by brands to market products, earned influencers spread information via word of mouth, without receiving any type of compensation. This paper focuses on paid influencers as companies aim to collaborate with them to ensure the success of their marketing strategy.

The first influencer in history was recorded in the 1920s, when companies started to create personas who influenced consumers emotionally and made them buy certain products. One of the most popular figures back then was the figure of Santa Claus created by Coca-Cola. Consumers' purchasing decision was influenced by their

sympathy to the old bearded man who brings joy to the world during Christmas time. Another example is the character of Tony the Tiger introduced by the Kelloggs group, symbolizing a happy tiger which prepares breakfast for children. Even though back then the term “influencer” was not used the way it is today, both characters had a similar effect on consumers – somatization with the brand – which increased the likelihood to buy (Gay, Charlesworth, & Esen, 2007).

The booming economy after World War II sparked the rise of more and more brands on the market. The buyers’ decision journey started to become more complex and the attraction to a product with a ‘visual-figure’ such as Santa wasn’t enough anymore. This was also the time when TV started to develop and TV spots became additional marketing tools (Newell, Salmon, & Chang, 2006).

A few years later, customers were bombarded with ads forcing marketing experts to rethink their strategies. Promoting a product and creating sympathy with a made-up character on a TV was not sufficient any longer. Companies needed to find a greater stimulus to create value for customers and more importantly create a stronger relationship with them after their purchase (Armstrong, Kotler, Harris, & Piercy, 2013). This time coincides with the marketing of celebrities and the widespread of so called “influencers”. The idea behind influencer marketing is to convince the customer to buy a product by using celebrity testimonials for a brands’ marketing strategy, based on the trust, identification and other qualities the celebrities might have already developed with their own fan base (Gay, Charlesworth, & Esen, 2007).

Based on several developments, social changes as well as other technical and media developments such as Instagram, niche markets have developed enabling everyone to create content online, and therefore to participate in the creation of value (Woods, 2006).

Instead of sinking in the enormous sea of information before buying a product, consumers listen to the recommendations of people they trust. Due to the valuable content influencers create, consumers sympathize with the influencer, follow them and make purchase decisions based on their influencer’s opinion regarding a specific subject (travel, beauty, food etc.). Participating in the supply chain, influencers assure the approach of the right target group, which forces marketing experts to rethink their strategies once again, integrate influencers into their company marketing plan and turn consumer-centered marketing into value-centered marketing (De Veirman, Cauberghe, & Hudders, 2017).

### **3 Influencers as Marketing Tools**

Nowadays, Instagram is ranked as the sixth most used app, with 1 billion monthly active accounts (Statista, 2020). This number can be characterized by the dramatic growth of influencers, who are known to have a large following of people with similar interests, making it possible to positively influence the consumers decision (Gay, Charlesworth, & Esen, 2007).

Even though influencer marketing has proven to be successful in the case of many companies such as Daniel Wellington, with 1.5 million engagements per year, the topic of this type of strategy is highly discussed among marketers.

This chapter focuses on the chances and risks for companies which have decided to engage influencers in their marketing strategies.

### 3.1 Chances and Risks for Companies

In this chapter the chances and risks that companies face when working with influencers are summarized.

While some marketing experts find that using influencers to boost their marketing plans is an effective strategy, others observe this point critically, pointing to some dangers.

- **Lack of transparency**

Over the past few years, social media channels, especially Instagram and YouTube, have become oversaturated with influencers. It has become almost impossible for companies to keep up with all of the content and find the right influencers to work with. Researching and communicating with the right influencer has proven to be very time consuming and expensive and despite the fact that this marketing method would be cheaper than TV spots, most companies still prefer to invest in the latter (Booth & Matic, 2011).

- **Inauthentic content**

It is not a secret that influencer marketing is often tied to inorganic growth, manifested by buying likes and followers. For most businesses this became one of the biggest reasons not to work with influencers as the content represented and the audience was not organic and thus was misleading. This became one of the biggest risks in influencer marketing – to partner with influencers who do not identify themselves with a product and don't have an authentic connection to the brand they are promoting (Hennig-Thurau, Hofacker, & Bloching, 2013).

- **Morality issues**

When it comes to influencer marketing, the brand strategy of the company has to be understood by the influencer. While a company may have a vision of their marketing campaign, their influencer may not have that same picture and may promote the product in a different way the company had imagined, thus throwing a bad light on the brand for many years to come (De Veirman, Cauberghe, & Hudders, 2017).

However, working with influencers does not bring only risks. Over the last few years, companies such as Adidas and Nike have been very successful in implementing influencers in their brand-awareness-strategies. Also, some new business, such as Gymshark or PrittyLittleThing have started several campaigns with influencers and can



credit much of their growth and success to Instagram (Virtanen, Björk, & Sjöström, 2017).

In the following subchapters, the advantages of influencer marketing are summarized.

- **Customized target group**

Partnering up with the right influencers can be one of the most effective ways to reach a certain target group as the influencer has already built a fan base that trusts him or her. By being present within this community, brands can effectively communicate with their target group through the influencer and also have the possibilities to attract potential new buyers. Followers of a social influencer are more likely to follow his or her content than be attracted by a commercial on a TV, since the content posted by the influencer does not appear to be too manipulative to their followers. Having the feeling of a community can positively influence the buying decision (Sudha & Sheena, 2017).

- **Trust and credibility**

With the massive amount of information available on the Internet, consumers might get quite overwhelmed due to not knowing who to trust. By cooperating with influencers, companies have the possibilities to win trust concerning their brand as people usually trust the influencers they follow. Furthermore, influencer marketing can enhance brands credibility. If an influencer, for example, posts a new product of the company, the chances that its audience is going to buy the product is very high (Jobs & Gilfoil, 2014).

- **Brand scope**

One of the most important reasons why companies choose to work with influencers is the scope of their influence. By working with influencers, companies have the possibilities to reach thousands or even millions of people from all over the world and enhance their brand awareness around the globe. This fact can help companies find new customers and increase their revenues, which would not be possible via TV spots, which usually cost more than working with a micro-influencer. Sometimes new influencers also agree to work for free in order to increase their credibility, which would even save the company money, yet at the same time allow them to achieve the desired results. Companies could for example work with micro-influencers when it comes to new, recently-launched brands or other niche-specific businesses (Sudha & Sheena, 2017).

## **4 The Development of Virtual Influencers**

Over the last few years, influencer marketing has played a focal point in digital marketing strategies. However, as the landscape is changing, investment in artificial intelligence has become more and more important in a way that could render actual

human influencers obsolete. In this chapter the evolution towards virtual influencers and the advantages and risks for companies is explained. In the previous chapters, the evolution of influencer marketing was presented. It can be said that influencer marketing is one of the most loved strategies of marketing experts as a product is advertised by a real person. However, because of morality or inauthenticity issues, which sometimes can create more harm to the brand than good, it became quite risky for some companies to cooperate with influencers. In such cases, companies don't work with human influencers at all and decide to look for virtual influencers (Sudha & Sheena, 2017).

The idea behind virtual influencers is to get rid of the risky disadvantages, such as dishonesty, intransparency and inauthenticity. By creating a virtual influencer, companies can match influencers, their brand and their target groups with more precision (Bram, 2019).

According to the New York Times (Hsu, 2019), the biggest virtual influencer was created by an agency called Brud. In 2016, the company created a virtual influencer named Lil Miquela who is a teenage fashionista promoting a variety of brands, primarily in the fashion industry. By April 2018, Miquela had more than a million followers and worked with luxury brands such as Calvin Klein and Prada.

#### **4.1 Chances and Risks for Companies**

The chances and risks for companies using virtual influencers as a marketing tool vary. While some enjoy the 'security' of working with the right influencers, others miss the point of the 'human touch' of spontaneity and flexibility (Djafarova & Rushworth, 2017). In the following subchapters, the advantages of working with virtual influencers are summarized:

- **Access to specific virtual influencers**

Due to the fact that virtual influencers are created by agencies, the types and character of the virtual influencers can be specifically designed. More and more niche-virtual-influencers that didn't exist before, e.g. for the music industry are being created. Their followers and posts can furthermore be designed and controlled in exactly the way a company desires (Bower & Landreth, 2001).

- **Higher engagement rate**

The newly created virtual influencer Lil Miquela enjoys an engagement rate of about 2,7%, which can be compared to the engagement rate of celebrities like Selena Gomez and Beyonce. Her posts get more than 47k likes, which makes her performance even better than that of an average human influencer (Social Media Today, 2020).

- **Lower budget**

Virtual influencers are becoming a trend due to their attractiveness of achieving the desired results by investing less than in the case of human influencers. Micro and nano-influencers who represent almost 80% of the overall number of influencers usually

have a closer relationship with their followers and a higher engagement rate, which allows the companies to profit from both a lower budget and higher access to potential customers (Barnett, 2019)

Even though some companies boast a high success rate as a result of implementing virtual influencers in their marketing strategies, as they can easier shape the conversation with the target group, in fact, they do not necessarily represent a safer option. Considering the fact, that virtual influencers are created by other people who are sometimes even anonymous, there is a lack of information of why they were created and what exactly their intention is. Right now, there is also little technical support available to find out about the credibility of virtual influencers. Below, some risks and disadvantages of virtual influencer marketing are presented:

- **Anonymity**

While working with a human influencer a company knows exactly who is behind the pictures, working with virtual influencers can be compared to a black box. No matter how safe and predictable a virtual influencer is, there is an anonymous human being behind the persona who has created this avatar. The risk of unpredictability can damage its brand reputation and since the person behind is anonymous, the companies do not even have a real person to claim for, which poses even more potential risks than in the case of their human counterparts (Penny, 2019).

- **The value of authenticity is lost**

One of the reasons, why influencer marketing has become so successful in the past years is because the promotion was actually done by a real person the followers trust. In the case of virtual influencers, naturalness is a pain point and the fatal flaw in the use of virtual personals could be a complete contradiction of this key value, making it hard for the followers to trust in what he or she posts, thus making this type of marketing strategy restrictive (Wirtz, et al., 2018).

## 5 Conclusion

The purpose of this paper was to enhance the understanding of why influencer marketing has become important, what advantages and disadvantages it brings to a company and whose aim it is to promote its brand. Furthermore, the goal was to describe the rise of virtual marketing as well as to point out what risks and opportunities it brings to the marketing world.

In conclusion it can be said that even though there are some good reasons for marketing experts to be excited about the future of virtual influencers, it is important to keep in mind that they might not necessarily be the safer option.

Even though virtual influencers help companies shape the conversation between influencers and the brand, the creator of the influencer is usually an anonymous person, which makes it harder for companies to predict their behavior. In the case of undesired posts or videos, the risks don't necessarily outweigh the rewards.

On the other hand, if the companies know exactly which agency is behind the creation of the virtual influencer, the result and the marketing experience can positively contribute to a customer purchasing journey. Such virtual influencers provide a safer trajectory for working with talent and the pitfalls that naturally would arise from working with their human counterparts are lower within the virtual world.

When it comes to the decision of whether or not to cooperate with virtual or human influencers, companies will need to have even more advanced technical tools that will allow them to analyze the market and choose the influencer that would best fit their marketing strategy.

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## Trends in migration movement in Russian Federation and Central Asia

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**Abstract.** This article aims to present the results of the analysis of the trends in migration movement in Russian Federation and Central Asia countries. The article is divided into three parts. The first part is devoted to migration inflows trends to Russia from the former Soviet states. In the second part we focused on labor migration from Central Asia countries to Russian Federation. The third part of the text deals with the migration from Central Asia to European countries and factors affecting these migration flows. We can conclude that the migration between the former soviet states remains their typical feature even 27 years after the dissolution of the Soviet Union. Nevertheless, migratory movements and socioeconomic situation in analyzed countries are changing and influencing their traditional directions of migration.

**Keywords:** migration, Russia, Central Asia

**JEL classification:** *J 11, J 61*

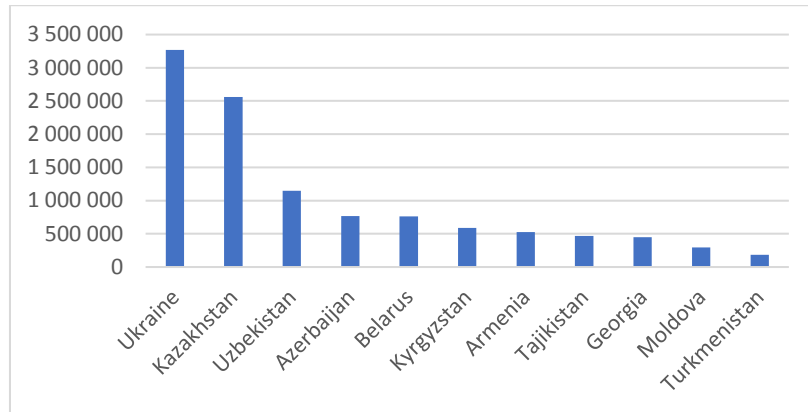
### 1 Introduction

Migration is an objective process of economic development in all countries of the world. On the one hand, one can say that migration is an indicator of the life of the inhabitants of those regions to or from which migratory flows are directed. On the other hand, it is also one of the directions of state regulation aimed at integrated development of individual territories and the country as a whole. We can also observe these processes and their indicators in case of countries we have examined. The empirical basis of the research are available statistical data dealing with the subject. Among used sources are included latest publications from International Migration Organization, United Nations Department of Economic and Social Affairs, Migration Policy Institute, Commonwealth of Independent States and facts and figures of government agencies of the analyzing countries. We analyze immigration inflows trends to Russia mostly by

graphically comparing the growth, respectively decline, in number of migrants since 2000. Same method is used in case of migration from Central Asia to European countries. Figures and tables are used to make the statistics more transparent. The synthesis method combining information on the current economic situation in the countries concerned is used to define factors, which determine these migratory flows. After the collapse of the Soviet Union, the newly formed Russian Federation faced economic and political problems. At the same time, Russia found itself home to a large number of migrants from the former Soviet states. The authors agree on the fact that most of the migratory flows generated in the post-Soviet area also end up in this area. According to Sergey Ryazantsev and Oleg Korneev, the most applicable to post-Soviet interstate migration is the model of pull and push factors. [1] Grigory Ioffe argues that for example in case of Ukraine is applied gravitational model of migration based on the importance of proximity and population size of the countries. [2] However, migratory inflows are changing and influencing the situation in contemporary Russia. As well as are changing socio-economic realities in the Central Asian countries and their destinations of migration. Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – all five states of Central Asia region represent significant number of labor migration to Russia. Nevertheless, we are witnesses of increasing migration from Central Asia to European countries. Such circumstances can result from several internal and external reasons.

## **2 Migration inflows trends to Russia**

According to World Migration Report 2020, Russian Federation belongs to the top 20 countries of destinations and origins of international migrants. More precisely, Russia takes fourth place in both lists of these countries. At over 10,5 million emigrants in 2019, the Russian Federation had the largest population of its citizens living abroad. At the same time, country hosted around 11,6 million immigrants. Most of international immigrants have come from neighbouring countries. The largest number of foreign-born population in the Russia in 2019 comprised immigrants from Ukraine (over 3 million), followed by Kazakhstan (around 2.5 million) and Uzbekistan (1.1 million).[3]

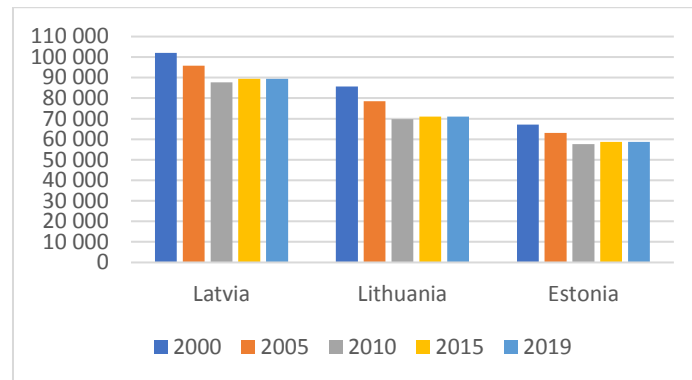


**Fig. 1.** Major countries of origin of migration to Russian Federation in 2019 (persons). *Source: Authors' own elaboration based on UN DESA, 2019.*

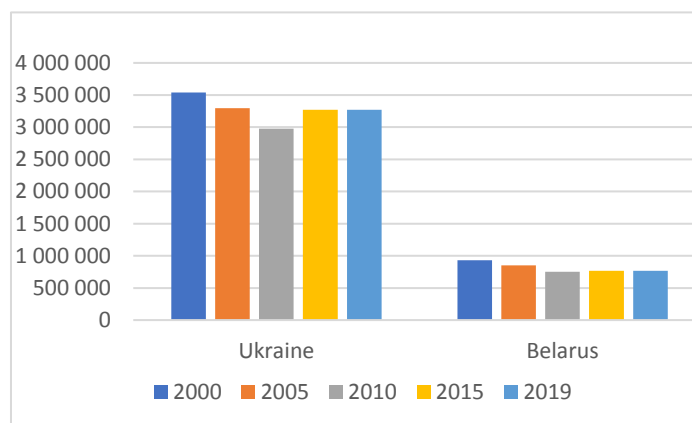
Today, Russian Federation has the third largest foreign-born population in the world, after that of the United States and Germany. Valid temporary and permanent residence permits holding by foreigners have increased in recent years. In 2015, 80 percent of these permits were given to foreigners from following countries: Ukraine (approximately 306,000 people, or 29 percent of the total), Uzbekistan (138,000, 13 percent), Armenia (116,000, 11 percent), Tajikistan (100,000, 10 percent), and Kazakhstan and Azerbaijan (with 85,000, or 8 percent apiece). In recent years, Russia has become one of the leading importers of labor. Temporary migrants are often unskilled workers employed in low-paying jobs with poor working conditions, which are unattractive to the native population. [4]

According to UN DESA International migrant stock data 2019, the home countries of migrants to Russia are former Soviet Union states. Despite the breakup of the USSR, Russian Federation keeps strong cultural, political, and economic ties with these countries. Since the dissolution, migrants to and from Russia have been moving mostly within the region. Citizens from former Soviet Union states represent 90 percent of the total authorized migration flow. In the period since 2000, the migrant inflows to Russia has undergone significant changes. The populations from Ukraine, Belarus, and the Baltic states (Estonia, Latvia and Lithuania) have shrunk, while inflows from Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) have grown. [5]

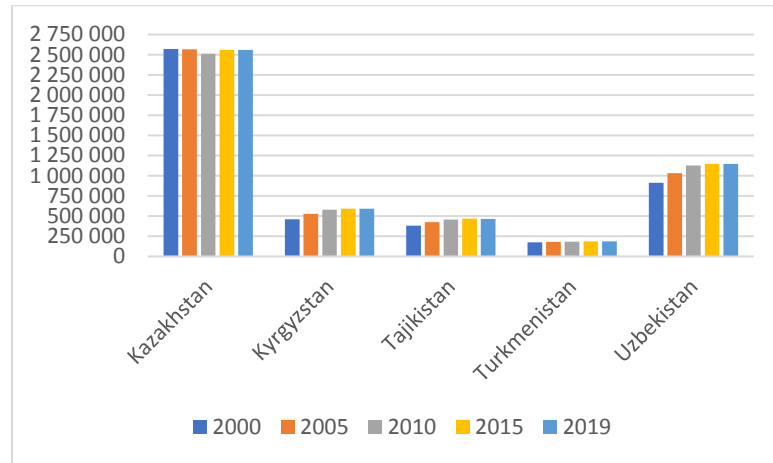




**Fig. 2.** Development of migration flows from the Baltic States to Russia since 2000 (persons).  
*Source: Authors' own elaboration based on UN DESA, 2019.*



**Fig. 3.** Development of migration flows from Ukraine and Belarus to Russia since 2000 (persons). *Source: Authors' own elaboration based on UN DESA, 2019.*



**Fig. 4.** Development of migration flows from the Central Asian countries to Russia since 2000 (persons). *Source: Authors' own elaboration based on UN DESA, 2019.*

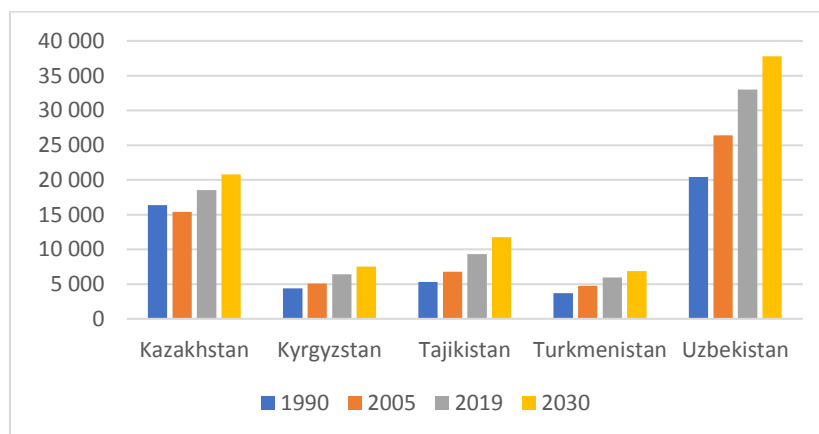
Given its sizable immigrant stock from the Europe and Central Asia region, Russia belongs to the major sending countries of remittances in the world. In 2018, remittances from the Russian Federation amounted to 21 830 US\$ million. [6] Migration flows are also determined by the visa-free regime. Most of the countries of the former USSR have entry into Russia without visas. At present the only exception are citizens of Turkmenistan, Georgia and Baltic states. [7]

Migration inflows differ throughout the country. The main centers of attraction for migratory flows are still the central, southern and northwestern federal areas of the country. But those areas actually do not suffer from labor shortages such as the Siberian and Urals regions. High concentration of migrants in some parts of the country can serve as a trigger for social tension, prejudices and negative perception of migrants by natives. Inflows of foreign population also affect religious distribution in the country. Migration to Russia involves a significant number of Muslims from near abroad as well as from Afghanistan, Pakistan, Iran and Turkey. Labor migration also means that Muslims are no longer limited to traditional areas in Russia, such as Tatarstan or the North Caucasus. In recent years, the influx of Muslim migrants from the Caucasus and Central Asia has increased to Moscow, St. Petersburg and other urban centers, where job opportunities have become available. Alongside migration, conflicts in the North Caucasus, the rise of nationalism in Russian Muslim republics, and international and domestic terrorism are main factors causing Islamophobia in Russia. At the same time, Russian Muslim officials, citing demographic trends, predict that about 30 percent of Russia's population will practice Islam over the next 15 years. [8]

### 3 Central Asia labor migration to Russia

For the Central Asia countries are typical migration movements out of the subregion and most noticeably northward to the Russian Federation. This migration corridor is one of the most stable in the world. It occurred with the collapse of the Soviet Union and accompanied these countries from the beginning of their independence. The migration corridor is created on the basis of geographical, cultural, economic and political ties. The main reasons for the departure of the population of Central Asia are internal economic problems. These problems are reflected in their very weak positions in 2019 Human Development Index Ranking, which is an important qualification in terms of migration. Turkmenistan and Uzbekistan are in 108. place, Kyrgyzstan 122. and Tajikistan takes 125. place in global ranking, unlike Russia, which is in 49. place. [9] Similar situation can be seen in ranking regarding the quality of trade and transport related infrastructure according to World Bank Logistics Performance Index. [10] Low wages and high unemployment in Central Asian countries, growing gap in living standards and unclear prospects for the development of the region's economy stimulate labor migration. According to the Interstate Statistics Committee of The Commonwealth of Independent States, Russia has significantly higher wages, diversified labor market with more employment opportunities, therefor is a leading destination for labor migrants from Central Asia. [11]

Such migration flow can be mutually beneficial in terms of the demographic challenge. Russia has long been in a demographic crisis, and the influx of migrants has to some extent offset the steadily declining population, even if the external migration cannot fully compensate for natural population. And for countries such as Uzbekistan, Tajikistan and Kyrgyzstan, whose populations have seriously increased since the collapse of the USSR, migrating part of the working-age population to Russia reduces tensions in the national labor market. [12]

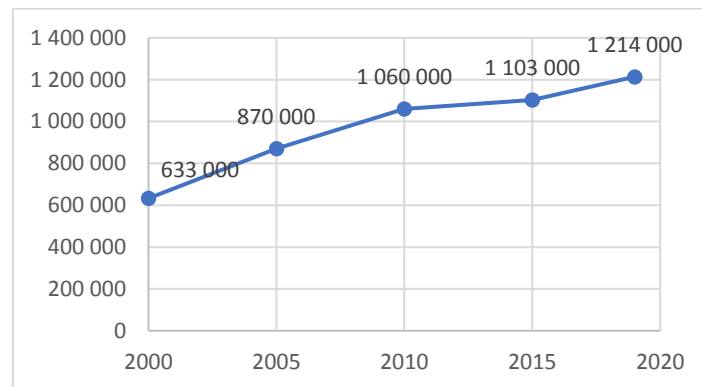


**Fig. 5.** Growth of population in Central Asia countries since 1990 (in thousands). *Source: Authors' own elaboration based on UN DESA, 2019.*

Remittance flows into Central Asian countries largely reflect migration patterns within and from the subregion, which are closely linked to work and income generation. International remittances play an important role in Central Asian economies. Two of the world's top 5 remittance-receiving countries relative to GDP are in this region – Kyrgyzstan (33 % of GDP in 2018) and Tajikistan (31 % of GDP in 2018). Dependence on remittance increases when that of illegal immigrants is included. Russia is the main source of these remittances, due to the size of its economy and historical links. Remittances from the Russian Federation have been substantial over time, aided by the relatively low transfer costs to the Central Asian countries. [13] It is not only economic development of donor countries that depends on labor migration. The same is true for recipient country, where considerable share of GDP is generated by foreigners. This dependency will keep rising in the context of demographic crisis and shrinking labor resources.

#### 4 Changing course on Europe?

The various works of researchers usually emphasize a well-established aspect of traditional migration routes from Central Asia to the Russian Federation because of at least the common Soviet past. However, they overlook the fact that the number of migrants from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan in other European countries is increasing at the same time. And this inflow to Europe is estimated to increase further.



**Fig. 6.** Growth of migrants from Central Asia to countries of European Union in total since 2000 (persons). *Source: Authors' own elaboration based on UN DESA, 2019.*

The significantly highest number of migrants from Central Asia in Europe, excluding Russia, has Germany with 1 090 000 migrants in 2019. Following leading migration destination countries are Ukraine (526 000 migrants in 2019) and Belarus (100 000 migrants in 2019). Beside Germany, other countries of European Union such as Greece,

Czechia, Italy and Latvia have become a home to thousands of migrants from Central Asia. [14]

**Table 1.** Growth of migrant flows from Central Asia to countries of European Union since 2000 (persons).

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
2000	539 167	37 084	10 590	6 038	40 012
2005	733 891	58 171	19 464	7 494	50 219
2010	887 292	75 590	26 822	8 517	62 647
2015	921 822	79 515	27 907	8 826	64 661
2019	1 016 615	87 262	30 661	9 513	70 068

Source: Authors' own elaboration based on UN DESA, 2019.

Such circumstances result from the lack of a domestic labor market and low wages due to poor industrial development. One of the most important reasons for the increase in labor exports is above-mentioned population growth in Central Asia with relatively young average age. The situation with labor migration from Central Asian countries has been significantly complicated by the migration crisis, which has led to a tightening of the European Union's migration policy and the economic crisis in the Russian Federation. Western sanctions against the Russian Federation due to Ukraine Crisis in 2014, depreciation of the ruble and persisting lower oil prices have negatively affected migrant remittance outflows from Russia. According to Annual Remittances Data of World Bank these remittance outflows decreased from 37 220 US\$ million in 2013, to 19 690 in 2016, and slightly recovered to 21 830 US\$ million in 2018. In this sense, transfers of labor migrants have more than halved, influencing all of the Central Asia countries. [15]

**Table 2.** Migrant remittance inflows to Central Asian countries (US\$ million).

	2013	2014	2015	2016	2017	2018	2019e
Kazakhstan	341	401	294	384	560	618	506
Kyrgyzstan	2 278	2 243	1 688	1 995	2 486	2 689	2 410
Tajikistan	3 698	3 384	2 259	1 867	2 237	2 183	2 298
Turkmenistan	40	30	16	9	4	2	1
Uzbekistan	6 689	5 653	3 062	2 462	3 374	3 689	4 150

Source: Authors' own elaboration based on Word Bank, 2020.

Given the dependence of Central Asian countries on Russia, their economies are undoubtedly highly exposed to changes in the external environment. As a result, countries are forced to actively seek out the countries with the most stable economies and high wages. The COVID-19 pandemic will also have serious effects on the

economies of these countries. It is likely that the inflow of remittances will decrease in 2020 due to measures taken.

Another reason for changing the major destination could be revision of Russian regulations on labor migration. As of 2015, according to the policies, all migrant from Central Asia must have an international passport to enter the Russia. Prior to that, citizens of Kyrgyzstan, Tajikistan, and Uzbekistan could enter on the basis of national identification document. In order to receive labor permit for migrant in Russia, so called patents, migrants must have migration card, medical examination and insurance, pass the examination on the Russian language, history and the laws and pay in advance the monthly fee/tax for the patent. It is estimated that such a procedure required an annual cost of EUR 1 000. Increased financial burden often force migrants to leave. However, these requirements do not apply to all countries of Central Asia. Since 2015, establishment of the Eurasian Economic Union has provided people from its member States – including Kazakhstan and Kyrgyzstan for free movement of goods, services, capital and labor. [16]

## 5 Conclusions

Migration of population is one of the important elements of socio-economic processes. Russian Federation and countries of Central Asia are no exception in this case. Russia belong to top countries of destinations and origins of international migrants and has become the target of a growing number of migrant workers, mostly from to countries of former Soviet Union. Within overall context of its migration inflow trends, we can observe interrelated developments that have a significant impact in contemporary Russia – changing economic and political realities of the Russian society, tightening migration policy and control, and social and cultural and even religious tension. Russia is a country where migrants from Central Asian countries have been sent for many years. Nevertheless, the situation is gradually changing. The number of migrant workers to Europe will probably increase further. Reasons for Central Asian citizens' interest in emigration include both internal and external ones. External reasons stimulating migration include the economic crisis in Russia and the depreciation of the ruble. The gradual growth of the population of Central Asia, the dependence of the budgets of the Central Asian countries on remittances, as well as their internal economic problems stimulate migrants to move to more attractive countries. According to growth of migrant flows from Central Asia to Europe, as the countries seem to be European Union. Subsequent development of these migration movements will be the subject of further research.

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## Russian emigration to the EU and its potential

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**Abstract.** The aim of the article is to present the results of the analysis of Russian emigration to the EU. The article is divided into three parts, with first part focused on defining the term migration and migrant. The second part of the text dwells into the discrepancy of Russian emigration between the Russian Federal State Statistic Service and the Statistics Offices of the host countries of EU. The third is examining Russian emigration flow to the EU and factors affecting the people of Russia to emigrate. We can conclude that the discussion on international migration is a current subject for social scientists and economics experts.

**Keywords:** Russian emigration, European Union, statistics.

**JEL classification:** *J 15, J 61.*

### 1 Introduction

After the collapse of the Soviet Union, the Russian Federation changed from a closed totalitarian country from which it was legally impossible to emigrate, to a democratic country. Russian Federation is a country, which that actively participates in the international migration process as a recipient country and a country whose inhabitants emigrate to other states. Under the current law of the Russian Federation of 1996, residents of the Russian Federation are free to leave the country and return to it freely. [1] The collapse of the Soviet Union also meant, among many other things, that states became sovereign nations, which resulted over 25 million Russians became a part of Russian diaspora, without changing residence between national borders. [2] Large communities of Russians make up a sizeable part of the population in Europe like in Baltic countries, Ukraine, Belarus and in states of Central Asia.

In the 1990's the major destination countries of Russian emigrants were Germany, Israel and the US, because of the emigration opportunities depended on the actions and migration policies of the host country. This emigration was mostly ethnic – ethnic German, Jewish and mixed families, because the legislation of the host countries encouraged mostly ethnic grounds. During the 2000's onwards patterns diversified to many other countries and outflows significantly lowered. Although the Russian Federation shows signs of an immigrant country, the UN ranks Russia as



having the third largest number of people living outside its borders after India and Mexico — 10.6 million. [3]

This article will focus on Russian migration to EU, specifically to the most immigrated countries by Russians. We will focus on the current Russian emigration in the period 2016-2019, as we consider the data obtained from these years to be the most up-to-date. The content of the first part is focused on defining the term migration. The second part will examine discrepancy of Russian emigration between the Rosstat and the Statistical Offices of host countries of European Union and OECD. Considers it important to point out the differences between data of Russia's Statistical Office and data of the EU host countries's Statistical Offices in order to create an objective picture of Russian emigration. As the article deals with Russian emigration to the EU, data on the EU side will be important to us for understandable reasons. In the third part we will analyze Russian emigration's reasons to move with the help of international and Russians analysis centers and also analyze demographic composition of Russian emigrants.

## **2 Defining the terms migration and migrant**

In the social sciences, the terms migration and migrant are explained from different perspectives and in different theoretical concepts. Terms related to migration are defined differently in each country, depending on the legal order of each state. The scientific community uses variable divisions using variables to define the different types of migration. In the article we will rely on variables, which are divided into three groups, namely spatial, temporal and causal features.[4] By spatial variable, Wagner understands migration as "any change of residence"[5], Treibel as any change of residence "within or between national borders"[6], Velikonya as "the physical transition of one person or group from one society to another, from one policy area to another"[7], and Vorobyova as "any territorial change of population within the borders of the state, or beyond the borders of the state, with the aim of changing the permanent residence"[8]. From a spatial point of view, migration can be divided into national and international migration. The time variable plays an important role in defining the concept of migration. Migration for more than one year in the territory of another state is also governed by other international migration organizations such as the EMN and the IOM. Causal factors in the study of migration are understood as the causes that cause migration. The causes of migration can be examined from an economic, social and political point of view and also include the circumstances of the migration, whether the migration realizes voluntarily or under duress. We also understand remigration as one of the forms of migration, i. e. return to the country of origin after a period spent abroad.

According to the EMN in the global context, a migrant is „a person who is outside the territory of the State of which they are nationals or citizens and who has resided in a foreign country for more than one year, irrespective of the causes, voluntary or involuntary, and the means, regular or irregular, used to migrate.” [9] In this case, it is so important to distinguish between the terms alien and migrant. An alien, according to

EMN, can be any person who is not a national (native or citizen) of a given State, but without interest in staying in it for a long time. [60] The term migrant means a person who stays in the territory of another state, as mentioned above, for at least twelve months.

According to Eurostat's concept and Definition Database and the UN Recommendations on Statistics of International Migration in the EU/EFTA context a migrant is „a person who either: establishes their usual residence in the territory of an EU/EFTA Member State for a period that is, or is expected to be, of at least 12 months, having previously been usually resident in another EU/EFTA Member State or a third country; or having previously been usually resident in the territory of the EU/EFTA Member State, ceases to have their usual residence in the EU/EFTA Member State for a period that is, or is expected to be, of at least 12 months.”[11]

The term emigrant in the EU context means a person who, having previously been usually resident in the territory of an EU Member State, ceases to have their „usual residence” in that EU Member State for a period that is, or is expected to be, of at least 12 months. [12] As we will also touch on the concept of a refugee in the context of Russian migration, we consider it important to explain it. Unlike a migrant, a refugee is considered to be a „person, who has fled their own country because they are at risk of serious human rights violations and persecution there. The risks to their safety and life were so great that they felt they had no choice but to leave and seek safety outside their country because their own government cannot or will not protect them from those dangers. Refugees have a right to international protection.” [13]

The sources for Russia's demographic data and data of Russian emigrants are the Rosstat, a Russian government agency and from international organizations - United Nations and the Organization for Economic Cooperation and Development.

We will examine Russian emigration to the EU with the help of the push and pull factors model. Pull factors arise in host countries based on the offer of something that is in the home country to a limited extent. Push factors arise in the home country and prevent people from meeting their social and individual expectations. [14]

### **3 Discrepancy of Russian emigration between the Rosstat and the host countries of European Union.**

In 2019, according to Rosstat, 416,131 Russian emigrants emigrated worldwide. According to official data from the Russian side, 10,340 citizens of the Russian Federation joined the European Union.[15] In tracking Russia's past and current emigration data, we can find some discrepancy between the Rosstat and UN figures, between Rosstat and OECD and between Rosstat and countries of arrival of Russian emigrants Statistical Offices (see Table 1). Partially, these discrepancies happen because Rosstat counts Russians who officially cancel their registration in Russia as emigrants, but most emigrants do not do so resulting in the number of Russians

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emigrating from the Russia is much higher than the numbers Rosstat has officially reported. [16]

**Table 1. The comparative analysis of the Russian and Foreign Statistics on the emigration from Russia**

	2016		2017	
	Rosstat	Foreign statistics	Rosstat	Foreign statistics
Germany	4694	23085	4372	18137
Italy	392	2877	418	2787
Finland	578	2540	593	1549
Sweden	135	1072	112	1017
Estonia	1089	1290	995	1272
Latvia	926	-	999	874
Lithuania	579	841	591	656
Spain	388	6236	427	6971

Source: data from the Rosstat and OECD.

Russian sociologists Vorobyova, Aleshkovski and Grebenyuk assume that, on average, the data provided by the Russian Federal State Statistics Service should be multiplied by 3–4 times to give a true picture of number of emigrants from Russia. This correction should not be mechanical and should reflect the changes in the emigration recording principles in Russia and the host countries. [17] Getting the exact number of emigrants is difficult for any country. Due to its size, population, ethnic composition and administrative division, the Russian Federation keeps records of the movement of the population not only crossing the border, but also within the country, whether it is just a change of residence for a few days. For each country, it is easier to obtain the most accurate number of immigrants than emigrants. Official records of emigration from the Russian Federation face an additional challenge: many emigrants do not report their departure, and therefore are not recorded by the Russian statistical office.

#### **4 Russian emigration flow to EU**

The economy, labour market, healthcare, the environment and others are driven by demography. While the world population increase every year, according to data of European Parliament in Demographic outlook for the European Union 2019[18], population of EU is expected to decline in the longer term – life expectancy increases and fertility rates drop compared to past. One of the solutions to improve future negative demographic trends is international migration, specifically emigration to EU. Migration to European Union from third countries plays a significant role in shaping the demographics. According to Demographic outlook for the European Union 2019 the effects are perceptible, as in 2017 the overall positive population growth for the EU was due to net positive migration. For example, Germany, Finland, Spain, Estonia,

Slovenia has recorded population increase, despite their negative population state. [19] The population of European Union is ageing and one of the solutions for future lack of labour is economic migrants from third countries.

According to European commission 19,1% Russian migrants and 85% of Russian refugees are in EU. The main flows of Russian migrants in EU lead to Germany (15,3%), Great Britain (12,4%, not in EU anymore) and Czech Republic (10,3%). The main reasons for Russian migrants to come and stay in EU are family reunion (35,7%), remunerated activities (21,1%), education (17,8%). Russian migrants to EU are not only economic/labour migrants with poverty and unemployment reasons, but also political migrants with security and democratization reasons, social migrants with reasons of education, health and urbanization. One of the least, but not the last are environmental migrants with natural hazards reasons. [20]

As we mentioned in the second chapter, we can also examine migration on the basis of the „push and pull factors” model. As we perceive the „push factors” on the domestic side as factors influencing the outgoing emigrant, our article will be based on the publication of the European Commission. It wrote the reasons why Russian emigrants left Russia on the basis of registration of individual countries to which Russian citizens emigrated. According to the European Commission, there are four main factors - political, economic, social and environmental.

Political factors:

- Democratization – perception of corruption
- Political stability.

Economical factors:

- Poverty - Income held, Under international poverty line \$1.90 per day, Rural population under national poverty line, Urban population under national poverty line
- Unemployment

Social factors:

- Education
- Health - Under-5 mortality rate (per 1000), Maternal mortality Health expenditure, Prevalence of undernourishment
- Urbanization - Urban population, Living in slum out of urban population, Access to electricity, Individuals using the internet

Environmental factors:

- Newly displaced people for natural disasters
- Information risk on natural hazards.[21]

As we mentioned in the chapter *Defining the terms migration and migrant* „pull factors” arise in host countries based on the offer of something that is in the home country to a limited extent. Pull factors influencing the decisions of Russian emigrants to come to the EU are according to respondents:

- A good place to claim asylum
- Relatives and friends reunification
- Good education
- Possibility of finding a better paid job
- Ethnic communities. [22]

According to Gallup World Poll analysis, one in five Russians (20%) want to leave Russia, if they could. Since 2014, the percentage of working-age Russians, who want to leave their home country tripled from 14% to 44% (15-29 years old), 7% to 22% (30-45 years old). In this analysis 40% of respondents want to migrate to European Union and 12% of respondents named Germany as most likely destination country. [23] The question remains as to how credible the surveys are and how many respondents would eventually leave the Russian Federation. From a sociological, economic and psychological point of view we considerate to migrate as difficult step, it follows that not every respondent would catch up with the idea of emigrating to the end. Population drain due to emigration is negatively affecting already strained population curve hindering Kremlin's step to increase population growth. Potential losses in all demographic groups could have negative implications on the future pension system. Russia is an immigration country that is addressing its long-term declining natural increase through immigration policy. Therefore, we can assume that the incoming workforce from the surrounding states will also solve the future pension system.

## 5 Conclusion

It follows from above text, that migration to European Union from third countries plays a significant role in shaping the demographics. The population of European Union is ageing and one of the solutions for future lack of labour is economic migrants. As mentioned in the text European Union is the most sought-after country for Russian emigrants due to its stable economic situation, high level of education and for relatives and friends reunification. The push and pull factors mentioned in the article have an important role in examining the motives of Russian emigrants to leave the country. It can be stated that the debate on international migration is a current subject of public debate and a considered tool for solving not only demographic but also economic problems. In the text, migration is mentioned not only as an instrument of demographic policy, but also of economic policy. It is therefore appropriate to pay increased attention to this topic in the social sciences as well. The study of migration processes is thus not only interesting for sociologists or political scientists, but is also gaining attention of economics experts.

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## Financial models of investment to public-private projects in Russia and Worldwide

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**Abstract.** Research object is public-private partnership. Research subject is the financial relations of economic agents. Aim of the study is to analyze the financial mechanisms of interaction between the public and private sectors in the implementation of infrastructure projects in Russia and Worldwide. Investment forms in infrastructure projects with the participation of the state and municipalities are reviewed, foreign and domestic experience in attracting investments in state or municipal projects are considered, methods of analysis and comparison of various financial models for the implementation of investment projects are used. As a conclusion, the authors note that the existing legal regulation currently acts as a constraining factor in the development of private investment to significant infrastructure projects.

**Keywords:** Public-private partnership (PPPs), infrastructure project, investor

**JEL classification:** *G18, H54, G31*

### 1 Introduction

Achieving the goals of the state's functioning in the field of ensuring its competitiveness on the world stage is impossible without the formation of infrastructures that meet modern technological requirements and the needs of society.

The implementation of infrastructure projects, in addition to being carried out for a long time, requires significant capital investments, and has a long payback period. Such investments are often unaffordable for the budget, in connection with which the question arises of the formation of institutions uniting the state and private investors, the purpose of which is aimed at creating a certain infrastructure object.

The current interest in public-private partnership (PPP), although their pedigree is much longer, began two or three decades ago when, in the face of public expenditure constraints, they were seen as a means for accelerating the provisions of infrastructure that, in the past, was generally seen as a purely public sector activity. This latter, traditional view stems very much from Adam Smith who argued that government has the «... the duty of erecting and maintaining certain public works and certain public



institutions, which it can never be for the interest of any individual, or small number of individuals, to erect and maintain; because the profit would never repay the expense to any individual or small number of individuals, though it may frequently do much more than repay it to a great society» [1].

Smith highlights the historical importance of this role in facilitating the Transport Revolution in that allowed the UK's industry and commerce to grow in the later part of the eighteenth century: The Industrial Revolution [2].

In the past few years, there has been an increased interest to PPPs in Russia due to the recognition of the fact of infrastructure development as the economy driver.

July 21, 2020 at the Forum "Infrastructure Business Initiatives" the problem of the slow recovery of consumer demand in the Russian Federation was noted, in connection with which it was noted that in these conditions the high multiplier effect of infrastructure projects could provide a quick exit of the Russian economy from the crisis, as well as a successful post-crisis economic breakthrough [3].

The formation of the investment financing architecture is the most important element of financial modeling, which depends on the different costs of attracting investment sources for projects.

## **2 Historical Development of Public-private partnership**

Governments have used this combination of public and private efforts throughout history [4]. Muhammad Ali of Egypt used "concessions" in the early 1800s to obtain public works at minimal cost, while concession companies made most of the profits from projects such as railways and dams. Much of the early infrastructure of the United States was built on what might be considered a public-private partnership. This includes the Philadelphia and Lancaster Line in Pennsylvania, which began in 1792, the early steamboat line between New York and New Jersey in 1808; many of the railways, including the nation's first railroad, were chartered in New Jersey in 1815; and most modern electrical networks. In Newfoundland, Robert Gillespie Reid was contracted to operate the railways for fifty years from 1898, although they were originally to become his property at the end of the period. In the late 20th and early 21st centuries, there was a clear trend towards the increased use of various PPP mechanisms by governments around the world. This trend appears to have reversed following the 2008 global financial crisis. Changes in the existing model of state financing of infrastructure projects began to take place in 1970-1980. Japan approached the solution of the arisen problems most radically, highlighting the structure of the economy in the third sector, in which joint corporations operate, invested by both the public and private sectors.

The UK has had a systematic public-private partnership program since 1992, with the aim of the 1992 Program, which aimed to reduce the need for public sector borrowing, although, as noted, the impact on government accounts was largely illusory. In 1997, the program was expanded with a shift in emphasis towards achieving "value for money", mainly through appropriate risk sharing. The UK Government Audit Office found that the private funding initiative model was more expensive and less effective in supporting hospitals, schools, and other public infrastructure than public funding. Practice has shown that public-private partnership is ineffective when creating social facilities such as hospitals, schools, and other public infrastructure.

### **3 Government Regulation of Public and Private sectors in Russia**

Currently, in Russia, direct interaction between the state and private investors in the process of creating new facilities or solving other resource-intensive tasks is regulated by Federal Law № 224-FZ dated July 13, 2015 (as amended on July 26, 2019) «On public-private partnership, municipal-private partnership in the Russian Federation and amendments to certain legislative acts of the Russian Federation» (hereinafter - Law on PPP) [5].

This law establishes one of the ways to develop public infrastructure, based on long-term interaction between the state and business, in which the private party (business) participates not only in the creation (design, financing, construction / reconstruction) of the infrastructure facility, but also in its subsequent operation and / or maintenance for the benefit of the public side [6].

In 2014, the Federal Law «On the Securities Market» № 39-FZ dated 22.04.1996 a new type of special purpose company has been introduced - a specialized project finance company (SPF): the activity of such a company is financing by acquiring monetary claims, as well as by acquiring other property necessary for the implementation of or related to the implementation of such a project.

PPP allows a public partner: to fully or partially transfer obligations to the private partner to finance the creation of an infrastructure facility; and also, to share or completely transfer the risks of higher construction costs to a private partner.

The advantages of a PPP for a private investor are the ability to shift part of the revenue risks onto the public partner (availability of certain guarantees) and the ability to increase revenue through additional services or reduce costs.

From a financial point of view, the advantage of PPP is the minimization of budgetary funds for the creation of infrastructure facilities, and for a private investor - the presence of a multiplier effect in the form of guaranteed income from investments and additional income. The concession form of the implementation of infrastructure projects meets the main PPP criteria and is widespread in international practice.

In Russia PPP is carried out in the form of a concession, regulated by Federal Law № 115-FZ of July 21, 2005 «On Concession Agreements» (hereinafter - Law on Concession Agreements). At present, following foreign experience examples a concession is probably the only form of cooperation between the state and private business in the implementation of infrastructure transport projects.

In accordance with the specified law, under a concession agreement, one party (concessionaire) undertakes at its own expense to create and (or) reconstruct immovable property defined by this agreement, the ownership of which belongs or will belong to the other party (concessionaire), and to carry out activities using the concession object agreement [7].

### **4 Concession**

The advantage of concessions is their relative cheapness for the state. At the same time, this form of cooperation is associated with certain risks, both for the state and for the concessionaire. Within the framework of the concession, the concessionaire is

interested in intensive exploitation of fixed assets, which results in their rapid deterioration and the need for the state to make large investments in their restoration or renovation. On the other hand, the amount of payments by the concessionaire to the grantor is stipulated by the agreement, while the profitability of the object of the concession agreement (for example, the railroad) is difficult to predict, since it depends on many factors, including structural changes in the economy, fluctuations in the economic environment, etc [8].

A distinctive feature of a concession is that a party in a legal relationship is always the state, which grants permission to carry out economic activities to an individual, since it has the prerogative (monopoly right) to certain resources or to engage in certain activities. Of the many types of concession agreements existing in practice Law on Concession Agreements provides only the type BOT («Construction - Management - Transfer»), but at the same time the type is used - BTO («Build - Transfer - Control»).

In Europe, Latin America, Asia, the WTO scheme is used to develop new toll road projects [9]. In the world, the most common concession schemes are two: BOOT BOOT «Build - Own - Operate – Transfer» and BOT BOOT «Build - Own - Operate – transfer», which assume that the facility being built with funds from a private investor will eventually be transferred to the ownership of the state. Since within the framework of the implementation of infrastructure transport projects, transport infrastructure facilities of regional or national importance are most often built, these two options for organizing PPP in practice are more in demand [10].

According to the Ministry of Economic Development in Russia, 3 thousand concession agreements were concluded for a total of 1.7 trillion. rub [11]. According to experts, the market lacks projects in which businesses could invest together with the state. At the beginning of 2020, there are about 3.1 thousand concession agreements in force or completed upon expiration in Russia. The total volume of investment obligations under them is more than 1.7 trillion. rub. Of these, 1.2 trillion. rub. (i.e. more than 70%) are off-budget investments, 0.5 trillion. rub. - State funds.

In Russia, there is an insufficient level of investment in infrastructure through PPP contracts. The volume of investment obligations assumed under the concluded concession agreements is about 1.6% of the GDP in 2019. At the same time, in the UK, for example, the volume of investments in PPP projects is at least 6.6% of GDP, in Canada - 8.1%.

Statistical data on the largest concession agreements at the federal level and participants in the financing of large investment projects in the Russian Federation indicate that transport concessions are the largest in terms of total investment - they account for 70% of the funds, mainly projects for the construction of road infrastructure, more of all agreements (94%) were concluded at the municipal level, mainly they relate to the field of utilities. However, the largest volume of investments (42%) is envisaged within the framework of concessions concluded at the federal level, of which 96% falls on the transport infrastructure.

We consider the problem of attracting private investors is rooted in the mechanism for forming sources of financing. A review of the participants in the financing of large investment projects revealed that there are investment projects, but in practice the state acts as an investor in one form or another.

The financial model of the concession agreement within the framework of PPP is the concessionaire's lending to the grantor for the duration of the project and the term

of the concession agreement, during which the grantor will reimburse the funds invested in the project. It follows that the payment for the use of the provided funds should be higher than the key rate of the central bank, taking into account discounted cash flows. The concession agreement does not imply a direct payment for the use of monetary resources, and the concessionaire's benefit is to receive income in the process of managing the object during the period of the concession agreement. Obviously, the object under construction must have characteristics that are attractive to the investor.

Regional authorities are taking various incentive measures to attract private investors in order to increase the attractiveness of the public-private partnership mechanism in the region, such as lowering the property tax rate, preferential rentals, increasing the volume of attracted investments, the quality and volume of services provided to the population [12]. But these measures are valid only for regional projects and do not apply to federal projects.

## 5 Life Cycle Contract

Another form of PPP is the Life Cycle Contract (LCC). This involves the formation of a single contract with a contractor for the provision of affordable and high-quality infrastructure service throughout the life of the facility (design, construction, financing and maintenance) [8]. Life cycle does not imply investment of public funds in the highway. The design, construction and commissioning of the facility is carried out at the expense of the contractor who independently attracts borrowed funds. After that, the state will pay not for the facility, but for the service of the operating facility throughout its entire life cycle, reaching 30-40 years, using a simple principle: «no service - no payment». State payments to the contractor are stipulated in the contract and are made annually (or at any other frequency) subject to the mandatory fulfillment of a number of functional criteria (for the railway, these may include: travel time, line availability, number of delays, number of failures, accidents, etc.). P.). If the values of these criteria decrease in comparison with those stipulated in the contract, the amount of the next payment from the customer to the contractor is reduced. At the same time, the contractor has complete freedom in the choice of building materials, solutions, methods and standards.

Unlike a concession agreement, a LCC encourages the contractor to create a reliable and high-quality highway and to moderate its operation (by combining design, construction and operation functions in one organization, as well as by adjusting the amount of payments from the customer to the contractor depending on the achievement of certain performance indicators). Another difference is that the concession agreement makes it possible to construct a railway cheaper, but in terms of its operation, the concessionaire, as a rule, does not provide the required efficiency. The use of the life cycle contract mechanisms ensures the efficiency of both the construction and operation of the railway. The use of LCC gives the following advantages to both the state customer (grantor) and the contractor (Table 1).

**Table 1.** Life Cycle Contract Advantages

<b>State customer (concessor)</b>	<b>Contractor</b>
1. Simplification of the contract and	1. Stimulating creative solutions, the use

control over its execution, which significantly reduces the need for personnel involved in the acceptance of the project, and prevents waste of funds	of innovative and resource-saving technologies
2. A significant reduction in the cost of the object and its maintenance (according to some estimates, up to 30% in the conditions of Russia)	2. Complete freedom of choice of technologies, construction methods, quality parameters, etc.
3. Reduction of technological and project risks	3. Improving the level of qualifications - both technological and economic, the possibility of entering the international market of life cycle contracts
4. Commencement of payments to the contractor only after the start of public use of the object of the contract	

For investors, life cycle center provides a clear and understandable payment return scheme guaranteed by the state, which reduces the risks of project financing for them.

For the state budget, such a scheme is also highly effective since there is no long-time lag between the investment of funds and their return (as would be the case with direct financing of the project from the state). In Russia, according to the ROSINFRA platform, only 27 life cycle contracts have been concluded to date.

The unpopularity of life cycle in the road sector is quite objective and based on the legal nature of the investment mechanism itself. First, the regulatory legal framework does not allow including the operation stage in the life cycle and does not provide for the possibility of concluding contracts for the reconstruction of existing roads. Accordingly, there is no opportunity to link all stages of the project within one contract. Secondly, like government contracts under the Federal Law № 44-FZ dated 05.04.2013 «On the contract system in the procurement of goods, works, services to meet state and municipal needs» (as amended on 08.06.2020) to be linked to the limits of budgetary commitments, which are set for three years, which does not allow the implementation of long-term contracts through the mechanism of public procurement, which is, to a greater extent, the life cycle. Thirdly, during the implementation of a project within the framework of the life cycle, all risks of an increase in capital costs at the construction stage due to poorly prepared project documentation, changes in the cost of imported components or for some other reason lie on the public side. In addition, it is important to mention that the principles of project financing for attracting borrowed funds to a project, as well as funds from private investors, are not applicable for life-cycle contracts, therefore the entire burden of costs falls on the state, and the private partner, contractor, attracts loans to fulfill its obligations at higher rates.

## 6 Securities

Alternative ways of attracting investments are possible by issuing securities.

The disadvantage of the method of raising funds by issuing debt securities in the form of bonds is the limited time period for their placement, which creates risks of either incomplete formation of a sufficient source of investment, or placement of bonds

with a higher yield, which will negatively affect the financial results of the investment object. To reduce the risk of placing a bonded loan on unfavorable terms, it is advisable to issue sequentially several tranches of loans in accordance with the implementation of the project. Each subsequent tranche will have a lower yield compared to the previous one, since the circulation time of bonds decreases.

To implement the project through the admission of equity securities, it is possible to use the issue of shares carried out by newly created joint-stock companies at the stage of establishment or by operating joint-stock companies.

The authorized capital of the joint-stock company to be created must be set in the amount of investment in the project in accordance with its economic justification. The share of the grantor is determined based on his share of investment in the total project cost. In order not to lose the opportunity to manage the company, the grantor must, at the stage of creation, determine the maximum block of shares of one shareholder to prevent possible collusion.

Since at the stage of creation, the placement of shares is carried out by private subscription, there is an opportunity to manage the process of attracting investment for potential investors, it is the opportunity to obtain a synergistic effect and invest in reliable financial assets that can bring constant income and are practically not subject to risk. Unlike a concession agreement, which involves the redemption of a share, the grantor can use similar amounts to redeem shares to maintain a dominant position in the joint stock company. In addition, the advantage of this method of attracting investments is the collection of funds in a short period of time, while investments are stretched over time. It is possible to temporarily place free funds in the market and receive income that can cover at least inflationary costs.

The disadvantage of this method of attracting investment is the risk of a dominant participant emerging by acquiring shares from other shareholders.

Attraction of investments in the form of issue of shares is an additional issue directly by the grantor. In this case, the additional issue may not exceed the missing funding. The advantage of this method is the absence of restrictions on the acquired block of shares, since if the entire volume of the issue is acquired by one person, he will not be able to influence the object management process.

In order to stimulate private investors, the Ministry of Finance of Russia and the Russian Union of Industrialists and Entrepreneurs (RUIE) agreed and sent to the government a package of proposals for new investment projects within the framework of agreements on the protection and encouragement of investments (SZPK) [13]. The main proposals of the union and the Ministry of Finance are the connection of financial products and instruments of development institutions to the SZPK mechanism and favorable banking regulation.

Some of the SZPK projects will be more likely than now implemented with favorable regulation of the Central Bank of the banking sector (recognition of financing under the SZPK, in some cases - benefits to banks in terms of standards with guarantees of the borrower's investment program). In addition, the Russian Union of Industrialists and Entrepreneurs and the Ministry of Finance of Russia consider it appropriate to have a temporary moratorium on negative revaluation of collateral (the Central Bank has already expanded it to all sectors in 2020), and also propose to discuss an accelerated VAT refund on investment projects for submitting tax returns before desk audits.

Currently, in Russia, because of the reduction in the key rate of the Central Bank of

the Russian Federation, deposits are no longer attractive to individuals. Individual investment accounts (IIA) have become an alternative way of saving savings. IIS is a financial instrument for attracting minority investors to infrastructure projects. Stockbrokers who sell PPP shares to individuals play an active role in the proposed financial model for project investment, thereby simplifying the search for minority investors for infrastructure projects. At the same time, this mechanism for attracting private investment from individuals allows maintaining transparency in the distribution of shares, while maintaining control of strategic projects for the state.

## 7 Special Purpose Entity

Such form of co-financing of investment projects as SPV (Special Purpose Vehicle) or SPE (Special Purpose Entity) is developing - a special purpose company, the primary goals of which are the implementation and maintenance of a specific project.

Basically, SPEs are created to carry out a specific transaction, where they act as a borrower, acquiring certain property rights or obligations from the project beneficiary. They are most often used if the project contains many participants that are regionally distant from each other and from the beneficiary of the transaction.

Primary directions of SPE implementation: mortgage lending, tax planning, investment attraction. Special purpose companies include various economic funds (for example, the European Financial Stability Fund) and financial development institutions (most often development banks).

In Russia, the emergence of SPE is due to the development of the corporate bond market, which makes it possible to attract financing by issuing Russian corporate bonds, Eurobonds, securitization of assets, project financing, purchase and sale of real estate, transactions with intellectual property.

The function of financing economically is to provide a third party with funds to create a property that can generate income from its use in the future. Legally, funding is provided in the form of payment for future rights that will arise from the use of the created property. The use of SPE for financing projects has a number of undoubted advantages due to the expansion of the investment base of the project, tax incentives, financing through the acquisition of property necessary for the implementation of or related to the implementation of the project and the issue of bonds.

Provided that the project is properly structured, financing with the participation of SPE, in our opinion, can become a remarkably effective way to attract funds from major players in the financial market, including such institutional investors as NPFs.

## 8 Conclusions

Each of the considered forms of attracting private investors to finance infrastructure projects, such as concession, Life Cycle Contract, securities, SPE have their own advantages and disadvantages.

**Concession:** hinders the attractiveness of participation in infrastructure projects of private business due to the opaque mechanism for the formation of sources of financing, in connection with which, in almost all projects in Russia, the state acts as an investor

in one form or another. Based on the legal regulations of the concession, an individual cannot be a concessionaire, he can participate indirectly as a participant in a company or a purchaser of bonds.

**LCC:** for investors, LCC provides a clear and understandable payment return scheme guaranteed by the state, which reduces the risks of project financing for them. Disadvantages - Life cycle should be linked to the limits of budgetary commitments, which are set for three years, which does not allow the implementation of long-term contracts through the mechanism of public procurement, which is to a greater extent life cycle.

**Securities:** The attractiveness of this method of attracting investment for potential investors is the possibility of obtaining a synergistic effect and investments in reliable financial assets that can bring constant income and are practically not subject to risk. The disadvantage of this method of attracting investment is the emergence of a dominant participant if he acquires shares from other shareholders.

**SPE:** Advantages of this model of investment in infrastructure projects: expansion of the investment base of the project, tax incentives, financing through the acquisition of property necessary for or related to the implementation of the project, issue of bonds. The disadvantages include the lack of an understandable legislative mechanism in Russia and the risks of abuse in the consolidation of financial statements of the SOPF with other legal forms of organizations associated with concealing losses.

Nepotism or corruption comes to the disadvantage of “weak interest” in the public sector: as through PPPs the existing principal-agent problems can be modified in the sense that – due to asymmetric information and fiscal leeway - political or public interest becomes less important than the business interests of the oligopolistic market players. Biased PPP regimes therefore act as a kind of monopolization of semi-open market situations. This problem becomes even more obvious because merely the public partner is bound by public law and political rationales, which do not apply to the private enterprise. Accountability in the traditional sense is not given in these cases; again, disadvantages for the public interest may be the result [14].

The choice of sources for the formation of investment resources is carried out taking into account the following factors: industry specifics, the volume of required investments, the cost of resources from various sources and their availability, the level of taxation, the level of accepted risk, the specified level of capital concentration [15].

The authors of the article consider the concession mechanism to be a priority in the development of a financial model for investing in infrastructure projects, which allows attracting private investors, including minority ones, contributing to the development and implementation of strategic state infrastructure projects, creating a concessionary society. The problem of cooperation between the state, municipal and private sectors of the economy consists in administrative barriers and the absence of government regulations that stimulate private investment in infrastructure, in connection with which the implementation of projects is faced with the need to attract additional budgetary allocations, which in turn repels potential investors. The ratio of government spending to gross domestic product (GDP) in the United States from 2014 to 2019 is at 35%, during the same period in the European Union, this figure decreased from 48% to 45% [16]. The data indicate that in developed countries there is a tendency to reduce the share of the state in the national economy, at the same time they are leaders in the development of infrastructure, which allows us to conclude that the private sector is



significantly wagging in the creation of socially significant objects.

Moody's analysts estimate the share of the public sector in the Russian economy at 40-50%, which corresponds to the estimates of the Center for Strategic Research, according to which the state occupies 46% of the Russian GDP. The stateization of the Russian economy and the lack of a transparent legal framework for PPP hinders the interaction of state and private economic agents. According to The Federal Antimonopoly Service of Russia (FAS), in Russia the ratio of the role of the state and the corporate sector in GDP is developing in the opposite direction [17]. The stateization of the Russian economy and the lack of a transparent legal framework for PPP hinders the interaction of public and private economic agents, which negatively affects the formation of infrastructure that meets modern technological requirements.

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## LONG-TERM CARE AT A CROSSROAD – THE GERMAN SYSTEM

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**Abstract.** A European comparison reveals striking differences in the construction and design of the national care systems. The ageing of the population, combined with other factors, intensifies the need for long-term care and requires increasing resources for social protection against the risk of needing care. Many countries are under pressure to find solutions for financing long-term care. It is due to this fact that this issue has been placed at the top of the economic and social agenda of these countries. The very difference in how long-term care is defined and organized in different countries is highly interesting because they have to meet the same future challenges. In view of the various vertically and horizontally fragmented long-term care systems within the European Union, policy makers and researchers need systematically processed information in order to assess the effectiveness of social protection systems for long-term care. This manuscript aims to contribute to the acquisition of improved knowledge about long-term care systems within the European Union. In particular, it will show how the social risk of the need for long-term care is covered in Germany.

**Keywords:** Long-Term Care, need of care, social care insurance, long-term care system, Germany.

**JEL classification:** *G 22, I 11, J 14.*

### 1 Instruction

In contrast to protection against "classic" social risks such as illness, maternity protection and unemployment, however, protection in the case of long-term care can look back on neither an international nor an international legal tradition. This backlog is due to the fact that the need for long-term care as a social risk is of comparatively recent origin.[26] It was not until the late 1970s that a few countries, among them France and the present Czech Republic and Slovak Republic, recognized the need for third-party support for people in need of long-term care and provided special services for this purpose. Until this time, the need for long-term care was not considered an independent phenomenon or a particular risk.[18]

According to article 34 of the Charter of Fundamental Rights of the European Union (FRCh),[11] the European Union nowadays recognizes and respects the entitlement to social security benefits and social services providing protection in cases such as maternity, illness, industrial accidents, old age, loss of employment and dependency. Social security in the event of the need for long-term care is expressly recognized here as a state task.[26] With the coming into force of the Lisbon Treaty in 2009, the European Charter of Fundamental Rights has become legally binding, which must be mandatorily observed.[12]

In European comparison, there are striking differences in the construction and design of care systems,[30] which are exacerbated by the federal organization of long-term care that is usually found. The answer to the question, what long-term care is and who is responsible for its provision, depends on the cultures and evolved structures of the respective welfare states.[2] This is due to the fact that the individual member states have developed their own systems in accordance with subjective needs, social traditions, their cultures and the financial means available.[29] The difference in the way in which social security for the need for long-term care is handled in the individual member countries alone is highly interesting because they must meet the same future challenges (Chapter 2).[18] In view of the various vertically as well as horizontally fragmented long-term care systems, policy makers and researchers need systematically prepared information,[21] to be used as a basis for assessing the effectiveness of social protection systems for long-term care.[19]

This manuscript is intended to contribute to the acquisition of improved knowledge about long-term care systems within the European Union and, in particular present, how the social risk of long-term care dependency is covered in Germany.

## **2 Perspectives of long-term care**

In the near future, pressure on long-term care is likely to rise for at least three reasons:

Firstly, the increase in the ageing of the population is constantly changing in the individual countries. Despite the uncertainty about the future proportionate amount of people in need of long-term care within the member states of the European Union, which varies enormously, the demand for long-term care services will increase in all societies due to demographic change.

Secondly, the changing social model, such as the decreasing size of families and the increasing participation of women in the official labour market, is likely to lead to a decrease in the availability of informal carers. This will shift demand to the formal care sector and generate an increase in paid care services.

Thirdly, increasing technological change makes it possible to provide long-term care in the home. This, however, requires a different care organization which is available in the individual member countries to date. That creates pressure to improve care and the services offered by care providers. The indicated need for change results in an increase in costs in the previously relatively small long-term care sector. These challenges will create upward pressure on the demand for long-term care services and consequently

require an increase in human and financial resources.[8] Many countries are under pressure to find solutions for financing long-term care. Therefore, this issue has been placed at the top of their economic and social agenda.[3]

### **3 German long-term care system**

On 1 January 1995, the fifth pillar of the social security system in Germany created a long-term care insurance.[14] It is intended to cover the financial risk of the need for care.[16] Unlike in most European countries this marked the beginning of a process of de-communalisation. Long-term care insurance is regulated at the national level. This includes above all the definition of the need for long-term care, the determination of the degree of care and the type and amount of care services. Carriers of the social long-term care insurance are the long-term care insurance funds. They are financed within the federal legal framework at state level by means of contracts between the long-term care insurance funds and the providers of social services.[1] The national regulatory system with a market orientation should ensure greater social justice and consumer choice. The responsibility is transferred to the lower levels of both state and private actors.[20]

Long-term care insurance is organised in addition to the health system. Since 2009, it has been compulsory for every citizen to join the long-term care insurance. The principle is that the long-term care insurance follows the health insurance. Accordingly, members of the statutory health insurance scheme must be compulsorily insured within the framework of the social long-term care insurance and all members of private health insurance are covered by private care insurance.[13] One of the most severe problems in the design of long-term care insurance is the solvency and long-term sustainability of public finances. The desire for a self-financing system, combined with an expansion of access for individuals with cognitive impairments and the need for quality improvement systems, has led to a number of reforms. Thus, the long-term care insurance system, which has remained largely unchanged from the beginning, was fundamentally reformed in 2008 (Care Further Development Act), 2014 (First Care Support Act), 2015 (Second Care Support Act) and 2017 (Third Care Support Act).[20]

#### **3.1 Access and care services**

All persons in need of care, regardless of their age, are entitled to benefits from the social care insurance.[13] The benefits are flat-rate and do not vary according to income or assets.[20] On January 1, 2017, the new levels of care were introduced, replacing the levels of care that had been in force until then.[17] Since then, benefits have been paid on the basis of five levels of care which take account not only of physical disabilities, but also of mental and psychological disabilities, thus extending entitlement in particular to people with dementia.[13] An independent medical service of the German health insurance funds determines whether the need for long-term care exists and at what level.[14] In the course of their examination of an applicant, the experts record the degree of independence of a person in a total of six important areas of life.[16] The

granting of the long-term care allowance depends on the level of care assessed and the care measures taken (at home or in a retirement home). Independent of the care level, support services for prevention and rehabilitation can be granted. These are given priority over all other care benefits, just as home care has priority over institutional care.[13] Special benefits of the long-term care insurance should make it easier for people in need of care to live independently in their own homes. For this reason, improving measures of the living environment and additional benefits are granted for dependent people who live in an outpatient assisted living groups.[22] The benefits from long-term care insurance do not differ between regions and are unlimited in time.[13]

In Germany there are three different arrangements that a person in need of long-term care can choose from:

- The long-term care allowance (cash benefit) or
- benefits in kind such as home care and institutional care.[25]

The main addressees of long-term care insurance are those in need of care. However, it also offers a range of information and support services for the relatives providing care. These include, for example, nursing courses, advice for carers, as well as benefits in kind such as care in case of prevention, short-term care and day and night care.[24] For entitled carers[20] the long-term care insurance pays social security benefits such as pension, accident and unemployment insurance.[6] Caregivers whose ability to work is limited due to home care obligations are entitled to 6 months' leave and, from 2017, up to 24 months' part-time leave. In addition to this, carers can apply for interest-free loans, which they must repay upon return to work.[20] In contrast to private insurance companies, there does not exist an explicit insurance contract in the social security system in which the covered benefits are laid down. Therefore, it is not possible to predict which benefits will be paid in the future. However, there is an implied promise of performance, otherwise the social acceptance of this system could not be assumed. Therefore, only gradual adjustments of the benefit catalogue are to be expected and extensive cuts in benefits are unlikely in the short term.[17]

### **3.2 Care infrastructure**

In accordance with the principle of subsidiarity, the long-term care system is intended to encourage competition between private sector providers, based primarily on quality and reputation and to a lesser extent on the price, which is highly regulated.[20] The supply side of the German care market is dominated by private providers. In 2017, there were 14,480 nursing homes and 14,050 home care services.[27] In 2017, a total of 3.4 million people were entitled to receive benefits from long-term care insurance. Of these about 818,000 (24%) persons received benefits for fully in-patient care. At home 2.65 million (76%) people in need of long-term care were cared for. A combination of out-patient care benefits and cash allowance was paid to 830,000 people. The remaining 1.76 million dependent people received only cash benefits which meant that they had to look after their own care provision.[28]

While the provision of services in the health care system is provided by health care facilities, in long-term care informal structures must be considered in addition to formal care services. In Germany, the relatives of those in need of care are the main service providers in the field of long-term care.[24] In 2017, 52% [28] of all people in need of care will be cared for without the involvement of external care services. This will result in about 2.47 million informal main caregivers in 2017. In addition to these, there are often other people who look after those in need of care. For example, 59% of people in need of care in private households stated that they receive help from two or more people. This means that the number of people involved in home care is at least twice as many as 2.47 million informal main caregivers. Germany's largest care service thus consists of the informal care workers.[24] Long-term care insurance requires that a large proportion of the care work is self-financed and privately provided. Thus, Germany relies on subsidiarity: the state only provides what the lowest level, in this case the family, cannot afford.[15]

Due to the increasing ageing of society, informal care is also likely to become more important [5] because the number of people in need of care is expected to increase. In 2050, 4.4 million people will probably be dependent as defined by the long-term care insurance system, who will be receiving benefits.[25] According to current forecasts, tens of thousands of additional nursing staff will be needed in the coming years.[7] Therefore, the care market remains a growth market and a job engine that has a stabilising effect on the entire economy even in times of economic crisis, provided that the existing and probably significantly increasing shortage of nursing staff do not lead to drastic distortions.[5]

### 3.3 Funding

Financing the social care insurance had not been a problem in the first years of its introduction, as a surplus was generated by the few applicants. However, expenditure already exceeded income in 2002 which prompted increases in contributions and led to discussions about pre-financing the programme because the social care insurance is obliged to finance itself.[20] The following major care reform in the last legislative period had considerable effects on the financing of the social care insurance.[24] The benefits for people in need of care have been expanded considerably with the introduction of the new care levels. In 2017, there were more than 700,000 people in need of long-term care compared to the end of 2013. Between 2013 and 2017, the benefit expenditure of the social care insurance rose by more than € 12 billion and thus much more strongly than expected to 35.5 billion. In order to compensate for the deficit of € 2.4 billion incurred by the social care insurance, contributions had to be increased.[7] As a consequence maintaining the solvency of the social care insurance represents a major challenge.[20]

The long-term care insurance is based on the structure of the statutory health insurance. One major difference, however, is that it is only partially comprehensive insurance. As a rule, persons in need of nursing care have to make additional payments.[1] Thus, the social care insurance already bears only just under half of the actual costs of the need for long-term care with a downward trend. The remaining

amount is borne privately by those in need of long-term care. Those who cannot afford the additional payments are entitled to social assistance under the "Help for Care" scheme.[4] In Germany, the most important sources of financing are the social care insurance, social welfare and private equity. In 2016, 83.7% of total public expenditure on long-term care will be covered by the social care insurance. A further 11.2% of this expenditure is covered by social welfare. In contrast, the share of public spending, borne by the private long-term care insurance with a quota of 3.0%, war victims' benefits with a quota of 0.5% and civil servants' allowances with a quota of 1.5%, is relatively small. Overall, these sources of funding accounted for 80.1% of total long-term care expenditure. The social care insurance is thus the most important funding source and at the same time covers only 67.1% of the costs incurred. Another 19.9% of total long-term care expenditure was privately financed in 2016. However, this figure does not take into account the opportunity costs of family care nor the € 8 billion that was privately funded for board and lodging and investment costs in nursing homes. In addition to this, the € 3.8 billion of private expenditure by persons in need of care who were unable to pay the costs is missing. The partial insurance character of the long-term care insurance system is therefore very clear.[24]

#### **4 Result for Germany and perspectives for the European Union**

Long-term care insurance contains a number of birth defects that still have an impact today and are shaping current reform projects and debates. These include the dual system of social and private long-term care insurance.[22] The reason for this is risk selection, from which private long-term care insurance benefits at the expense of social long-term care insurance. This is because privately insured persons not only have higher incomes, but also lower age-specific care prevalence. In addition to this, there is above-average representation of men, who have a lower frequency of care. These results in a disadvantage for those insured under the social insurance system. An integrated long-term care insurance system comprising the entire population would be the easiest way to compensate for the unequal distribution of risks.[23]

Social security systems have the advantage of defining a general or universal eligibility for long-term care, they combine cash and in-kind benefits, and often offer more choice than tax-funded systems without hindering access, as is the case with purely market-based systems.[9] In addition to this, social security takes into account both the risk of care dependency and the uncertainty of long-term care financing, and therefore offers a better mechanism for protection against both.[10]

Despite drastic reforms, the financing of the German welfare state is not yet sustainable in the long term. If attempts are made to maintain the current levels of benefits in the nursing care insurance system, the contribution rates will have to be increased considerably. The main reason for this is the two-fold ageing of the German population. In addition to this, there is the fact that nursing care insurance already covers only just under half of the actual costs of the need for long-term care. Those in need of long-term care who are unable to pay privately for the costs of care have claims on their social welfare institutions. This expenditure by the local authorities amounted



to about € 3.5 billion in 2016, which is also about 14% of the expenditure on the social long-term care insurance system. This amount is likely to increase dramatically in the next few years, as the level will probably fall and the many costs will rise disproportionately.[4]

Recent policy reforms aim to address one of the programme's core problems: the financial sustainability of long-term care insurance in view of an ageing population. However, it remains to be seen what the long-term impact of this will be, given the unpredictability of demographic change and future long-term care needs and the adequacy (or otherwise) of funding reforms.[20]

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## **The phenomenon of altruism: The analysis of altruistic behavior in dictator game**

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**Abstract.** The aim of this paper is the analysis of altruistic behavior and human decision making in dictator game. We run online experiment with two treatments – “Give” and “Take” Treatment and then we analyzed the dictator’s decisions. We investigated differences in decision – making between treatment frame, men and women, low- and high-income people and between people who had experience with charity activities and people who did not. We find out that women are more altruistic than men and people active in charity are more altruistic too. The income has almost no effect on altruistic behavior in our research.

**Keywords:** behavioral economics, altruism, decision-making

**JEL classification:** D64, D90, C72

## 1 Introduction

Nowadays, the analysis of people's altruistic behavior is very actual issue. The mainstream economy is significantly affected by alternative economics theories. Due to the popularization of new economics disciplines, such as behavioral and experimental economics, the human behavior analysis and decision-making analysis come to the attention of economics. For humans in today's world, it is not possible to live without any interacting with other people. Globalization and new technologies increase the demands on individuals in a more complex environment, which is also related to increasing deviations from optimal standard behavior. Altruism itself is also a deviation from the standard model of homo economicus, because altruistic behavior is incompatible with the standard feature of selfish maximalization of utility.

We can describe altruism as a selfless way of behaving, or it is also the opposite of egoism. Although measuring altruism using conventional economics methods is almost impossible, there is the possibility of measuring it in economics experiments where we can make analysis in constrained conditions. However, altruistic behavior is not the same for all people in the world, it can vary depending on age, socio-economics status or even gender.

Altruism is often associated with charitable activity. In some theories the charity is defined as a public good. It is the example of one of the most typical privately provided public good. The contribution to the charity corresponds to voluntary contribution to the public goods. The study of effectivity of various charity donation models is the part of public goods provision analysis.

Becker (1974) formulated the theoretical model of charity as a public good. Becker introduced the idea of altruistic individual, whose utility function includes private goods and also a public good. Then, the individual utility increase not even with consumption of private goods and also with consumption of public good. The Becker's theory explains, that in the case of private philanthropy exist free - rider problem. The free riding leads to a lower than effective rate of charitable activities. But the reality, when most people donate a large amount of funds to the charity, is not consistent with Becker's theory. For this reason, most of the economist try to find out alternative models. One of the most popular is the model of impure altruism developed by James Andreoni (1989). Andreoni extended Becker's model by added the benefit of the act of donation, which is called the warm – glow effect.

## 2 Literature Review

Currently, the definition of altruism is not uniform. Simons (1991) defined four basic characteristics of altruistic behavior:

1. Increasing external benefit at the expense of own's. The altruist primary wants to increase someone else's benefit without having to increase own benefit. This effort then influences his decision.
2. This effort is always voluntary. The altruist must voluntarily make the decision on increase the benefit of someone else.
3. The effort of altruist is intended. The act of an altruist must be primarily simulated by the desire to increase the benefit of someone else.
4. The individual does not expect any benefit in return for this effort. An altruist does not expect any reward from a person to whom he has behaved altruistically, either immediately or over a long time period.

This strict definition of altruism is not consistent with traditional economics theory, which is based on a model of behavior called *homo economicus*. Becker (1981) claims that in a large society the altruistic behavior can be observed in people who are close to each other (family, friend, etc.). Burnstein et al. (1994) adds that the altruism increases with the closer the connection between relatives. According to Batson and Shava (1991), people behave more altruistically when they are able to share the views or perspectives of the person they are confronted with. People with the higher level of altruism work more often as volunteers for various charities and thus behave altruistically towards people who are unknown to them (Carpenter, Myers 2010).

To investigate the influence of social preferences, such as altruism, economists often use economics experiments (field or laboratory experiments), which allow collection the data that conventional economics methods do not. With these experiments we can observe and measure the social preferences. Levitt and List (2007) defined four basic types of games that test social preferences and altruism too. These are trust games, public goods games, ultimatum games and dictator games. We choose dictator game for this research, so we will make other analysis with using only with this type of game.

According to Charness and Gneezy (2000) the dictator game is based on simple principles. There are two players in the game: the dictator and the recipient. The dictator has the amount of experimental money and distribute the experimental money between himself and the recipient. The ratio in which the amount will be distribute depends only on the decision of the dictator, he can keep 0% - 100% of the amount. The recipient does not have the option to reject this offer, which completely reduces the influence of fear of the dictator and makes it possible to measure the influence of altruism.

When testing altruism using a dictator game, the dictators redistributed around 20% of experimental money, which is not consistent with the neoclassical economics theory of human selfishness. According to the concept of *homo economicus*, a dictator who maximizes his benefit should keep the whole amount to himself. So, people behave more altruistically than expected. (Camerer, 2011)

The dictator game is often using for analysis the difference in altruism between different groups of people. The work of Henrik and Norenzayan (2010) investigated the influence of different cultural environments and its impact of the altruism. They find out that social preferences affect people from culturally developed countries more

than from third world countries. Frey and Meier (2003) then focused on the differences in altruism within students of different specializations. They concluded that the students of economics are less altruistic than other students.

Banerjee and Chakravarty (2012) observed how the dictator's altruism is influenced by the knowledge of the recipient's social and economics status. The dictators behave more altruistically towards people with lower social status and is willing to give up on average up to 70% of his budget.

In the dictator game, the researchers also often investigate the influence of gender or the influence of anonymity on altruism. Charness and Gneezy (2000) interpret their results that dictators are more altruistic towards the beneficiaries if they are people from the same social group – for example to a student from the same university versus competitive university student.

In Hoffman et al. (1996) the authors mention a situation in which a dictator receives a lot of information about the recipient. If, based on the information obtained during the experiment, the dictator is able to unambiguously identify his recipient, he may request ex post compensation from the recipient. If he behaves altruistically towards the recipient, it is possible that this happened for greedy reasons, and after the experiment, the dictator will find the recipient and demand something in return.

Andreoni and Vesterlund (2001) confirm that the difference between altruistic behavior of men and women exist, but not in general, but depending on the "price of altruism". In the case of a low "price of altruism", men are more altruistic, while in the case of a high "price of altruism", women are more altruistic. If the amount the dictator gave up was lower than the amount the recipient received for it, the men were more altruistic. In a situation where the amount the dictator gave up was higher than the amount the recipient received; the women were more altruistic. The price for altruism was replaced by a coefficient, which multiplied the amount that the dictator gave up in favor of the recipient.

Very interesting research is also Benenson et al. (2006) Researchers investigated the children's altruistic behavior in dictator game. Findings from this study indicate that, even by 4 years of age, a majority of children from both lower and higher socioeconomic environments behave altruistically.

### 3 Methodology

As we mentioned in previous text, we choose dictator game for our research of altruistic behavior. The method of economics experiment is very useful especially in study of human behavior and decision-making. Very clear definition of dictator game give Leder and Schutz (2018): „*The dictator game is an experimental paradigm in which one participant (the dictator) receives an endowment and then decides to what extent she/he wants to split this endowment with another, anonymous participant (the recipient). The*

*action space of the dictator ranges from giving nothing to giving all of the endowment to the recipient. The dictator fully determines the final allocation as the recipient plays a passive role. After learning these rules, the dictator makes a decision. The endowment split, i.e., the pie size given to the recipient, is the dependent variable of the game.”*

We run an online experiment via online form. Our participants were bachelor students from the University of Economics in Bratislava. First of all, we find out that students were interested to participate in online experiment. 88 students were interested in participating in an online experiment. We divided students into dictators and recipients randomly. Then we formed a pair of students – all the dictators had recipients. No one knew who he was in pairs with throughout the experiment. We employed a within-subject design with 2 treatments and 42 dictators in each treatment. The students had the opportunity to gain additional points to online exam depending on their decisions.

At the start of the experiment subjects were told they have 5 experimental euros, which was the same for all subjects in this experiment. In the “Give Treatment” the dictators were given access to an additional 10 experimental euros and could transfer any amount between 0€ and 10€ to the recipient. In the “Take Treatment” the recipient was given access to an additional 10 experimental euros and the dictator could transfer any amount between 0€- 10€ to himself. The roles of the recipients were passive – only the dictators fill in the online forms. Each treatment consisted of two parts – in the first part the dictators made financial decisions with experimental euros and in the second part the dictators fill in the demographic questionnaire. In the questionnaire we find out the gender of the dictators, the field of study, the net monthly income of the dictators and experience of the charity donation. In the question of the monthly income the students have five options (groups of monthly income): 1- 0€-100€, 2- 100€-300€, 3- 300€-500€, 4-500€-800€, 5- more than 800€. All answers were anonymous.

## **4 Results**

In this part of the paper we present our analysis of data from our experiment. First, we present descriptive statistics such as average amounts allocated by dictator. We analyzed allocations by gender, by income groups and by experience with charity. The results are divided by treatments.



**Table 1.** The structure of participants – in the number of participants (dictators)

	Gender		Income Group					Donating to Charity	
	Male	Female	0€-100€	100€-300€	300€-500€	500€-800€	more than 800€	yes	no
Give Treatment	10	12	5	7	5	0	5	16	6
Take Treatment	10	12	10	8	2	0	2	17	5
Total	20	24	15	15	7	0	7	33	11

Source: own processing

**Table 2.** – Average allocations by gender – in the number of experimental euros

	Give Treatment		Take Treatment	
	Male	Female	Male	Female
Average donation	4,70	4,92	5,60	5,00

Source: own processing

Data from Table 2 show, that in both treatments women behave more altruistic - in the give treatments they allocated more to the recipients and in the take treatment they transfer less amount for themselves. However, the differences are not so significant.

**Table 3.** – Average allocations by income group -in the number of experimental euros

	Give Treatment					Take Treatment				
	0€ - 100€	100€-300€	300€-500€	500€ - 800€	more than 800€	0€ - 100€	100€-300€	300€-500€	500€ - 800€	more than 800€
Average donation	5,00	4,57	4,80	no participants	5,00	5,25	5,25	5,50	no participants	6,50

Source: own processing

We can find in data from Table 3, that there is not significant difference between allocations low- income dictators and high-income dictators. It seems that dictator's income has not impact on altruistic behavior.

**Table 4.** – Average allocations by experience with charity donation – in the number of experimental euros

	Give Treatment		Take Treatment	
	Yes	No	Yes	No
Average Donation	4,50	6,00	5,24	5,40

Source: own processing

It is clear, that people with charity activities experiences are more altruistic. In “Give Treatment” is difference more significant – in average 1,5 experimental euros. In “Take Treatment” is not very significant difference, but also in this treatment people with experiences in charity behaved more altruistically.

**Table 4.** – Summary descriptive statistics/ number of experimental euros

	Give Treatment	Take Tretment	All Treatments
Average Donation	4,82	5,27	5,05
Minimum Donation	0	3	0
Maximum Donation	10	8	10
Standard Deviation	1,64	1,09	1,41
Variance	2,82	1,26	2,04
Median Donation	5	5	5

Source: own processing

At the end of our analysis we also run an OLS regression in Stata software. Our dependent variable is the amount allocated to the recipient(donation) and independent variables was gender dummy, treatment dummy, income dummy and charity dummy.

**Table 5.** – Regression analysis

Source	SS	df	MS		Number of obs	44
Model	7.5412529	6	1.2568754		F( 6, 37)	0.58
Residual	80.367838	37	2.1721037		Prob > F	0.7448
Total	87.90909	43	2.0443974		R-squared	0.0858
					Adj R-squared	-0.0625
					Root MSE	1.4738
donation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
genderdummy	-.0888432	.4597024	-0.19	0.848	-1.020289	.8426023
incomdummy_2	-.0813072	.5395154	-0.15	0.881	-1.174469	1.011855
incomdummy_3	.1672505	.7572772	0.22	0.826	-1.367139	1.70164
incomdummy_4	.5044856	.8568479	0.59	0.560	-1.367139	2.240624
charitydummy	.7655754	.5347104	1.43	0.161	-.3178508	1.849002
treatdummy	.6344093	.5248243	1.21	0.234	-.4289858	1.697804
_cons	4.531052	.5938136	7.63	0.000	3.327871	5.734232

Source: own processing

## 5 Conclusion

We can conclude, that our participants did not behave consistent with neoclassical assumptions – they were not selfish and did not maximize only own's utility. We also investigate that women are more altruistic in both treatment frame. Very interesting finding is that people, who have experience with charity are also more altruistic than people, who have not experience with charity activities. We employ a give and a take treatment and compare the amount given in the give treatment with the amount left for the recipient in the take treatment. However, our data are not very robustness, but for simply analysis they are sufficient. We cannot provide classic laboratory experiment because of COVID-19 pandemic. We try to run an online experiment and it was a new opportunity for us. In future research we would like to run classic or classroom laboratory experiment and compare data from both forms of experiments.

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## Financial Market Law - Its Influence On Business And Its Future Within Financial Law

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**Abstract.** Supervised financial market entities are subject to rules which are influencing and determining the commencement and subsequent conduct of their business. These entities carry out business activities belonging to the group of socio-economic relations regulated by financial market law. Financial market law and the legal relations arising within it have both private and public elements. Financial market law is a subsector of financial law. However, it is also possible to meet with opposing views. These legal opinions claim that financial market law will emancipate from financial law. And financial market law will become a separate branch of law. This evolution will occur due to the special object of legal regulation of financial market law. The paper focuses on selected aspects of influence of financial market law rules on the business of supervised financial market entities. It also pays attention to the question whether financial market law will remain a subsector of financial law.

**Keywords:** Financial Market Law, Supervised Financial Market Entities, Financial Law.

**JEL classification:** K 2, K 22, K 23

### 1 Introduction

Financial law can be defined as a set of rules that regulate the relationships arising in the process of creating, distributing and using monetary mass and its part (Babčák et al., 2017). Financial law belongs to public law. The objects of legal regulation of financial law are financial relations. The basic characteristics of financial relations can be summarized as follows: financial relations are economic relations, their essence and the reason for their origin are certain economic facts (Babčák et al., 2017); financial relations arise on the basis of the financial activity of the state and always represent a form of realization of public interests (Balko, Králik et al., 2005); financial relations have a property nature (Babčák et al., 2008); financial relations arise, change and terminate often independently of the will of the participants, based on the decision of the state, of a superior authority (Balko, Babčák et al., 2009). Financial law can be

divided into a general and a special part. The general part of financial law consists of rules that regulate the financial relations of most or all financial institutes of financial law and have a general meaning (Mrkývka et al., 2004). A special part of financial law is represented by a set of rules regulating specific areas of financial activity of the state. Based on specific features, the following subsectors of financial law can be distinguished: budgetary law, fee law, customs law, monetary law, foreign exchange law, tax law and financial market law (Holub et al., 2016). Attention will be paid to the last mentioned subsector.

## **2 Financial Market Law - The Term**

Financial market can be defined as a place where the supply of free funds in the form of savings of various economic entities and the demand of various economic entities for these funds, which they use for investment, meet (Chovancová et al, 2006). Financial market is a set of instruments, institutions and relations between them, through which there exists a transfer of free funds (Pavlát, 2013). Financial market means a system of relationships, institutions and instruments in which temporarily available funds are allocated and distributed on the basis of supply and demand (Horniaková, Čunderlík, 2009).

The concept of finance includes both private and public finances, which meet on the financial market, its macroeconomic impact is significant, therefore it cannot remain without rules, and these can be found in the provisions of financial market law (Balko, Babčák et al., 2009).

Financial market law can be defined as a set of legal rules regulating the conditions for the performance of the activities of financial intermediaries, financial instruments, financial consumer protection, regulation and supervision of the financial market (Balko, Babčák et al., 2006). The objects of financial market law are relations that arise in the process of creation and functioning of the framework of the financial market (Pauličková, Bakeš et al., 2007).

## **3 Financial Market Law - A Sum of Rules Influencing Business of Supervised Financial Market Entities**

Supervised financial market entities are legal or natural persons - entrepreneurs. To these subjects a license or registration has been granted in order to perform a certain kind of entrepreneurial activity on the financial market.

The Act No. 747/2004 Coll. on Financial Market Supervision and on Changing and Supplementing Certain Acts as supplemented (hereinafter only "Act on Financial Market Supervision") names in Article 1 the supervised financial market entities, which are being supervised by the National bank of Slovakia. The list of these subjects is interpreted to be final (Babčák et al., 2017).

To this legal opinion and opposite view can be presented according to which the list defined by the Act on Financial Market Supervision is not final.

When interpreting the list of supervised financial market entities not to be final, attention must be paid to a further competence of the supervisory body. The legislator

empowers the National Bank of Slovakia to supervise also legal and natural persons carrying out unauthorized activities on the financial market (e.g. Article 114 Paragraph 1 of the Act No. 43/2004 Coll. on Old-Age Pension Savings and on Changing and Supplementing Certain Acts as supplemented or Article 70 Paragraph 1 on of the Act No. 650/2004 Coll. on Supplementary Old-Age Pension Savings and on Changing and Supplementing Certain Acts as supplemented). Unauthorized conduct of business on the financial market means the provision of a financial service by a subject which is not authorized for this activity. Unauthorized conduct of business on the financial market takes various forms. The sophistication of unauthorized conduct of business is increasing. Subjects providing services on the financial market like this cannot create a coherent group. Taking the supervision of unauthorized subjects into account, together with supervised financial market entities is leading to the conclusion that list of supervised financial market entities is not final.

Supervised financial market entities are represented by legal persons and natural persons - entrepreneurs. It will be focused on legal persons - companies. These are joint stock companies and limited liability companies, determined by legal institutes incorporated in financial market law.

Following areas of the activities of supervised financial market entities on the financial market, which are influenced by financial market law, can be distinguished:

### **3.1 Influence on the legal form of supervised financial market entities**

Trading companies are being regulated in particular by the Act No. 513/1991 Coll. Commercial Code as amended (hereinafter only "Commercial Code"). For the trading companies which are supervised financial market entities the interpretation rule *lex specialis derogat lex generalis* will be applied. Leading to the conclusion that the Commercial Code will be applied subsidiary.

Special laws relating to the individual sectors of the financial market set the legal form of a supervised financial market entity, requiring particularly a joint stock company (e.g. bank, insurance company, asset management company, pension asset management company, supplementary pension asset management company). Where the legal framework differs, the legislator determinates, that a legal person must be founded as a corporation obliged to create share capital. So an entrepreneur may choose the form of a limited liability company (e.g. financial advisor, the payment institution or the e-money institute).

### **3.2 Influence on the organizational structure of supervised financial market entities**

Not only the legal form, but also the organizational structure of a supervised financial market entity, is being influenced by the financial market law.

An example is the obligation to include a compliance officer/or internal controller/or professional guarantor into the organizational structure of a supervised financial market entity. Regardless of the name of the function its main scope is to observe compliance with the legal environment. Mainly it is the monitoring whether the obligations that arise from the generally binding regulations for the entrepreneurial activity of the supervised financial market entity are being fulfilled.

The functions in the organizational structure must be taken up by natural persons with appropriate qualifications.

### 3.3 The sanction proceedings

The purpose of sanction proceedings is to punish supervised financial market entities for shortcomings in their activities. Shortcomings in the activities are defined by a set of legal acts governing the relevant financial market sectors. When defining shortcomings the legal acts show identical elements in the legal definitions of shortcomings.

Such as:

- non-compliance with the conditions laid down in the licenses;
- non-compliance with the conditions set out in the decisions of the National Bank of Slovakia, by which a prior approval of the National Bank of Slovakia has been granted;
- non-compliance with the conditions or obligations set out in other decisions of the National Bank of Slovakia;
- non-compliance with generally binding legal regulations relating to the activities of the supervised financial market entities.

The legal regulation of administrative offenses that can be committed in the area of the financial market is currently not completely regulated in one code. It is contained in a set of special laws regulating individual sectors of the financial market. In them the sanctions can be fined.

The sanctions proceedings are a special type of administrative proceedings, in which the application of the Act No. 71/1967 Coll. on Administrative procedure (Code of Administrative Procedure) is being excluded. The sanction proceedings are being governed by financial market rules. The National Bank of Slovakia is in charge of sanction proceedings.

### 3.4 The licensing proceedings

Licensing proceedings are also being governed by financial market rules and held by the National Bank of Slovakia.

In the licensing proceedings, licenses, approvals and prior approvals of the National Bank of Slovakia are granted. The outcome of a licensing procedure is a decision of the National Bank of Slovakia. It is an individual administrative act. These can be divided into two subgroups. The first consists of permits and licenses. The second group consists of prior approvals and approvals of the National Bank of Slovakia.

A permit or a license can be defined as an individual administrative act enabling the exercise of activities on the financial market. This is provided under the condition that the party to the proceedings has demonstrated compliance with the conditions laid down by law for the performance of the activity.

The decision of the National Bank of Slovakia granting a permit or a license to conduct business has constitutive effects.

After granting license to conduct a selected type of business on the financial market, the party to the proceedings becomes a supervised financial market entity.

Monitoring the entity and its activities is being carried out through an approval or a prior approval of the National Bank of Slovakia.



Both, approval and prior approval of the National Bank of Slovakia, are individual administrative acts by which the supervisory authority enables the performance of certain legally defined acts.

The distinction of both is the time at which the supervised financial market entity is obliged to dispose of a valid individual administrative act.

In order to perform acts subject to the prior approval of the National Bank of Slovakia, it is necessary that the supervised financial market entity files for a prior approval before acting. Meaning it already has a valid decision of the National Bank of Slovakia, when acting (e.g. when appointing a member of the managing board of a bank).

While performing acts subject to the approval of the National Bank of Slovakia, the supervised financial market entity is obliged to file for an approval after performing an act (e.g. when changing the bank's articles of association).

Acts subject to the consent or prior approval of the National Bank of Slovakia consist mainly of the following areas, e.g. outsourcing, sale of the business, election or appointment of natural persons to legally defined positions in the supervised entity (e.g. a member of a supervisory body), reduction of share capital or termination of business on the financial market.

The financial market rules regulating the conduct of both proceedings, contributes to the fulfillment of the objectives of financial market supervision in the Slovak Republic. In particular it is contributing to the protection of the financial market and of the consumers on the financial market.

The proceedings fulfill control function, verification function and the regulatory function.

## **4 Financial Market Law - Its Future within Financial Law**

Between 2005 and 2007 academic disputes had been held about financial market law. Distinct legal opinions arise concerning financial market law. According to one of them, financial market law is a subsector of financial law (Sidak, Duračinská et al., 2014). There also exists another legal opinion claiming that financial market law is not a part of financial law and it will become a separate branch of law (Králík, Jakubovič, 2005).

### **4.1 Reasons leading to a potential emancipation of financial market law into a separate branch of law**

An essential reason for emancipation of the financial market law is the increasing number of regulated financial market activities. These are reflecting on the technical progress and innovation.

A minimum level of regulation will always be needed, as over time some subject may not be able to resist the temptation to improve their market position by harming other competitors (Jopek, 2013).

Financial market regulation includes all those standards that include the governing of the behavior of financial market actors, through orders and prohibitions. Financial

market regulation also ensures the prevention of systemic risks, reflecting the importance of the financial sector (Ladler, 2014). At the same time, the state performs one of its functions, namely to ensure a stable and functioning financial market through regulation (Ladler, 2014).

The need for regulation can be derived from market failure, i. e. situations where the market can no longer fulfill the allocation function or does not perform it effectively (Baldwin, Cave, Lodge, 2013). One reason for financial market failure is information asymmetry. Under the term information asymmetry all situations belong in which one party to the financial service contract has less information than the other. The subject of activity of a financial institution is so complex that without a suitable education, few clients can understand it. Consumers as investors have an information deficit towards financial institutions (Davies, Green, 2008). And since obtaining information is costly and time consuming, only a minimum of investors are informed about financial products and financial institutions (Dewatripont, Tirole, 1994). And here comes the role of regulation, which reduces information asymmetry by setting information obligations.

Another reason for becoming a separate branch of law is protection of clients on the financial market.

The unauthorized conduct of business on the financial market takes various forms, with a tendency towards an increased sophistication. This represents a threat for an increasing number of clients and it is therefore appropriate for financial market law to become a separate legal branch ensuring even more effective client protection.

#### **4.2 Reasons for remaining a subsector of financial law**

The fact that financial market law is connected with financial law (and will remain as a subsector of financial law) can be shown on grounds of common methods, financial authorities and functions.

The basic method of regulating financial relations is the imperative method (Sidak, Duračinská et al., 2012). The imperative method enshrines the inequality of subjects of financial legal relations (Sidak, Duračinská et al., 2012). Financial market law is represented by a set of rules governing socio-economic relations arising among others in the area of financial market supervision. The imperative method is used during the performance of financial market supervision. On one side there is the supervisory body (empowered with competence) on the other side there is the supervised entity. The supervised entity (e.g. a bank) must endure on-site or off-site supervision checking whether the rules are being followed. The National Bank of Slovakia carries out financial market supervision.

A distinction must be made between the financial system and the system of financial authorities and institutions (Slovinský, Girášek, 1979). The term financial authority can be defined as a legal person established by law or according to law, operating within the limits of its competence in a certain area of financial relations (Babčák et al., 2017). However, it must not be only an authority of financial administration; such a status can also be granted to other entities, such as banks (Babčák et al., 2012). The system of financial authorities within the national framework is formed by state financial administration bodies, financial and other local authorities, banking system authorities (e.g. banks) and other (specialized) financial authorities (e.g. insurances) (Babčák et al., 2012).

This division shows that banks, insurances, supervised financial market entities, are a part of financial authorities. From which a common element between financial market law and financial law can be derived.

Financial market law provides functions that partially overlapping with the functions of financial law. Those are:

- regulatory function - defines i. e. access to business in the financial market,
- stabilization function - regulates in particular the position of financial intermediaries;
- protective function - ensures public protection of financial consumers;
- repressive function - manifests itself especially in the sanctioning of supervised financial market entities.

### **4.3 A possible inspiration from Germany and Austria**

Financial market law may develop for the future in a way it is being anchored in the legal orders of Germany and Austria.

The division of law into legal branches is common in Germany and Austria. However, the legal branches are not completely identical to the Slovak ones. There exists no subsector of law as financial market law.

In Germany and Austria different legal branches can be found. These are: the law of the capital market (Kapitalmarktrecht), bank law (Bankrecht), public economic law (öffentliches Wirtschaftsrecht) and insurance law (Versicherungsrecht).

Capital market law in the broadest sense represents all the rules regulating the capital market and affecting it directly or indirectly (Kalls, Oppitz, Zollner, 2015). Bank law can be defined as a set of rules from various branches of public and private law, from which a separate legal branch has gradually evolved (Tonner, Krüger, 2016). Bank law can be divided into public and private. Part of public bank law is banking supervision, which standards are characterized by the fact that banks, as the addressees of rules and are in a subordinating position towards the supervisory authority (Tonner, Krüger, 2014). Public economic law can be defined as the shaping influence of the state on economic life (Ruthig, Storr, 2008). Insurance law incorporates the law of the insurance contract, the law of insurance companies and the law of insurance supervision (Wandt, 2016).

This possible development of financial market law would not only reflect the current branches of law in Germany and Austria, but would also follow up on legal opinions from the late 90ties. There already had been presented ideas of dividing the regulation of the financial market into bank law (Balko, Grůň, 2001) or insurance law and bank law (Grůň, 1996).

## **5 Conclusion**

A supervised financial market entity can be defined as a legal or natural person who is under the control of a supervisory authority. The business of supervised financial

market entities is being predominantly governed by the rules of financial market law. Every entrepreneur starting business on the financial market is obliged to gain a permit or license. In Slovakia, these are being granted by the National Bank of Slovakia. In the licensing proceedings not only licenses, but also approvals and prior approvals of the National Bank of Slovakia are being granted.

The rules of financial market law determine the legal form, the organizational structure of a supervised financial market entity. In addition to this, supervised financial market entities will be sanctioned for shortcomings in their activities. The sanction proceedings are also being governed the rules of financial market law.

In science of financial law, a dispute about the classification of financial market law, took part between the years 2005 and 2007. There existed arguments for both opinions. In Czech Republic, the science of financial law came to the conclusion that the financial market law belongs to the subsystem of the special part of financial law (Bakeš et al., 2006). This legal opinion has been followed and since 2007 the situation stabilized.

The importance of the rules of financial market law is constantly increasing, as the need for regulation of the activities on the financial market has increased since the outbreak of the financial crisis. For the future, it can be expected that more and more activities on the financial market will be influenced by the financial market law.

The methods, authorities and functions of financial market law are partially overlapping with financial law. Providing evidence for the fact that financial market law and financial law are strongly connected. It can be stated that also in the future financial market law will remain a subsector of financial law.

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## Stochastic Modeling of Mortality Development

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**Abstract.** Traditional deterministic methods for mortality prediction did not take into account the stochastic nature of mortality and so the mortality improvement got underestimated. Consequently, actuaries began to prefer a stochastic approach which, in contrast to the deterministic one, views the observed values as random variables. One of the biggest advantages of stochastic modeling of mortality rate development is that it can be used to determine not only point estimates but also interval estimates of future mortality. The aim of this paper is to present and compare methods for mortality prediction. We will discuss three methods, the Lee-Carter, Lee-Miller and Booth-Maindonald-Smith method from both theoretical and practical aspects. First of all, we will look at these models in theoretical way and show the differences between them. Subsequently, we will estimate the parameters of above-mentioned models and forecast future mortality rates using the program R and population data of Slovak Republic. In the last section of this paper we will compare and analyze obtained mortality rate forecasts from all three models as well as compare the models for various age groups. The comparison will show that mortality rate estimates from the basic Lee-Carter method show higher values for most age groups than the other two methods and vice versa, that the Booth-Maindonald-Smith model estimate anticipates the most outstanding decrease in mortality rate in the future.

**Keywords:** Mortality Rate, Lee-Carter method, Lee-Miller method, Booth-Maindonald-Smith method.

**JEL classification:** J 11, G 22

### 1 Introduction

The mortality rate has been subject to analysis and researches in recent decades to reveal specific factors that influence its development and thus contribute to a more reliable forecast of mortality in the future. Mortality researches focus on both, mortality rate development in time and differences between countries.

It has been shown that in the last 50 years the mortality rate predictions have constantly underestimated its improvement over time. Xiaoming (2008) states that this false risk evaluation was one of the main reasons for insolvency of the British company Equitable Life Assurance Society. The topic of future mortality rate development has

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gained a lot of attention in the recent time, above all, for a correct setup of premises when evaluating insurance risks. Kirkwood and Austad (2000) hold the view that the aging process shall get delayed, which can lead to a more rapid increase in the life expectancy connected with the health improvement at the higher age of individuals. In the topic of mortality decrease a question appears more and more often, if there is a so-called biological limit of life and if the humanity is approaching this limit. This theory has been e.g. subject to research of Oeppen and Vaupel (2002), where they state that the life expectancy does not approach a biological limit. Oeppen and Vaupel at the same time propose to extend the mortality rate forecast by various genetic changes and non-genetic interactions.

The goodness of fit of the used model is therefore a key question for mathematical calculations in the insurance business as the use of a wrong method can have a significant negative impact on product evaluation for products that carry the risk of death or longevity and by this on the very solvency of the insurer. Traditional deterministic models did not take into account the stochastic nature of mortality and so the mortality improvement was underestimated, which resulted in incorrect calculations of insurance companies reserves (Models based on deterministic premises are described e.g. by Olivieri and Pitacco (2012)). Consequently, actuaries began to prefer a stochastic approach which, in contrast to the deterministic one, views the observed values as random variables. Stochastic models have been examined e.g. by Milevsky and Promislov (2001) or McNown and Rogers (1989), who extended the deterministic model of Helligman and Pollard (1980) by stochastic premises and thus created one of stochastic mortality models. In stochastic modelling it is necessary to define random variables appearing in the model and their mutual relations, as well as definition of the function used for the stochastic modelling. One of the biggest advantages of stochastic modelling of mortality development is that we can use it to determine not only point estimates but also interval estimates of future mortality.

One of the basic and currently most commonly used models for mortality prediction is the Lee-Carter (LC) model presented in Lee and Carter (1992). It is an extrapolation model for mortality prediction, which is mostly used for long-term predictions of variables such as mortality rates or life expectancy for individual ages. The reason why LC model is so popular, among other things, is that the exponential function is used here. Exponential function is suitable for mortality modeling, because due to the decreasing mortality trend, a decreasing function is needed, the decrease of which must slow down in time so that its values do not reach zero or negative numbers. The model's pragmatic approach to mortality prediction is a positive property too. The U.S. Bureau of the Census adopted LC method as a benchmark, too, which is another proof of the wide acceptance of this model. The LC model has been extended several times, even by the authors themselves, and there exist several variants. Two main ones are the Lee-Miller (LM) method presented in Lee and Miller (2001) and Booth-Maindonald-Smith (BMS) method presented in Booth et.al. (2002), which we will discuss in this paper.

The aim of the paper is to describe the basic stochastic model, the LC model, together with its two extensions, the LM and the BMS model. Further we will predict the mortality development by these three popular models on real data (population data for Slovak republic) and look at the prediction differences for various age groups. For

prediction we will use the statistic program R, among other reasons because it is an open source program highly compatible with other programming languages as C, C++, Java and Python. Access to high quality data by database development (e.g. the Human Mortality Database) and specialized software development with common programming language R helps us improve the knowledge on the field of future mortality development. Hyndman, Booth, Tickle and Maindonald developed and published a software package `demography` in R containing modeling and prediction by Lee-Carter method and its variants. Procedures to use the above mentioned (and other) methods for future mortality rate prediction in programming language R we will derive from the publication Charpentier (2016).

The goodness of fit for a chosen method depends in particular on the data available and the prognosis objective. In this paper we found out that the used mortality prognosis methodology affects the under- or overvaluation of mortality development for various age groups significantly, whereby the base data stay common for all used models. In general, the BMS method counts with a significantly lower mortality rate than the LC or the LM model and the basic LC model, with regard to its limitations and simplicity, presents for most age groups the highest mortality rates. Therefore, for actuary calculations, it is good to consider carefully, with respect to the usage purposes, which of the below-mentioned methods shall be used.

## 2 Lee-Carter and related forecasting methods

### 2.1 The Lee-Carter method. Theoretical approach.

Let us consider that the mortality rate is constant within year, so:

$$\mu_{x+\xi_1, t+\xi_2} = \mu_{x,t} = m_{x,t}, \quad (1)$$

for  $0 \leq \xi_1, \xi_2 < 1$  and  $t \geq 0, x \geq 0$ . The LC method assumes that

$$\ln(\mu_{x,t}) = \alpha_x + \beta_x \kappa_t, \quad (2)$$

where  $\alpha_x$  is an age-specific parameter that is independent in time and speaks of the average mortality level of a person aged  $x$ ,  $\beta_x$  indicates the sensitivity of the mortality rate  $m_{x,t}$  to changes in the parameter  $\kappa_t$ , being independent of time as well and the parameter  $\kappa_t$ , which is the only parameter that changes over time and expresses the level of mortality at time  $t$ . To use this model, the first step is to estimate parameters of the model  $\alpha_x, \beta_x, \kappa_t$ , most often using the maximum likelihood method or the least squares error method. We get estimates  $\hat{\alpha}_x, \hat{\beta}_x, \hat{\kappa}_t$  and by modeling the parameter  $\kappa_t$  as a time series we get future predictions. For predictions that begin in year  $t_n$ , where  $t > t_n$ , it holds

$$m_{x,t} = \exp(\hat{\alpha}_x + \hat{\beta}_x \kappa_t) = m_{x,t_n} \exp[\hat{\beta}_x (\kappa_t - \hat{\kappa}_{t_n})]. \quad (3)$$



It should be noted that the mortality rate  $m_{x,t}$  for  $t > t_n$  is modeled as a random process, which is based on a random process  $\kappa_t$  and from it we can calculate the confidence intervals for predictions of  $m_{x,t}$ . Since the parameters of the model cannot be determined unambiguously, it is necessary to consider certain constraints. The choice of the constraints is subjective and does not affect the quality of the model. In literature we can most often find the constraint

$$\begin{aligned} \sum_{t=t_1}^{t_n} \kappa_t &= 0, \\ \sum_{x=x_1}^{x_\omega} \beta_x &= 1. \end{aligned} \quad (4)$$

There are several methods to estimate the parameters of the model, but the most commonly used one is the least squares method. We will therefore consider a statistical model

$$\ln(\hat{m}_{x,t}) = \alpha_x + \beta_x \kappa_t + \varepsilon_{x,t}, \quad (5)$$

where  $x \in \mathbf{X}$  are the observed ages and  $t \in \mathbf{T}$  are the corresponding years of observation.  $\hat{m}_{x,t}$  are the observed mortality rates and  $\varepsilon_{x,t}$  are residuals, i.e. a random variable with mean 0 and constant variance  $\sigma_\varepsilon^2$ . The function to be minimized is

$$O_{LS}(\alpha, \beta, \kappa) = \sum_{x=x_1}^{x_\omega} \sum_{t=t_1}^{t_n} (\ln(\hat{m}_{x,t}) - \alpha_x - \beta_x \kappa_t)^2. \quad (6)$$

Let us estimate the parameter  $\alpha_x$  first. Let  $\frac{\partial}{\partial \alpha_x} O_{LS} = 0$ . Then we get

$$\begin{aligned} \sum_{t=t_1}^{t_n} (\ln(\hat{m}_{x,t}) - \alpha_x - \beta_x \kappa_t) &= 0, \\ \sum_{t=t_1}^{t_n} \ln(\hat{m}_{x,t}) - \sum_{t=t_1}^{t_n} \alpha_x &= \beta_x \sum_{t=t_1}^{t_n} \kappa_t. \end{aligned} \quad (7)$$

We use the constraint (4) to get the estimate of a parameter  $\alpha_x$  as

$$\hat{\alpha}_x = \frac{1}{t_n - t_1 + 1} \sum_{t=t_1}^{t_n} \ln(\hat{m}_{x,t}). \quad (8)$$

Now we need to estimate the vectors  $\beta_x$  and  $\kappa_t$ . Their estimation will be done by using the Singular Value Decomposition method (SVD)<sup>2</sup>. Let us have a matrix equation

$$\hat{M}_{x,t} = \ln \begin{pmatrix} m_{x_1,t_1} & \cdots & m_{x_1,t_n} \\ \vdots & \ddots & \vdots \\ m_{x_\omega,t_1} & \cdots & m_{x_\omega,t_n} \end{pmatrix} - \begin{pmatrix} \hat{a}_{x_1} \\ \vdots \\ \hat{a}_{x_\omega} \end{pmatrix} (1 \dots 1) \quad (9)$$

such that we subtract from each matrix row its average value. According to Wang (2007), if  $SVD(\hat{M}_{x,t}) = ULV^T$ , then the vector  $\beta_x$  is represented by the first column of the matrix  $U$  and the vector  $\kappa_t$  will be obtained by multiplying the first row of the matrix  $V^T$  and the first element of matrix  $L$ .

After estimating the parameters, it is necessary to extend the obtained function in the future and thus obtain an estimate of the future mortality development. Since the only time-dependent parameter is  $\kappa_t$ , we will look for its values for future years. The LC model estimates  $\kappa_t$  in relation to the total number of deaths. This adjustment gives more weight to higher mortality rates, roughly balancing out the impact of using the logarithmic transformation of mortality rates. Lee and Carter (1992) predicted the future values of this parameter by using a linear function

$$\hat{\kappa}_{t+1} = \hat{\kappa}_t + \theta + \varepsilon_{t+1}, \quad (10)$$

where  $\varepsilon_t$  is an uncorrelated error and  $\theta$  is a constant (drift), which is determined by the first and the last value of the parameter  $\kappa_t$ , written as

$$\theta = \frac{\kappa_{t_n} - \kappa_{t_1}}{t_n - t_1}, \quad (11)$$

where  $[t_1, t_n]$  are the input data years. This vector can be predicted for an arbitrary time period and is used to calculate the corresponding mortality rates.

Now we need to determine the confidence intervals. First, we determine the standard deviation of the values of the vector  $\kappa_t$  from the line by which it was approximated on the interval  $[t_1, t_n]$

$$s = \sqrt{\frac{1}{t_n - t_1 - 2} \sum_{t=t_1+1}^{t_n-1} (\kappa_t - \hat{\kappa}_t)^2}, \quad (12)$$

whereas  $\kappa_{t_1} = \hat{\kappa}_{t_1}$  and  $\kappa_{t_n} = \hat{\kappa}_{t_n}$ . Next, we need to determine the standard deviation for future values of  $\kappa_t$ . We estimate them as  $s_{t_n+m} = s\sqrt{m}$ . The 95-percent confidence intervals of the vector  $\kappa_t$ , for  $t > t_n$  we estimate as  $\kappa_{t_n+m} \pm 1,96s_{t_n+m}$  and from this it holds for the mortality estimate itself that

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<sup>2</sup> Wang, J.Z.(2007): Fitting and forecasting mortality for Sweden

$$\begin{aligned}
e^{[\alpha_x + \beta_x(\kappa_{t_n+m} \pm 1, 96s_{t_n+m})]} &= e^{(\alpha_x + \beta_x \kappa_{t_n+m})} e^{\pm(\beta_x 1, 96s_{t_n+m})} \\
&= m_{x,t_n+m} e^{\pm(\beta_x 1, 96s_{t_n+m})} \cong m_{x,t_n+m} e^{\pm(\beta_x 2s_{t_n+m})}. \quad (13)
\end{aligned}$$

The advantages of the model include robustness, simplicity, because it contains only a single factor that expresses the mortality dynamics over time, and its advantage is also that it offers a good fit across a wide range of ages. However, the disadvantages of the model are that the age parameter  $\alpha_x$  is insufficiently smooth, which is manifested mainly in small populations. This parameter also affects the trend of uncertainty at age  $x$ , which may lead to an underestimation of mortality uncertainty, especially in higher ages. Also the model does not allow the inclusion of improved mortality for different ages at different time, and because it is a one-factor model, mortality rates are perfectly correlated across different ages.

## 2.2 Other related methods.

Several variants of LC method were constructed to eliminate the deficiencies of the basic LC model. For example, Lee and Miller (2001) found that the pattern of change in mortality rates is not constant over time, but this is a fundamental assumption of LC method. Hydman and Ullah (2007) extended the LC method by proposing a nonparametric method of modeling and predicting logarithmic mortality rates. There are several extensions of the basic model, and in order to choose a suitable one, it is necessary to determine what we want to focus on when estimating.

### The Lee-Miller method

The LM method according to Charpentier (2016) differs from the basic LC method in three ways:

- In contrast to the LC method, the inputs of which were mortality data of the US population from 1933-1987, in the LM method the fitting period begins in 1950, because earlier data show irregularities, and these skew future results.
- The adjustment of parameter  $\kappa_t$  involves fitting to the observed life expectancy  $e(0)$  (the average number of years that a person aged 0 may expect to live) in year  $t$ , while the LC method is fitting to the total deaths in year  $t$ . Thanks to this assumption, it is not necessary to use population data.
- The jump-off mortality rates are considered to be the observed rates in the jump-off year, as Lee and Miller (2001) found a discrepancy between the fitted rates of the last year included in the estimate and the observed mortality rates in the same year. This error was eliminated by using the observed mortality rates in the jump-off year.

### The Booth-Maindonald-Smith method

The BMS method according to Charpentier (2016) differs from the basic LC method in three ways:

- The fitting period length is determined on the basis of statistical goodness of fit criterion, under the assumption that the principal score  $\kappa_{t_1}$  is linear. Unlike the LC method, where its common feature is the linearity of the best fitting time series of the model of the first component principal score, Booth et. al (2002) discovered and described that this linear time series gets negatively affected by structural changes. BMS seeks to achieve the optimal goodness of fit by assuming linearity of the first component principal score and it picks the optimal fitting period from all possible fitting periods, which end in year  $t$ .
- In comparison to the LC method, the adjustment of  $\kappa_t$  involves fitting to the age distribution of deaths, i.e. it uses quasi maximum likelihood method by fitting the Poisson distribution to model age-specific deaths and uses deviance statistics to measure goodness of fit.
- The jump-off rates are the fitted values of the given model, i.e. the fitted rates are considered to be the jump-off rates.

### 3 Practical application of described models on real data

In this section we will show practical application of models described in Section 2 on real data using program R. For mortality forecasting we will use historical data from the website of the Human Mortality Database (HMD) project, which is a database containing data on the population, mortality and birth rate of 41 countries, including Slovakia. In this database we can find both, raw data and modified versions such as cohort mortality tables. The data is divided by country, gender, age and year of origin.

In this database we have access to data for the Slovak Republic from 1950 to 2017 and for ages from 0 to 110+ years. We will work with mortality rates  $m_x$ , using the years 1962 to 2017 to predict the development of future mortality, because the quality of data between 1950 and 1961 is lower than of data from the following years. This limitation of the input data is also recommended by the HMD itself. In addition, we will consider ages from 0 to 100+, as for this age span our mortality tables are usually compiled. We will estimate the development of mortality rates by 2060, i.e. for 43 years ahead, and we will be interested in the total mortality rates, i.e. for men and women altogether.

Since we will be working with demographic data, we need to install the `demography` library in the R program. Subsequently, we will select the population data for the Slovak Republic and limit the maximum age to 100 years.

```
install.packages("demography")
library(demography)
```

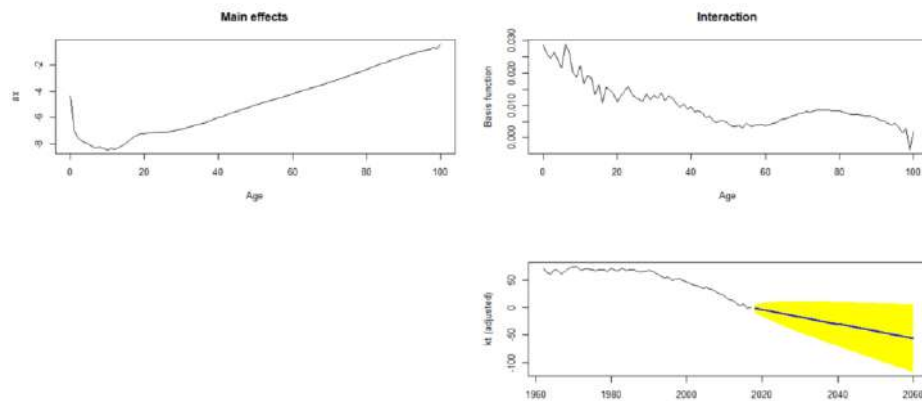
```
svk<-hmd.mx("SVK","username", "password", "SVK")7
svk.100<-extract.ages(svk,ages=0:100)
```

### 3.1 The LC method

We will perform the first estimate using the LC method described in Section 2. For this estimation we will use the built-in function of `demography` library. If we consider 95-percent confidence intervals of the vector  $\kappa_t$ , the R code will be as follows:

```
lc<-lca(svk.100, series="total",years=1962:2017)
forecast.lc<-forecast(lc,level=95,h=43)
```

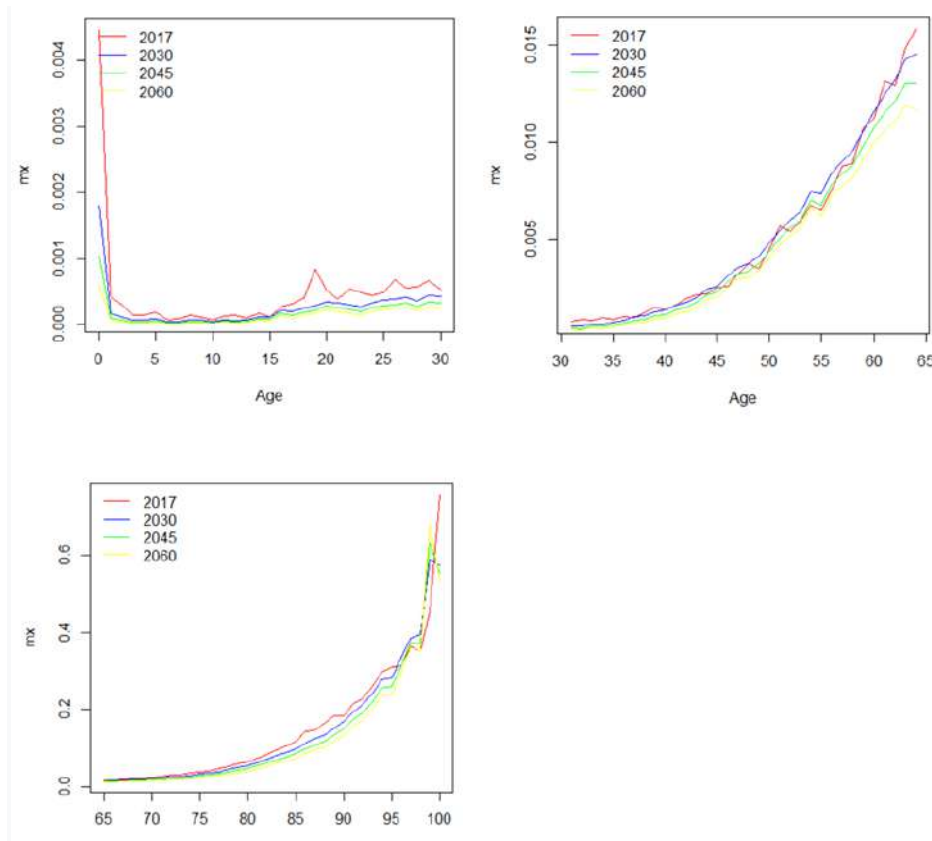
The parameters of the models we obtain by using the commands `lc$ax`, `lc$bx` and `lc$kt`. These are shown in Figure 1. The first graph describes the behavior of the parameter  $\alpha_x$ . It is obvious that with increasing age its values increase, as it indicates the mortality rate. There is a noticeable volatility in earlier ages, mainly under 1 year of age due to the sudden infant death syndrome and congenital defects, and also around the age of 20, mainly related to the higher occurrence of deaths due to injury. The second graph shows the parameter  $\beta_x$ , which describes the time effect on mortality between age groups. If its value is higher in some age groups than in others, the mortality rate is more volatile. We observe the largest volatility mainly at lower ages (up to about 30 years) and we also record an increase around 80 years. In the third and the last graph, we see that the development of the mortality rate has a declining trend over time. The dark blue line expresses the point estimate of the future  $\kappa_t$  values and the yellow area expresses the interval estimate, with respect to the determined confidence level.



<sup>7</sup>The access to data is personalized. It is necessary to be registered on HMD page beforehand.

**Fig. 17.** The LC model and forecast for Slovak total (both male and female) mortality. Fitting period = 1962-2017; forecasting horizon = 43 years.

The predicted development of mortality rates for different age groups and different years is shown in Figure 2. The rates for the jump-off year 2017 are the observed mortality rates. The graphs clearly show a declining trend in the development of mortality in the future. However, slight fluctuations can be observed in the last age group, i.e. from 65 to 100 years, which could lead to an underestimation of mortality at higher ages.



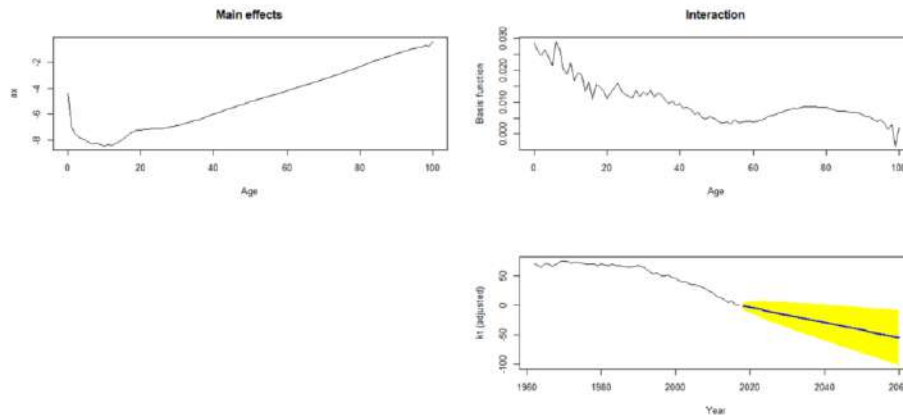
**Fig. 2.** Observed (2017) and predicted (2030, 2045, 2060) mortality rates using the LC model for Slovak total mortality in different age groups.

### 3.2 The LM method

As it was already mentioned in the Section 2, the LM method differs from the LC by the fact that the estimation of the parameter  $\kappa_t$  includes modeling to the observed life expectancy  $e(0)$  and that the jump-off mortality rates are considered to be the observed mortality rates in the jump-off year. So we modify the command as follows:

```
lm<-lca(svk.100, series
="total", adjust="e0", years=1962:2017)
forecast.lm<-forecast(lm, h=43, level=95, jumpchoice
="actual")
```

The estimated parameters of the model can be seen in Figure 3. As we can see, the parameters  $\alpha_x, \beta_x$  show the same trend as in the case of the LC model. However, the difference is noticeable in the parameter  $\kappa_t$ , especially in the fact that in the case of the LM model the confidence intervals are narrower, so the estimate should be more accurate.



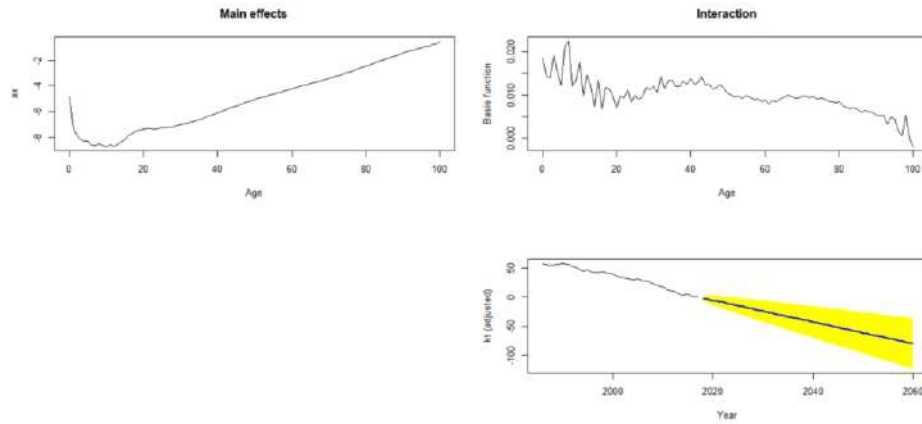
**Fig. 3.** The LM model and forecast for Slovak total (both male and female) mortality. Fitting period = 1962-2017; forecasting horizon = 43 years.

### 3.2.1 The BMS method

Now we will look at the estimation using the BMS method. Again, we use the built-in function in R and consider 95-percent confidence intervals for the vector  $\kappa_t$ . We set the minimum fitting period to 30 years. The BMS method is implemented thus:

```
bms<-bms(svk.100, series="total", minperiod
30, breakmethod = "bms")
forecast.bms<-forecast(bms.svk, h=43, level=95)
```

Figure 4 shows the estimated parameters of the BMS model. Unlike the LC and LM methods, the volatility of the parameter  $\beta_x$  is more significant and the values of the parameter  $\kappa_t$  decrease faster than in the models described above.  $\kappa_t$  also shows a linear trend, which is a logical consequence having in mind the model assumptions.



**Fig. 4.** The BMS model and forecast for Slovak total (both male and female) mortality. Fitting period = 1962-2017; forecasting horizon = 43 years.

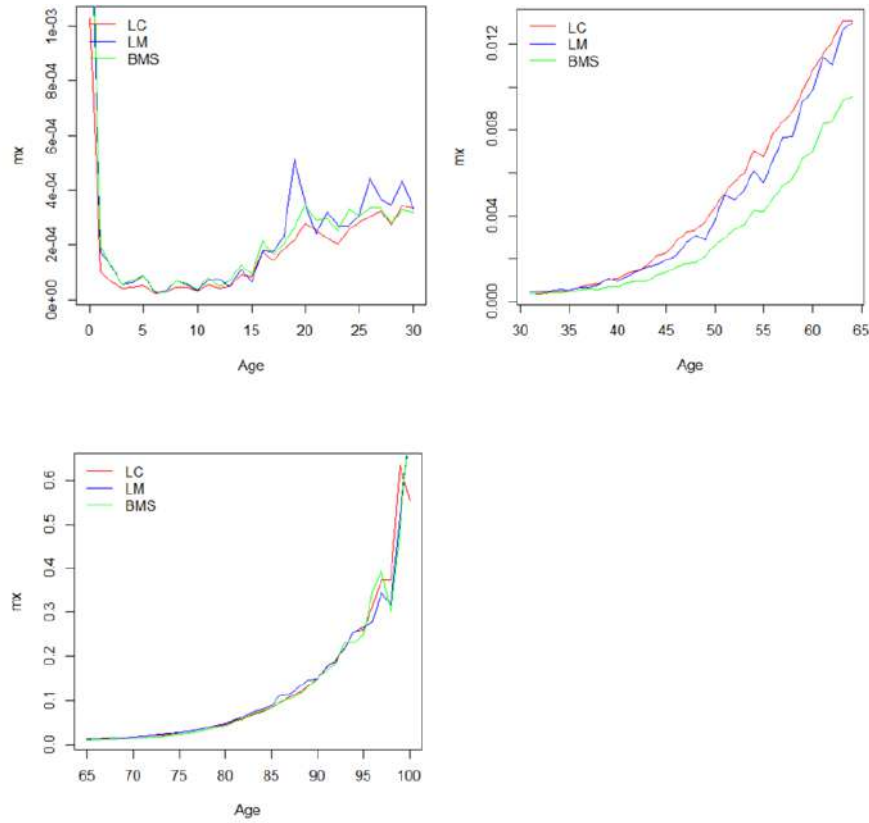
### 3.3 Comparison of results of LC, LM and BMS methods

In the Table 1 we can see the predicted mortality rates using the above-mentioned methods for different ages and years 2030, 2045 and 2060, and the Figure 5 shows us the predicted mortality rates for different age groups in year 2045.

**Table 1.** Predicted mortality rates for different ages and years, using LC, LM and BMS method.

Age	2030			Age	2045			Age	2060		
	LC	LM	BMS		LC	LM	BMS		LC	LM	BMS
0	0,0018	0,00277 7	0,00282 8	0	0,001031	0,00160 6	0,00168 8	0	0,00059	0,00092 8	0,001008
10	4,84E-05	5,11E-05	5,95E-05	10	3,14E-05	3,33E-05	3,65E-05	10	2,03E-05	2,18E-05	2,24E-05
20	0,00034 6	0,00043 5	0,00042 3	20	0,000278	0,00035 1	0,00034 8	20	0,000224	0,00028 4	0,000286
30	0,00042 8	0,00042 5	0,00044 3	30	0,000332	0,00033 1	0,00031 8	30	0,000257	0,00025 8	0,000228
40	0,00129 3	0,00113 8	0,00103 3	40	0,001075	0,00094 9	0,00070 6	40	0,000894	0,00079 2	0,000483
50	0,00476 7	0,00414	0,00348 8	50	0,004373	0,00380 4	0,00260 9	50	0,004012	0,00349 5	0,001951
60	0,01160 8	0,01057 4	0,00895 6	60	0,010768	0,00982 1	0,00699 1	60	0,009988	0,00912 2	0,005457
70	0,02142 6	0,02211 3	0,01906 4	70	0,018461	0,01910 3	0,01453 1	70	0,015907	0,01650 3	0,011075
80	0,05509 7	0,05561 5	0,05425	80	0,046787	0,04736 4	0,04294 6	80	0,03973	0,04033 7	0,033997
90	0,16948 2	0,16653 8	0,17447 6	90	0,150584	0,14827 9	0,15051 3	90	0,133794	0,13202 2	0,129841
95	0,28330 2	0,29031	0,28184 6	95	0,260271	0,26711 2	0,24935 3	95	0,239113	0,24576 7	0,220606





**Fig. 5.** Predicted mortality rates for different age groups for year 2045, using LC, LM and BMS method.

## 4 Conclusion and Discussion

The selection of a suitable mortality forecasting method is an important task, especially in life and pension insurance. History has shown that deterministic models lead to an underestimation of the improvement of future mortality rate, which may have a negative impact on insurers, especially in capitalizing type of insurance and pension insurance, as technical reserves may not be sufficient to cover the long-term risk. On the other hand, in the case of death insurance, the underestimation of mortality can lead to the same problem, and therefore, in actuarial calculations, it is necessary to use an appropriate model with regard to the risk to be covered. Stochastic models have

therefore proved themselves to be more appropriate, as they look at the observed values as random variables.

In Section 2 of this paper we approached the basic LC method from a theoretical point of view and generally its two extensions, the LM and BMS method. In Section 3 we applied our theoretical knowledge to real data, i.e. to population data for the Slovak Republic obtained from HMD. We estimated parameters of each model and compared the predicted mortality rates obtained by mentioned methods using the program R.

In the Figure 5 we can see the predicted mortality rates for year 2045 using the above-mentioned methods for three age groups. If we look, for example, at the age group of 30 to 65, we can see that the BMS method assumes lower mortality rates than LC and LM here, so this model could be the most suitable for evaluation of those insurance products, where longevity risk has a significant impact on profitability and the LC model would in turn be suitable, for example, for death insurance. If we look at the age group of 65 to 100, then we can see that in general, the BMS model would be theoretically a suitable model for evaluation of longevity risk, as, except for the age between 95-97 years, it reaches the lowest values among discussed models.

If we look at the predicted mortality rates in the Table 1, it is clear that all three models assume that the mortality rates will decrease over time. The most notable decrease in mortality rates we can see especially in post-productive ages. The BMS model, in terms of predicted mortality rates, reaches the lowest values at most ages and, conversely, the LC model usually reaches the highest values among discussed models.

When selecting a suitable method, it is necessary to take into account, among other aspects, the range of the input data, data quality or the purpose for which the method is to be used. For this reason, it is not possible to explicitly determine which of the above-mentioned models is the best one. Residual analysis, for example, would also be needed to determine the appropriate method. The handouts of actuary education of the Institute of Faculty of Actuaries appeal in this topic as follows: *“Describe the approaches to the forecasting of future mortality rates based on extrapolation, explanation and expectation, and their advantages and disadvantages. Describe the Lee-Carter, ageperiod-cohort, and p-spline regression models for forecasting mortality. Use an appropriate computer package to apply the models above to a suitable mortality dataset.”*

The article presents a graduate formulation of the topic of mortality modeling with the description of outcomes we gained working with the programming language R. As input data we chose the population data for Slovak republic, but this can be modified according to the particular analysis. An emphasis has been placed on methodology of stochastic mortality modeling by this method.

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## Online scanning and break-through attempts conducted by foreign attackers to internal online systems and the costs associated with them

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**Abstract.** In first section of our paper we describe several types of attack that impact data security nowadays. We focus on dictionary and brute force attacks in theory and practice. Then we chose most vulnerable services that are exposed on internet. Those services are well-known world-wide web services (web server) and secure shell (ssh) service which is mostly known as tool for system administrators to maintain operating systems. The second chapter describes methodology we used in our research. Third chapter aims on results we obtained using various techniques and finally the countermeasures we applied. We filtered out the most countries where attacks had been led from and finally showed brief graph overview of rising costs spent on security measures and estimated future costs.

**Keywords:** security, vulnerability, online systems, countermeasures

**JEL classification:** M15

### 1 Introduction

In recent years, we have witnessed the rapid take-up of new technologies and the upgrading of existing ones. Each device and service we own generates some amount of data. These data become more valuable than before because of continuous migration from paper media to digital media in state service, business and so. Data are valuable for criminals for trading, espionage and racketeering. State service and also companies invest more money to strengthen security of their systems and employees' security awareness. These items in budgets are continuously growing so it is necessary to highlight the weakest spots in infrastructure. These spots should be identified individually according to needs of the company and according to services they provide. Our paper is targeted on most commonly used services, that many companies use to administer their internal systems or to run web infrastructure like internet shops, internal systems, online presentations and alike.

## **2 Attacks and costs accompanied with them**

In these days there exist threats that can be imposed on IT infrastructure. This behavior brings increased costs, because of precautions taken before or costs caused after data being damaged. Economic damages can sustain any company. According Cybercrime magazine (Morgan, 2019) worldwide expenditures rise from 3,5 billion of US dollars in the year 2014 to 120 billion USD in 2017, which is almost 35x over 13 years. These cover cybersecurity market at all – hardware and software measures. Information security is a subset of overall cybersecurity market and its own costs reached 114 billion of USD in 2018 and forecasted costs are about 170 billion of USD. Costs mentioned above are only of those spent on precautions. Damages caused by attacks are way higher, prediction on year 2021 is almost 6 trillion USD (Morgan, 2018). Companies must invest on their infrastructure, like specialized hardware which could prevent intrusion into company systems, backup systems and alike. Secondly companies must bear higher costs for security courses and training staff to increase their actual knowledge in security area. We as the members of Department of Applied Informatics wanted to find out, if also our university is under attacks described briefly in this paper. Our research proved, that our technical infrastructure is under massive everyday malicious testing from the attackers' side trying to break in our infrastructure. As we can see in before mentioned sources, by appropriate securing our IT systems, we can save significant amount of money mainly on preventing damages caused by attackers. The aim of our paper was to find out, analyze and take countermeasures to prevent any malicious actions we detected and therefore to diminish the risk of losing data and risen costs related with it.

### **2.1 Types of attacks and ways of intrusion into systems**

There are several types of attacks in practice, the phishing attack, which is to persuade the victim to take some action that an attacker needs to successfully penetrate the system. Such an unaware collaboration consists, for example, in deceiving a victim to trigger an attachment from mail, for example a false billing from an operator when, after running the zip archive content, files with the most known extensions were encrypted on the computer and the attacker requested a ransom for files decryption. Another type of attack is a worm that scans, for example, home and business networks, and searches for vulnerable services such as file sharing services and the like. Another type of attack is the attack through public Wi-Fi networks, where the attacker can try to capture unencrypted communication of other users. It is another popular technique, when USB keys are left in different public places, and when they are inserted into a computer, they can try to infect it and then capture user activities such as keystrokes, screen, camera and microphone to watch activity around the computer area.

In our text, we will focus only on network-based attacks that are targeted on intrusions by using port scanning tools and testing dictionaries names and passwords - dictionary-based attacks and possibly brute force attacks.

## 2.2 Infrastructure monitoring

Our infrastructure, on which we actively monitored intrusion attempts, included several types of servers where Linux distributions were installed, namely two CentOS Linux servers, one Debian Linux server, and one Suse enterprise Linux server. All servers are used for teaching and have only those services and ports configured for the service needed. Servers are regularly updated to keep running most recent version of libraries. The author himself has been active in the field of information technology as a system administrator, so current installations can be considered as properly set up and secure as possible. In addition to known bugs in operating systems and other software products, the so-called zero-day vulnerabilities exist, where the software manufacturer has not updated the libraries yet. This type of errors are probably the most dangerous and there is no effective protection against them.

On our infrastructure, the ssh (secure shell) service is currently running, which is essential for the remote administration of Linux-based servers. Furthermore, the Apache web server service is essential for running web-based applications. Apache web server is not the only product that allows web applications to run, but is one of the most widely used. In addition, we have an Oracle database server and MySQL database server running in our environment. Database servers can run completely isolated from the Internet environment, but are vulnerable indirectly through so-called sql-injection attacks that an attacker can execute through an application running on the Apache web server while communicating with the database server.

## 2.3 Secure shell (ssh) service

Secure Shell (ssh) is a cryptographic network protocol for operating network services securely over an unsecured network. Typical applications include remote command-line login and remote command execution, but any network service can be secured with SSH.

SSH uses public-key cryptography to authenticate the remote computer and allow it to authenticate the user, if necessary. There are several ways to use SSH; one is to use automatically generated public-private key pairs to simply encrypt a network connection, and then use password authentication to log on.

## 3 Methodology

Based on literature review we have chosen some types of attacks which also occurred mostly on our operating systems. We also analyzed malicious behavior noticed in system logs. According to Pan et al. (Pan et al., 2019) attacks can have significantly different characteristics. Different types of web attacks, such as SQL injection, cross site scripting, remote code execution and file inclusion vulnerabilities, use different forms of attack vector and exploit different vulnerabilities inside web applications. These attacks therefore often exhibit completely different characteristics. For example, SQL injection targets databases, whereas remote code execution targets file systems. Our effort was targeted to prevent attacking primarily on ssh service because we used

deep log files inspection before choosing which service is mostly flooded with break-in attempts.

We used comparative method to see what results were obtained by researchers on St. Cloud State University (Faust, 2018). They were using method for analyzing traffic called “Honeypot” utilizing false servers imitating real servers. Data they gathered were quite different contrary of ours. We measured that most attacks were conducted (first five places) from China, United States, Vietnam, Australia, Indonesia and foreign study mentioned China, Hong Kong, Russia, United States, India. Based on this data we can preliminary conclude that at least two countries in our study and foreign study list were identical – China and United States. Further research would be appropriate to continue to track actual and future trends to attack our communication infrastructure.

Methodology we used in our model was as follows:

- 1) Manual check of chosen log files on daily basis. Log files we were monitoring was *secure* log file, which is located in */var/log* directory and *access\_log* in */var/log/httpd* directory. According to Pompon and Heath (Pompon, 2020) authentication attacks belong to top ten attacks against service providers in period from the year 2017 to 2019. Our monitoring confirms that presumption and we focused on monitoring already mentioned *secure* log;
- 2) We used particular techniques to identify entries in *secure* log with failed login. Techniques are explained in more detail in “Results” section in this paper;
- 3) After identification of malicious IP addresses we took countermeasures to block them (described in “Results” section);
- 4) Later we monitored further failed login attempts and at the same time we monitored if banned IP addresses were still trying to connect to our systems;
- 5) With the tool *whois* we found out the country of origin of IP addresses.
- 6) Statistics calculated for the given period from 20<sup>th</sup> of March till 25<sup>th</sup> of April 2019 (Fig. 1).

For our own research it is necessary to have a server running on the public network - the Internet and enabled logging events for a particular service. We have to know how to use available third-party tools to analyze log records, or use embedded operating system tools. We have used the built-in operating system tools for analysis as they are present in every Linux installation and are therefore immediately available.

The model for use in our work has been set up as a sequence of steps, when we provide both current and archived logging records (Hussain, 2013) for processing purposes, as a second step we have prepared a script that performed analysis on the logs, resulting in the extraction of data that contained only the failed login attempts. Since logging records contain thousands of records of both legal and illegal activities, filtering out relevant data was a necessary step. Since the newly acquired data is also in large quantities - depending on the size of the log files, it can be thousands of lines depending on the time span we choose - it is necessary to perform additional filtering according to the IP address (Schmidt, 2017), where we get the frequency of IP addresses

from which penetration attempts were made. Subsequent analysis will determine the first five most numerous attacks and from which countries, respectively networks they originated. To determine the ISP of the attacking IP address, we will use the IP address tool called whois in conjunction with the nslookup tool. Both tools will be used as needed, whois will be most used. After the main analysis, we can determine which networks are most involved in the current attempts to infiltrate our network, and we can give network administrators recommendations for taking active action. This tool is usable repeatedly without restrictions and therefore can provide recommendations on any time basis, but to reduce the load on the current server it is recommended to do once a day, or do off-line analysis, that is, on another specified server performed as needed.

The tool in the current development phase is designed to find suspicious IP addresses from which a predefined amount of penetration attempts are made and display the IP address to the system administrator after analysis. In the future, the author plans to extend the tool to include active measures in the form of direct entry of malicious IP addresses into the `/etc/hosts.deny` file (Bandel, 2000), where we block the ability to connect to the server and in our case it will be a ssh service that was mentioned in the text above. The advantage of our tool is basically instant executability and minimal setup effort, as well as its currently free use.

## 4 Results

### 4.1 Obtaining data

As mentioned earlier, the operating system on which we will analyze logs is CentOS Linux version 7, which is derived from Red Hat Enterprise Linux, which itself and its derivatives are among the most widely used operating systems in the corporate area (The Red Hat Enterprise Linux Team, 2018). In this version of Linux, we are looking for log entries in `/var/log/` and we will evaluate the logs of the intrusion attempts through the ssh protocol running on port 22 and the log file name is `secure`, the full path of the log file will be `/var/log/secure`. Successful login attempts are also noted in this file, and messages such as the `crond` process that execute tasks according to their time settings are also written to this file. In other Linux operating systems, the `/var/log/` location is also used, but the log file name may vary, and the internal structure of these log files may also vary. For example, in Suse Enterprise Linux, ssh records are stored in files named `audit`. We analyzed logs from 20<sup>th</sup> of March till 25<sup>th</sup> of April 2019.

Since we need to find penetration attempts, we will use the operating system tools to see if there are bad login attempts and calculate the number of attempts using another operating system tool (`wc` tool, will be mentioned later). As mentioned in the text above, we will have to set threshold value represented by the number of invalid login attempts. For our purposes, we will choose the value of 5 attempts, unless the value proves not to be accurate (for example, a legitimate user forgets a password and tests his passwords to log in), so we can adjust that threshold. To find bad login attempts, we will use the Linux command combination within the bash (Michael, 2008): `cat /var/log/secure | grep -i failed`. This command combination shows (`cat`) the contents of the `secure` file and then executes the `grep -i` command after `cat` statement, which



searches for the occurrence of the word failed. The -i switch ensures that the word failed can be in the form of, for example, Failed, that is, Linux distinguishes uppercase and lowercase letters in commands, as opposed to Windows, which does not distinguish between case letters. This property is generally referred to as case sensitivity (Bresnahan, 2015). In a small preview, we'll show the result of this operation:

```
Apr 23 17:53:34 CentOS sshd[20497]: Failed password for invalid user pi from 135.0.47.21 port 43374 ssh2
```

```
Apr 23 17:53:34 CentOS sshd[20509]: Failed password for invalid user pi from 135.0.47.21 port 43375 ssh2
```

As shown from the example above, the attacker tried to connect to ssh from California's IP address 135.0.47.21 with user pi, where the attacker believes that he is trying to attack raspberry pi on our network (Upton, 2016).

In the next example, we calculate the number of penetration attempts using a command combination: `cat /var/log/secure | grep -i failed | wc -l`. This command combination no longer shows the contents of the secure file on the screen, but directly counts the occurrence of rows with the word failed in the computer's memory and lists only the number of records at the end of the operation. The wc command means "word count" and the -l switch counts the number of lines. The logging record audited in the earlier period has shown that over time approx. 5:35 am to 1:00 pm during the same day, the attacker attempted to penetrate 8504 times from the same IP address, which is documented by a short log record:

```
Mar 29 05:35:27 CentOS sshd[5459]: Failed password for root from 107.0.106.213 port 49967 ssh2
```

```
Mar 29 05:35:30 CentOS sshd[5464]: Failed password for root from 107.0.106.213 port 50189 ssh2
```

This IP address was banned later and we will show how in the next text.

## 4.2 Banning IP addresses of the attackers

Blocking addresses that try to connect to our server through ssh can be done in several ways. When we talk about enterprise infrastructure, the easiest solution is to ask your network administrator to activate blocking rule at the central firewall, which is a network traffic control device. This approach is the most widely used, but it has one disadvantage for our approach, which is the constant need to contact the network administrator to block a specific address or unblock it if the situation so requires. Another option is to use a firewall on our own server to block the IP address. This service is provided, for example, by the firewall-cmd utility (Ellingwood, 2015) or ufw application (Krout, 2019). However, configuring these utilities requires some experience in network administration as well as network protocol knowledge, such as which service uses which port (Russel, 2012) and so on.

Therefore, we will use a system service that allows us to block individual IP addresses based on the service. So, we define which service is blocked for a specific IP, but other services are not covered if we don't change that setting. So, in short, if we block an IP address from accessing our ssh service, then the www service, that is, the web server service providing the website does not apply the blocking. This is because access to the server management (via ssh) is mostly done by a few people, but virtually anyone from around the world accesses the web presentation because the web presentation is intended to be publicly accessible. The Linux operating system uses a pair of files to control the access to its services, namely /etc/hosts.allow and

/etc/hosts.deny. The hosts.allow file allows addresses that are explicitly defined to access the service while a full access ban is applied, and hosts.deny has the opposite effect that all IP addresses are allowed to access our service except those defined in this file. For our approach, we have chosen to use the approach that all IP addresses have access to the services of our server - in our case ssh service - except those explicitly defined in the /etc/hosts.deny file. The addresses in this file are to be "punished" by prohibiting access for their behavior on our server being evaluated as a penetration attempts and not standard communication.

Furthermore, another advantage of this solution is that we can disable entire IP address ranges (Schmidt, 2017), not just one particular IP address. From our experience, we know that attackers use thousands of IP addresses, so it is no harm to block the entire scope, especially when we know that they are locations outside Slovakia. Once the entry to this file is made and saved, the blocking of that address is activated. The address is permanently blocked until it is manually deleted. Of course, we must be careful not to block ourselves inadvertently, because then it is necessary to unblock either directly at the physical location of the server or unblocking it from another non-blocked IP address. This applies to ssh service. The advantage of this approach is that even a non-IT specialist is able to perform these interventions after short training. Here's a small bit of /etc/hosts.deny:

```
sshd:
58.242.83.,61.177.172.56,112.115.181.187,168.195.230.82,59.45.175.,105.,203.206.,213.248.,186.227.230
.40,218.,153.,209.87.,115.249.,111.0.,123.,46.166.
185.,221.,122.,188.164.,121.,186.,181.,188.19.,31.,173.,46.,190.,124.,95.188.,117.,49.,95.68.,175.,103.2
07.,113.,91.197.232.,51.
```

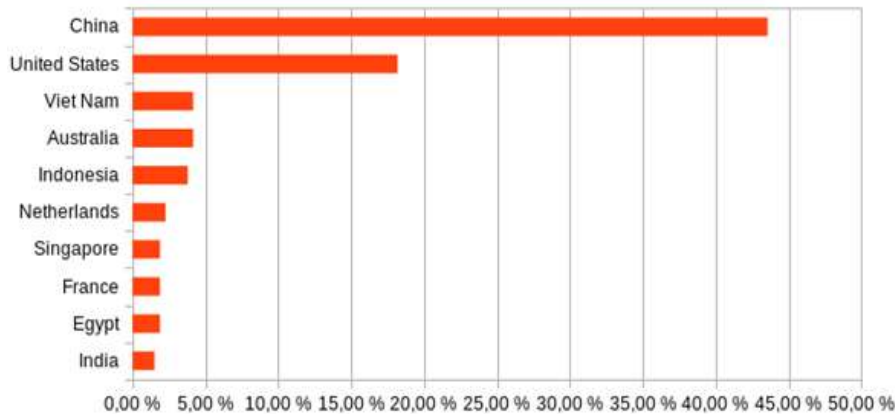
It can be seen from the brief illustration that we are also blocking specific IP addresses (they have the form X.Y.Z.W - that is, they have four octets (Blank, 2004)) or entire IP ranges, e.g. 51 (marked with bold font). This means that no IP address starting with the first octet 51 will connect to our service. Which service uses this active blocking is marked at the start of blocked IP addresses, in our case it is sshd (bolded), which means ssh daemon - secure shell service (ssh) mentioned earlier in the text.

Let us show an effect after activating blocking rules (command used to filter out refused connections `cat /var/log/secure|grep -i refused`). In just three days, there were 104 observations of refused IP addresses, but we show just four to demonstrate an example:

```
Apr 24 12:05:46 CentOS sshd[12011]: refused connect from 162.105.146.159 (162.105.146.159)
```

### 4.3 Most frequently used attackers' IP addresses

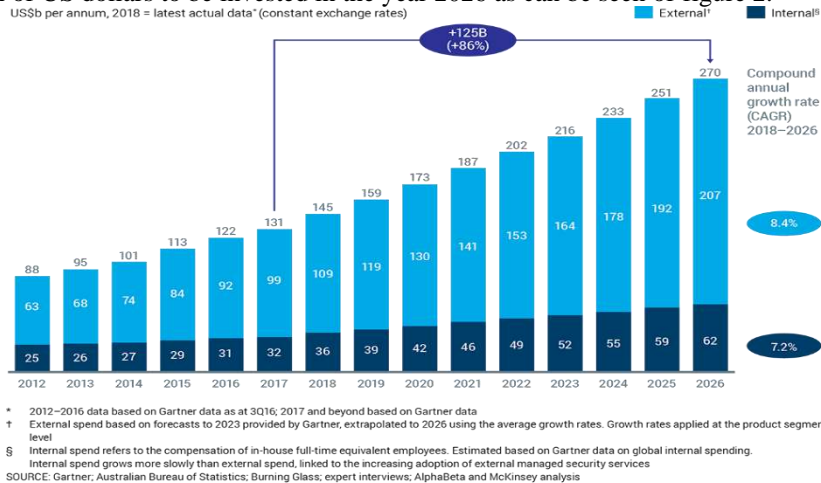
After applying our new rules for blocking IP addresses attacking our server, we will review the correctness of the measures taken before in our logs to verify that our system will block the connection attempts (see logs illustration mentioned earlier with refused connect statement). Now we'll analyze the rejected login attempts for about one week of monitoring, from which country it was reported, the number of attempts, and the result will be displayed graphically (Fig. 1). Tool used for analysis was whois utility.



**Fig. 1.** Percent of IP addresses according to attacker's origin. **Source:** own elaboration

We can conclude from our calculations that over two hundred of blocked IP addresses were trying to connect to our server in about week. As we can see from the graph the most of them originated from China - 115 times, followed by US addresses - 48 times, and Vietnam, Australia, and Indonesia approximately 10 times. Note that these were connection attempts, which we refused directly at the first connection attempt. Before blocking of selected IP addresses, attempts to connect were in thousands and were made within a few hours almost every two or three days. Analyzing these penetration attempts would be enough to create a separate article and therefore will not be discussed further.

According to Australian Cyber Security Growth Network costs spent on cyber security have been growing from year to year and their outlook estimates up to 270 billion of US dollars to be invested in the year 2026 as can be seen of figure 2.



**Fig. 2.** Global cyber security spends. **Source:** SCP - Chapter 1 - The global outlook for cyber security (<https://www.austcyber.com/resources/sector-competitiveness-plan/chapter1>)

## 5 Discussion

Aim of our paper was to identify IP addresses with malicious intent to break into our systems. For this purpose, we chose Linux based servers, which are being used in teaching process for students to save their papers and to make e-tests. One of these servers is located inside University of Economics in Bratislava as virtual server and the another one was located as virtual server in google cloud platform infrastructure. Both servers underwent similar type of attacks. The intended purpose of attackers was to find out, which services are published into the internet network and subsequently to adapt the type of attacks. In our servers there are configured world wide web (www) service (Apache server), secure shell service (ssh) and indirectly can also be accessed database server (MySQL). Therefore, we described in the text before the main type of attacks, that we can await. By observing log files, we identified an often attempts to break-in to our systems via secure shell by technique that can be either dictionary attack or brute force attack. We took measures to stop these activities by blocking particular IP address or whole address block if attacker came from suspicious IP addresses outside European countries. Our security countermeasures approach has main flaw, that in our solution the user is banned forever to access the service. This can cause problem with accessing www service from these addresses for regular users, but it could be treated by time-limited blocking. Users accessing ssh service are mostly administrators, so access to this service can be blocked for everybody outside the whitelisted IP addresses.

## 6 Conclusion

As we have seen in the analysis on real world data, the problem of security issues and system hacking is more relevant than ever and it can be assumed that similar scenarios are taking place on all available operating systems throughout the Internet. Thanks to the mass scale of internet attacks these lead to relatively successful system penetrations. Based on the public database lustration (Collins, 2014) it is possible to find out IP addresses owners, but it is not possible to determine who is really behind these addresses. It is obvious that the owners of these addresses are not going to reveal the holders of these IP addresses without state authorities' cooperation.

Of course, to gain more precise data, it would be useful to analyze log records for a period of at least half a year and ideally on at least ten and more involved operating systems. This can be a subject of future research.

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## Waste management as an important issue of EU countries

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**Abstract.** We rank waste management and air quality among the biggest environmental problems in Slovakia. The conclusion of the comparison of international indicators aimed at measuring the level of results achieved in individual areas of the environment was, that the Slovak Republic lags behind the most developed countries in the field of waste management and air quality. In Slovakia, the rate of recycling of municipal waste is one of the lowest in the whole EU and landfilling is one of the dominant forms of waste management, while its rate is among the highest in the whole EU. The purpose of this paper is to point out the importance of the issue of waste management in connection with the increasing generation of waste and inappropriate disposal of waste management in the context of compliance with European Union regulations. In addition to increasing the importance and significance of this issue in society, the main goal in the field of waste management should be to increase the reuse of used materials, approach effectively to the consumption of materials, but especially to change public and government attitudes with intent to increase emphasis on environmental behavior and education and also to emphasize the collection and processing of data in order to better formulate future measures.

**Keywords:** waste, treatment of waste, recycling, municipal waste, landfill

**JEL classification:** *F 18, F 64, O 13.*

### 1 Introduction

Waste management is and will be one of the important topics in Slovakia, due to the sustainability of environmental quality, economic growth and consumption. Nowadays, Slovakia is one of the countries of the European Union (hereinafter also the EU) with the lowest recycling rate and the highest landfill rate. New requirements for the transformation of the economy from linear to circulating and the related new environmental requirements will lead Slovakia to perform significant structural reforms

in waste management in the coming years. It will have to move from predominant landfilling to other forms of waste management and disposal. Changes, even in the approach of all stakeholders, will be necessary regarding the environmental objectives to which the Slovak Republic has committed itself, but above all because not to cause permanent damage to the environment [10].

## **2 Literature review**

The main role of the international environment is to improve waste management, as the constant increase in the use of plastics has become a major global problem in recent years. However, in order to minimize the negative effects of waste management on the environment, it is necessary to understand the concept of waste itself. Defining “waste” is a complex and fraught matter in many jurisdictions. Often, whether or not a substance is waste determines whether or not it is subject to a mass of rules and regulations which can involve significant costs for various actors. Needless to say, it is impossible to go into great detail on the definition of waste in the various regimes, but a few salient points can be selected for the sake of comparison [6]. Key to the definition of waste in many jurisdictions is the concept of discarding or abandonment. For instance, the EU Waste Framework Directive [12] defines waste as ‘any substance or object which the owner discards or intends or is required to discard’. The US definition refers to “garbage”, “refuse”, and “other discarded material”, terms which are not defined in the legislation [13].

A key point of contention in many jurisdictions is as to whether or not recyclable materials, and materials subject to resource or energy recovery, are classified as waste. In the US, if a material is recyclable it is not waste, because ‘to stigmatise recyclable secondary materials as waste [would be] a catalyst for community opposition’ [14]. New South Wales takes precisely the opposite approach: the definition of waste explicitly includes ‘any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification’ [15]. The EU approach is more nuanced. According to the legislation of the Slovak Republic, mainly in the Waste Act no. 79/2015 Coll. § 2 paragraph 1, waste is a movable thing or a substance which we dispose of or want to dispose of [16]. For wastes, several breakdowns are used due to different treatment and use. In general, we can say that this includes all substances that no longer have their properties and parameters for suitable subsequent use.

## **3 Methodology**

This article is mainly statistical, therefore data used are of a secondary character. Most of the data found in this article come from the official statistical office of European union, Eurostat. Data are measured in tonnes of waste generated and in kilograms per capita according to the annual average population. The paper uses as research methods mainly descriptive statistics, especially frequencies, percentages, minimum and maximum values, spread and averages. In terms of time, the paper works with data

within several years, but most often for the years 2012 to 2018, except for total waste generation since 2004. The last known period is 2018, as data for 2019 are not yet publicly available and are published usually in the months of July to August of the following year. From a territorial point of view, the contribution monitors the data in question for three main territorial categories, i.e. the European Union, the Visegrad Four countries and Slovakia. As the data used mainly cover the years 2012 to 2018, we also included the United Kingdom of Great Britain and Northern Ireland in the total number of European Union countries, as they were still members of the EU during this period and they leaved EU to 31.01.2020.

Given the importance of the issue, the aim of this paper is to present the current state of production and waste management, within the European Union and the Visegrad Four countries. This main objective of the paper is divided into 2 sub-objectives. The first partial objective of the paper is to point out the overall development of waste production in general, for the period 2004 to 2016 in the EU-28 and the V4 countries, as well as the development of the production of only one type of waste, i. e. municipal waste in the same monitoring period and in the same sample. Following the first sub-objective, the second sub-objective is to examine the management of municipal waste generated in the EU-28 and in the V4 countries in the period 2012 to 2018. In this context, the second sub-objective also examines the trend of landfilling and recycling in Slovakia over several years. As a result of the above main and sub-objectives is research design of this paper to point out the importance of the issue of waste management in connection with the increasing generation of waste and inappropriate disposal of waste management in the context of compliance with European Union regulations. In order to meet the main and partial objectives of the presented paper, it was necessary in the first step to summarize data on total waste production in general, but also specifically for municipal waste for the EU-28 and V4 countries. In the next step, we recalculated the data on municipal waste production per capita. This was followed by a summary of data in connection with waste management, and subsequently we focused only on the rate of landfilling and recycling of municipal waste in Slovakia.

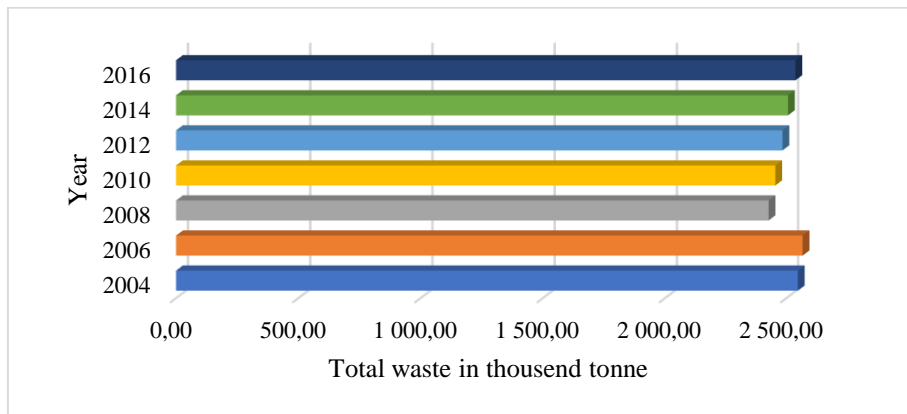
#### **4 Waste management as a global problem**

The European Union has been paying increased attention to this issue for a long time and therefore we decided in this part of the paper to summarize current trends in waste production and waste management in all EU member states and individual Visegrad countries to highlight the most significant environmental impacts of waste management, which concern the management of waste (including its disposal), the prevention of waste through the rational use of resources and their subsequent recycling.



#### 4.1 Waste generation

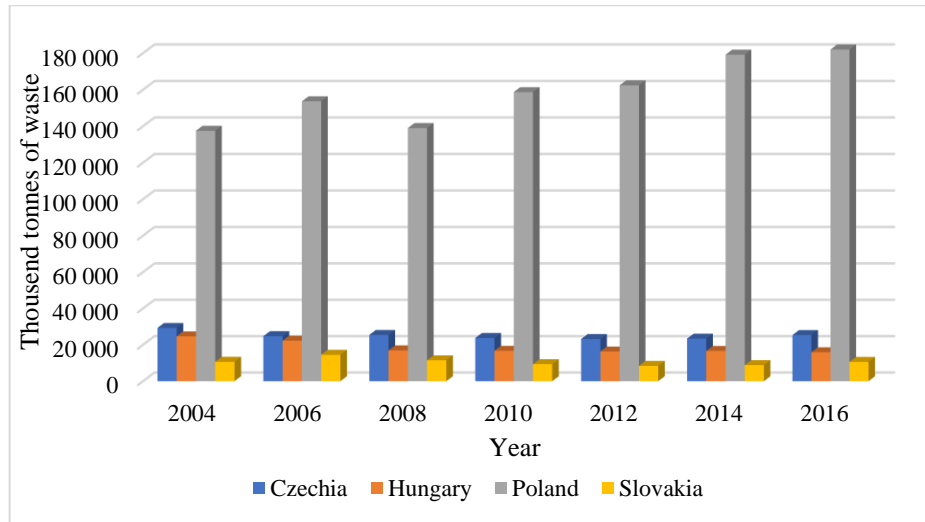
Based on figure no. 1, we can state, that during the twelve years monitored, the amount of waste generated by EU member states did not change significantly. Compared to 2004 and 2016, only a slight decrease can be observed. The most up-to-date data are not available until 2016, when the total generation of EU waste for this year amounted to approximately 2 537,77 ths. tons of waste. In comparison of individual EU member states, the founding EU countries generated the most waste in the order of Germany, Italy and France, which is logical as they also have the largest population.



**Fig. 1.** Total generation of waste in EU-28. *Source: Eurostat, own processing.*

When comparing the initial year 2004, when the amount of waste generated began to be monitored, and the year 2016, for which we have the latest current data, it is particularly interesting, that the volume of total waste has increased in thirteen countries. Greece and Latvia saw a twofold increase in waste generation, followed by Finland with an increase of more than 70 %, followed by Denmark, Sweden and the Netherlands, with an increase of more than 50 %. Countries such as Belgium, Italy, Estonia, Cyprus and Austria are below the 20 % increase in waste generation. On the other hand, Portugal and Romania have managed to reduce the volume of waste by more than half, followed by Ireland, Spain, Bulgaria, Malta, Croatia and the United Kingdom, which is no longer a member country of the European Union.

In the context of the Visegrad Four countries, within figure no. 2, it is clear that Poland, as the only country in the group, has been experiencing a growing trend in waste production since 2008. An example country is Hungary, which has been constantly reducing the volume of waste produced from 2004 to 2016. On the contrary, Slovakia and the Czech Republic in the generation of waste record considerable fluctuations in its amount, but especially in the last two monitored periods they have gained a negative trend, i. e. that the volume of waste produced increased by almost two million tons.



**Fig. 2.** Total generation of waste in V4 countries. *Source: Eurostat, own processing.*

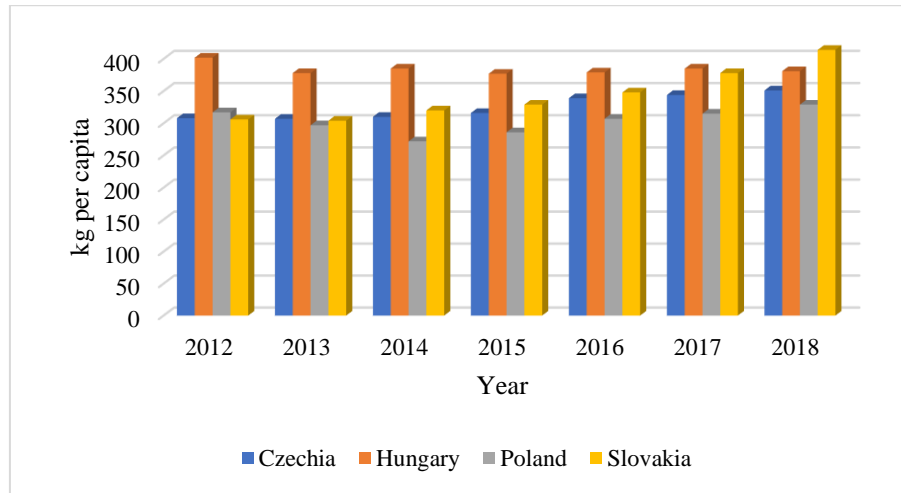
The total development of municipal waste generation together for all EU member states and also per capita is shown in table no. 1. From the above data we can see that the amount of municipal waste generated did not change significantly, during the period under review, except for 2012 and 2013. The most recent data shows, that 489 kg of municipal waste is generated per capita in the EU per year, which is 250 642 tonnes in total waste. If we look at the municipal waste produced from the point of view of individual EU member states, we can say, that Denmark generates the most municipal waste per capita and Romania the least. These countries have been maintaining this trend for several years. If we look at municipal waste from the overall point of view, i.e. for the period from 2012 to 2018, the European Union increased its municipal waste generation by 3 kg per capita.

**Tab. 1.** Generation of minicipal waste in EU-28

year/amount	2012	2013	2014	2015	2016	2017	2018
in thousand tonnes	245,3	242,3	242,9	244,8	249,0	249,5	250,6
in kg per capita	486	479	478	481	488	488	489

*Source: Eurostat, own processing.*

From the point of view of the V4 countries, the figure no. 3 shows, that a similar development scenario is shown again as it was for the total amount of waste generated. The only country, that recorded a decrease in municipal waste generation during the period under review was Hungary, and the fluctuating course accompanied by its decrease and growth was recorded in Poland.

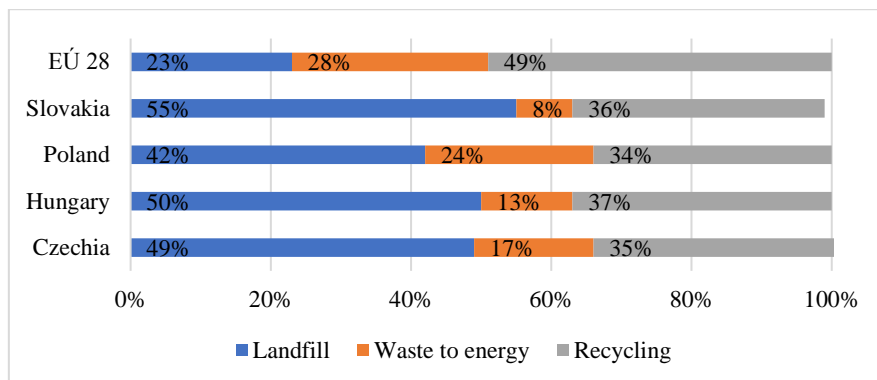


**Fig. 3.** Generation of municipal waste in V4 countries. *Source: Eurostat, own processing.*

Slovakia and the Czech Republic are again increasing the amount of municipal waste generated over the entire period under review. Even in this context, it is remarkable to mention, that the Slovak Republic, which has several times lower population, than the Czech Republic, generated more municipal waste (per capita). This is also confirmed by the fact, that by comparing the years 2012 and 2018, the volume of municipal waste in Slovakia increased by 108 kg per capita, while in the Czech Republic only by 43 kg per capita.

#### 4.2 Waste treatment

In connection with waste management, it is not only important, whether the volume of waste generated has decreased or increased in recent years, but especially how the generated waste is further treated, resp. how the waste is recovered. We distinguish two basic levels of waste recovery, i. e. energy recovery or material recovery of waste. From the point of view of EU countries, we can state, that in the period from 2012 to 2018, the amount of energy and materially recovered municipal waste increased every year. Of course, this trend is not identical in every member state and the results differ significantly. Examples are Denmark and Romania, which are the exact opposite. Denmark recovers municipal waste for energy at the level of 50 % and materially at the level of almost 30 %. In contrast, Romania achieves values several times lower, i. e. the rate of material recovery is almost 8 % and of energy recovery less than 5 %.



**Fig. 4.** Waste treatment in EÚ-28 and V4 countries in 2018. *Source: Eurostat, own processing*

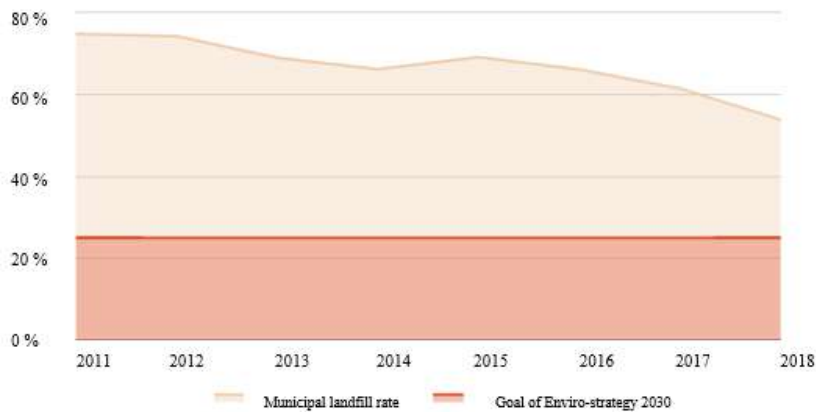
Based on figure no. 4 in the V4 countries, landfilling dominates the most in waste management, followed by recycling and energy recovery. The Slovak Republic, which has the highest landfill rate among the V4 countries, has an unflattering lead in these data, at a level of 55 % in 2018. In this context, other V4 countries also do not achieve lower landfill rates either, while the results are still above 40 %. As already mentioned, the second most used method of municipal waste management in the V4 countries is recycling. The values of this indicator are approximately the same in individual countries, i. e. range from 34 % to 36 %. However, we record different values in the energy recovery of municipal waste, in which the Slovak Republic again reaches the lowest values. Poland is the best in energy municipal waste recovery, followed by the Czech Republic and Hungary.

If we compare the percentages of municipal waste management methods in the V4 countries with the values for the EU member states, we conclude that the development is not identical and differs significantly. In this context, the results for all EU countries suggest, that recycling is the most widely used method of municipal waste management, followed by energy recovery, and landfilling, which is dominant in the V4 countries. This comparison provides a signal, that not only Slovakia, but also other V4 countries must change the ways of municipal waste management and reorient themselves from landfilling, which has many negatives, to other more environmentally friendly and especially more favourable ways of waste management. One of the solutions is a higher rate of material reuse, reduction of consumption, but especially support environmental behavior of individual inhabitants of these countries.

#### **4.3 Waste management of Slovakia in the context of compliance with EU obligations**

Based on the above facts, we can state, that the biggest problem of Slovak waste management is the disproportionately high rate of municipal waste landfill (55 % in 2018). Landfilling of waste predominates, because it is the cheapest and least technologically demanding way of disposing of waste, but landfilling is associated with

many risks. Every landfill has the potential to become an environmental burden. Landfill burdens the environment with traffic, noise, odor, as well as pollution of the environment with air raids. Fires are also a common problem in landfills, and even closed landfills may be environmental hazards for the future [2]. On the other hand, the problem of Slovakia is not only a high landfill rate, but also a low recycling rate, and even worse is the energy recovery of waste, which accounts for only 8 % of the total municipal waste management. The high rate of landfilling in Slovakia is shown in more detail in figure no. 5.



**Fig. 5.** Development of municipal landfill rate. *Source: Ministry of environment of SR, 2018.*

One of the reasons, why landfilling predominates in Slovakia over other forms of waste management is the economic aspect. This method of waste management is the cheapest compared to other forms. The finding, that landfilling is the cheapest way of disposing of municipal waste is confirmed in particular by the prices for depositing one tonne of waste in landfills in the V4 countries. From tab. 2 it is clear, that the lowest price for landfilling of one tonne of municipal waste in 2019 is achieved by the Slovak Republic. However, since 2019, an amendment to the law has been in force, which applies the so-called an incentive element in the form of the level of sorted waste. This element has increased and will continue to increase landfill fees, up to a maximum level of 26 €/t in 2020 and 33 €/t from 2021. On the other hand, the highest price for landfilling in V4 has Poland with 40 Euros per tonne of waste [8].

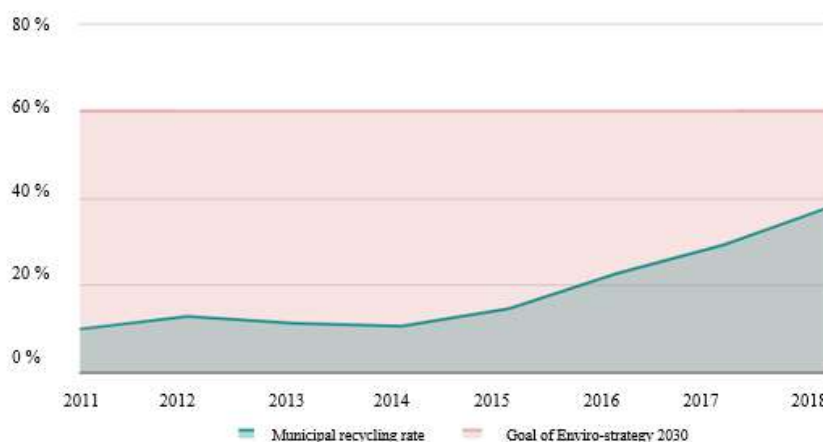
**Tab. 2.** Landfill fees of municipal waste in 2019 in V4 countries

Country	Lanfill fees
Slovakia	17 Eur/t
Czechia	20 Eur/t
Hungary	19,30 Eur/t
Poland	40 Eur/t

*Source: Cewep.*

Given the factual situation of high landfilling rates, it can be assumed, that landfills will become a major public, social and economic problem in the future [2]. The problem

of Slovakia is not only the high rate of landfilling, but also the low rate of recycling. The recycling rate of municipal waste in Slovakia in 2018 was at the level of 38 %, which confirms and shows in more detail figure no. 6 [4]. Following such a trend towards high landfilling and low recycling rates in Slovakia, the European institutions agreed last year on legislation banning EU countries landfilled recyclable waste from 2030. Based on this, from 2035 onwards, the total landfill of municipal waste in EU countries can reach only 10 %. According to an agreement between the European institutions, at least 55 % of household and small business waste should be recycled by 2025. By 2030, the share of recycled municipal waste should reach 60 % and by 2035 at least 65 % [9].



**Fig. 6.** Development of municipal recycling rate. *Source: Ministry of environment of SR, 2018.*

## 5 Conclusion

Meeting the goals in the field of waste management, to which the Slovak Republic has committed itself to the EU, is a highly actual issue. In order to meet European goals, it is not enough to invest exclusively in recycling, as even that cannot be 100 % for some wastes and will therefore also produce non-recyclable waste. One of the possible solutions for reducing landfills is offered by waste incinerators, which can significantly contribute to reducing the share of landfills. The first problem of waste incinerators in Slovakia is insufficient capacity for waste incineration, as Slovakia currently lands 1,2 million tons of municipal waste and the capacity for its incineration is only 300 000 tons per year. The second major problem is the cold attitude of the European Union institutions towards the financing of new capacities for this purpose. The European Commission, as the European Union's executive body, does not have a strong position on waste incineration and prefers re-use and recycling in the waste management hierarchy before incineration. However, it recommends that countries with a high level of landfill and low waste incineration capacity invest primarily in recycling facilities, analyze the long-term impact of new facilities and consider exporting waste to neighboring countries. The solution to reduce landfilling and increase the rate of

recycling outside waste incinerators is to introduce innovations and new technologies in the treatment and use of mixed municipal waste as a secondary fuel for energy production. Mixed municipal waste has great potential for recycling and energy use. Companies that plan to increase capacity for energy recovery of waste as fuel claim that this is a landfill.

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## Limitations and possibilities of additive printing systems (3D printers) in the construction industry in the world

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**Abstract.** The article outlines the benefits in terms of cost-effectiveness and efficiency associated with the introduction of automated and digital additive construction techniques in an area that has so far remained tied to highly inefficient and time-consuming approaches. The expected rapidly growing demand for 3D additive manufacturing equipment provides an opportunity for both manufacturers of technological innovative equipment and participants in the construction market to gain a competitive advantage through the rapid creation of additional opportunities. These opportunities and benefits for all participants in the construction ecosystem (manufacturers, developers, users) are considered in this study. A number of limitations and problems associated with the use of 3D printing in the construction industry are also highlighted. The article describes the possibilities and analyzes the enormous transformative potential of additive manufacturing in construction. The study covers not only the global housing market with its growing demand, but also the infrastructure potential of the construction market in connection with significant income opportunities. The proposed measures for Russia in terms of promoting and developing additive technologies could be implemented by other developing countries, taking into account national amendments and adjustments.

**Keywords:** additive technologies, 3D printers, construction industry

**JEL classification:** O31, O33, L74

### 1 Introduction

A promising and in-demand additive building technology known as construction 3D printing systems is becoming more common. Additive technologies in construction can provide as great an opportunity for innovative manufacturing as the entire industrial and medical industries combined. While the technology is still young, billion-dollar deals have already been signed, bringing these technologies to futuristic construction projects around the world. As technology advances and the industry grows rapidly, some of the largest construction groups are already investing in providing know-how

and advancing the development of new materials and processes.

Digital systems and additive manufacturing are already widely adopted in the construction industry for both architecture (design and physics modeling) and engineering (design, development and prototyping). This foundation will help accelerate the development of innovation in residential and commercial construction as the tools for introducing digital, additive manufacturing into the construction market become more available. Additive manufacturing is used in the construction of bridges, communications and skyscrapers, as well as for artistic and archaeological purposes, in the restoration and reconstruction of damaged, destroyed historical sites.

Additive technologies or 3D printing technologies are currently gaining more and more development and application in various fields of human activity. The boom in additive technologies began in the world with the recovery of the global economy after the 2008 crisis. One could observe a significant increase in the number of purchases in additive engineering and the creation of start-up companies for the design and promotion of 3D printing [11]. The rise in this area was mainly driven by the initiative of enterprises, since the 3D printing industry has not yet gained significant government support. A key explanation for this trend is the understanding that the future is behind additive technologies in industry. The general development of technologies in the industrial sector also contributed to this trend [7]. So in 2008-2010, equipment began to fall in price, and an opportunity arose for cost-effective and stable 3D printing.

Global demographic changes, massive urbanization of the population, overpopulation and other housing problems, especially in developing countries, contribute to the development of innovative solutions. Traditional construction methods will not be able to solve emerging problems and challenges. New approaches are required to the construction of housing and infrastructure of residential areas.

## **2 Opportunities and benefits of additive construction technologies**

However, in most developing countries, the implementation of additive technologies in the construction industry is a matter of the distant future. Mass adoption requires investors, and in many emerging economies, the investment climate remains unfavorable, and government support for innovative 3D printing industries leaves much to be desired. Such countries include, for example, Turkey, Tunisia, Sri Lanka, Latin America, The Caribbean and Africa. Although countries with a moderate investment climate, such as Russia and the CIS countries, Southeast Asia, do not sufficiently develop innovations in the construction industry.

In Europe, the USA, China, meanwhile, startups for the construction of houses using 3D printing are actively developing.

Low-rise and individual construction of residential buildings using innovations ("smart home"), as well as the construction of budgetary and temporary housing for the needs of victims of natural disasters and military actions are especially interested in using the 3D printing method.

The advantages of a 3D solution in the construction segment are associated with a

higher speed of building construction (almost 2 times faster and a third cheaper than the traditional method) and a significant reduction in costs. Omitting the technological features of 3D printing of buildings and building structures, the following additional benefits of using 3D printing in the construction industry can be highlighted:

1. Using 80-95% less labor and multiple savings in human resources [9].
2. Automation of the process up to 80%, thereby improving its quality, reducing costs / resources, construction time and the influence of the human factor.
3. The ability to create products with almost any geometry of complexity, which requires high costs with conventional construction technologies.
4. The ability to print solid, including large-sized parts, which eliminates the need for assembly of building structures.
5. Saving up to 100% on warehouse logistics and waste of building materials.
6. The ability to obtain high quality, precision processes and characteristics identical to the required parameters of building materials.
7. Erection of individual projects without increasing the cost of construction work.

Thus, 3D printing allows you to significantly reduce costs and increase the speed of construction, providing various economic benefits - a decrease in the consumption of materials, building components, resources, time, and a decrease in the risk of errors. Buyers of houses and apartments erected using additive technologies are attracted by innovative, unusual design, new architectural solutions, waste-free construction. 3D printing allows for sustainable and fully functional architecture, building without noise, dust and air pollution.

### **3 Limitations and problems of additive printing systems in the construction industry**

It would seem that 3D printing in construction should have great potential for application. However, in practice, its use often encounters a number of limitations and problems:

1. The introduction of 3D printing comes with a high initial investment in addition to ongoing maintenance costs.
2. Difficulties in certification and standardization of additive products, technological processes, materials and compositions.
3. The use of highly qualified and, accordingly, highly paid personnel.
4. Limited size of parts, structures, obtained using 3D printing.
5. Implementation and application of 3D printing without a clear, deep economic analysis of the existing technological process chain.

The use of additive building technologies is influenced by both - cost factors and saving, economical factors. The 3D printing approach is effective at high labor costs as the focus shifts from physical, manual to intellectual labor. In countries where labor costs less than \$ 5 per day, it is not economically viable to build with 3D printers.

At the moment, to reduce the risk of design errors in most countries, it is allowed to build houses using 3D printing no higher than the 2nd floor. Although in the United

Arab Emirates in 10 years it is planned to build up to 25% of housing, including high-rise, using 3D printing technology for residential modules [8].

The main problem in the development of 3D printing technologies for residential buildings in Russia is associated with an unsettled regulatory framework, a lack of investment activity and qualified specialists. There is still no single professional information field in Russia for obtaining information, transferring skills and experience in 3D printing, 3D modeling and other related technologies in the construction industry. The construction industry in Russia lacks professional sites that ensure the exchange of tasks and solutions between all participants in the construction ecosystem (manufacturers, developers, users). At the moment, in Russia, with a relatively built pricing policy, service support, technical support and developed production, there are about 8 main domestic manufacturers of 3D printers of FDM technology (the most common), not counting the constant rotation of start-up and dying startups.

The problem in many countries, as we see it, is *overstated consumer expectations*. The reason for this is the lack of information, skills, competencies. Any new technology, before it takes its place on the market, goes through the quite standard path of "hype", on which, however, it may die before reaching the finish line. The first successful attempts to apply a new principle at the prototype level generate a boom in research and development and overestimated expectations of society, reaching their peak. Then the developers, industrialists and society "see clearly", realize the harsh reality and begin to part with illusions. And only then, having rolled off the mountain of mass delight, the technology begins to slowly rise to the plateau in order to take its place in the market.

According to Gartnerresearch Institute, society's expectations of 3D printing technology - an appropriate device in every home that will allow you to "print" whatever your heart desires, and not go to the store - are now at their peak [3]. This means that in the next few years the technology will begin to slide from this peak and only in 5-10 years will it determine its real place in the market.

The peculiarities of this problem in many countries of the world is that the media often add fuel to the fire with various kinds of news: such as "soon it will be possible to print a person and his organs" or about the mass printing of skyscrapers, car bodies, aircraft, weapons. The most serious developments in the field of bioprinting, electronic printing, high-strength dual-use materials, biocompatible materials, printable powder and self-combustible mixtures, carbon and unique metal-plastic materials, and much more in China, Korea, the USA, Europe are of a closed nature and are sponsored by large research institutes and foundations, as well as industrial and defense corporations.

Another problem can be called "*first bad experience*". In the period from the beginning of the 2010s to the current moment, the markets of many developing countries were filled with budget additive technology, which is mainly self-assembled sets of 3D printers imported by semi-legal channels from the countries of the East by ordering them on foreign online stores such as ALIEXPEPRESS or GEARBEST. The problems of subsequent technical support, warranty and service maintenance that arose in connection with this caused massive negativity. In addition to this, companies face problems and possible financial and economic difficulties in violation of tax and customs laws. Consumers faced with these problems developed a general rejection of

additive equipment and led to erroneous conclusions about the unreliability, inefficiency of the purchased additive equipment, and the inaccessibility of the domestic consumer to high-quality and technically supported equipment.

Another problem can be called "*additive technologies and innovations without understanding and under duress*".

As a rule, the national scientific and technical community and industry are actively studying the world experience on the example of foreign practices and implementation projects [11]. But, as often happens, this implementation occurs without a clear, in-depth economic analysis of the existing process chain and, in general, an analysis of the possibilities, limitations, potential and feasibility of using additive technologies in each specific production and business.

The introduction of innovations often occurs not for practical purposes, but for the image "hype" status of an enterprise, company, center. The most common scenario is that a manager, as part of an exchange of experience or participating in major international and domestic exhibitions, conferences and other image summits, receives a superficial (often just visual) understanding of the capabilities of these technologies and implementation experience. Arriving on site, he instructs his technical staff, chief engineers, production workers to urgently select any equipment for various purposes (from simple visualization to small-scale production of the final product).

At the same time, neither he nor this specialist has a final understanding of the economic justification for using this technique in the process. Not possessing special knowledge, technology features, information about the reliability and quality of each of the brands, and also, which is sometimes completely illogical - being limited by a spontaneously chosen budget for this, the performer from the Internet, using the first (often subjective) links, selects the technique. Subsequently, incorrectly operating this equipment, choosing the wrong settings, not calibrating it, the user does not achieve the results he expected, which is why the equipment sometimes stands for years without operation [6].

The main thing in this case is to understand that the use of additive manufacturing is justified only when the management of the entire product life cycle is clearly and effectively established. In other words, we need a developed, well-coordinated link of industry (extractive to processing and manufacturing, as well as centers of real (not exaggerated) competencies in additive technologies.

We believe that an important problem is *the lack of qualified specialists* both at the service provider and at the consumer. There are lack of a comprehensive system for training qualified personnel both at the level of the educational process in schools and initial vocational training in universities and colleges, and in industry. Often, educational methods are of a purely basic informational nature, often trite copied from a number of foreign private works used in the FAB-LAB concepts or, at best, foreign Shared Use Centers at leading universities in Europe and the USA. Courses in 3D modeling, printing, three-dimensional scanning are mostly of a purely commercial nature and are set up to transfer superficial basic knowledge. It is necessary to participate in the educational process of end employers in the person of small businesses, industrial enterprises, design bureaus and engineering centers as customers. Without understanding the needs for workplaces, the level of competencies, prospects

and tasks for specialists in the context of the general tasks of employers, the very level of training of specialists in the field of additive technologies will remain at the everyday level and tasks of small business. It is impossible to do without the training of appropriate engineering personnel who could professionally understand what is expedient to print, and what is more effective to continue to do with the traditional method.

The next problem in many countries is *the consumer and professional information vacuum* in the field of additive building technologies.

For example, from the very beginning of the "entry" of additive technologies into the market of many developing countries and until now there is a lack of an objective, professional and independent information field for obtaining information, transferring skills and experience in printing, modeling and other related technologies between users of different levels of training [2].

Whole groups of modelers and printers have been created at the Smithsonian Institution, Massachusetts Institute of Technology and many others. And even the concepts of FAB-LAB and Shared Use Centers, taken as a basis by domestic moderators of engineering centers, imply the provision of often free, high-tech equipment for use by both individuals and students, schoolchildren, project managers, etc.

There is no information field that ensures the exchange of tasks and solutions between all parties.

We also observe a tendency for industrial circles to "distrust" the established engineering centers due to the unwillingness to disclose internal problems and tasks, as well as technological schemes with attempts to solve these problems not on outsourcing terms, but with our own internal resources.

## 4 Conclusion

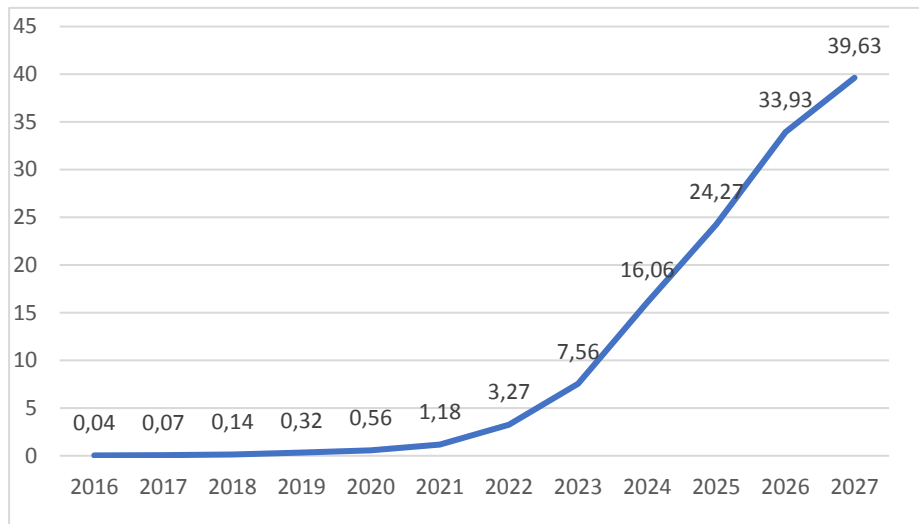
Additive technologies are one of the main global trends mentioned in the context of both the general world industrial revolution and an important direction in the national strategy of scientific, technical and industrial development of the advanced countries of the world.

The annual growth of this market in the world, which in fact has not yet been formed and has no clear boundaries, varies within 20-30%. The global additive manufacturing industry grew in 2016 by 17.4% (in 2015 - by 25.9%) and now stands at over \$ 10 billion. Experts give the most optimistic forecasts - the market for all additive technologies will reach \$ 17.8 billion already by 2021 [10]. If companies manage to introduce 3D printing at least 1.5% of their total production capacity by 2035, then the market volume will exceed \$ 350 billion by that time [5].

In countries such as China, USA, Netherlands, France, UAE, additive building technologies are growing rapidly. In 2017, the market for 3D printing with concrete in value terms was dominated by Europe (including the Russian market). The growth of revenue of additive construction is forecasted from 70 mln. in 2017 to \$ 40 trillion. in

2027 (Fig. 1).

**Fig. 1.** Forecast of growth in revenue of the additive construction market in the world, billion US dollars (according to SmarTech Publishing's report [9])



Today, three-dimensional printers are mainly used for low-rise and small-sized individual construction, as well as for the manufacture of small architectural forms. Typical construction in 3D printing has not yet begun, but the future belongs to it, as soon as ready-made technological solutions appear.

Printing of residential modules develops the construction market due to the emphasis on the individual request of the consumer - a family can independently design a future home for living, using 3D printing for ease and simplicity of design. Soon in the United States, China, Europe, it will be possible to lease 3D printing equipment from a building materials store and build a house on your own according to instructions. But all this is not yet feasible in Russian reality, where even leasing a car for a family is exotic.

The transition to mass production of 3D printers is happening quite quickly. Additive technologies are becoming more affordable: the price of equipment is falling, the speed of 3D printing is increasing, and the range of materials is expanding. The focus is on quality, manufacturing time and long service life of equipment that will be in demand on the market for a long time.

The popularity of 3D printing is growing steadily as it helps to reduce costs, speed up construction, and improve the quality and safety of homes. The construction economics is still unique in each specific case, but the annual growth rates of this market cannot fail to impress - on average, 20-30% [4]. There is still no consensus in assessing the role of additive technologies in construction: some say that the introduction of three-dimensional printing methods will lead to the decline of the traditional residential construction industry [1], while others say that 3D printers will become just one of the elements of the scheme and construction technologies [12].

Despite all the existing disagreements, the great prospects of additive technologies in construction cannot be denied. The greatest impact of additive innovation is seen in the combination of automated 3D printing with traditional construction methods.

Promotion of additive technologies, their integration into production processes, economic sectors and areas of activity of the construction business have their own differences and peculiarities, some of which we have tried to summarize, analyze, build a problematic and formulate ways to solve it.

## 5 Recommendations

Taking into account the above issues and problems, taking into account their interconnection and commonality, as well as world and domestic experience in the practical implementation of a number of projects, we have formed ways to solve them, taking into account the regional specifics for Russia. Below is a list of measures necessary for the popularization, systemic development and practical effective integration of additive technologies into education, as well as the branches of the Russian economy and industry:

1. Creation of a scientific and technical expert council for the development of additive building technologies:

- preparation of expert opinions on various specialized areas of consultation;
- interaction with small businesses for updating and solving their needs and tasks (orders) in the direction of additive technologies;
- conducting promotional and educational events with the invitation of domestic and foreign experts;
- promotion of Russian developments in the field of additive building technologies;
- carrying out an inventory, accounting and assessment of the current technical condition of additive industrial equipment at enterprises and engineering centers of the country;

2. Creation of an electronic information portal with an electronic database of existing and potential consumers of services in the field of additive technologies with the following functionality:

- employment of specialized specialists in the field of additive technologies (job exchange);
- information block from leading domestic and world manufacturers of 3D equipment;
- general popularization of 3D printing;
- accumulation and selection of private developments in the field of import substitution of technologies, equipment, new 3D-printing materials with the subsequent introduction of systematized and well-grounded projects into state support programs.

The proposed measures for Russia in terms of promoting and developing additive technologies can be implemented by other developing countries, taking into account national amendments and adjustments.

3D printing technologies are progressing, and, most likely, in the near future they will change the residential construction market in the world, so Russia needs to actively master and develop them, without waiting for the moment when world additive innovations will go far ahead and time will be lost. You should especially think about



creating certified software for developing 3D printing projects. Russia must find its niche in the global market, because dozens of companies are already operating in the country, including those supplying 3D printers abroad.

However, today, especially in the context of the economic crisis associated with the global pandemic, the Russian government is concerned about supporting only the traditional segment of the construction industry.

This state of uncertainty of political will and indecision of investors in the absence of government support will accompany additive manufacturing in construction for at least another 8-10 years. The use of additive technologies in construction at the initial stage will most likely cost more, but it is impossible not to participate in this process, optimization and reduction in cost, with an incredible number of other advantages, will inevitably happen - therefore, the process must not only be, it must be led.

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# POLITICAL CONFLICT, MIGRATION, AND THE EU: THE CASE OF POLISH PRESIDENTIAL ELECTIONS

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**Abstract:** Last presidential election in Poland provided additional data about how deeply the Polish society is divided. We argue that it is a direct result of GAL/TAN political conflict. The article aims to analyse the structure of political conflict in Poland from the point of GAL vs. TAN dimensions on the example of Polish presidential elections (1990-2020). Firstly, we provide theoretical background regarding political cleavage theory, political conflicts, and GAL/TAN approach. Secondly, every presidential election between 1990 and 2020 is analysed utilizing GAL/TAN political dimensions. Lastly, it is argued that Poland witnesses deeper ideological struggle within the Polish society.

**Keywords:** Poland, presidential elections, TAN, GAL, political conflict, migration, EU

**JEL classification:** D 72, P 16

## 1 Introduction

Observers from all around the Europe were tensely observing the development of last Polish presidential elections. After some delay, President Duda quite unsurprisingly managed to win his re-election after narrowly defeating rival candidate Rafał Trzaskowski in a runoff 51:49%. It comes as no surprise that “traditional class and religious cleavages have lost strength” (Bornschier 2010, 4), even in clerical Poland. The political conflict no longer oscillated around class and religious conflicts but shifted toward post-modern, GAL vs. TAN conflict, taking into accounts the attitudes toward the euro-pacific integration and migration (openness to globalization).

This article is organized as follows. (1) Firstly, we approximate theoretical foundations of political conflict and political cleavages while pinpointing the relatively new aspects of cultural identity and migration. (2) Secondly, we provide a basic structure of GAL/TAN political conflict outlining the polish presidential elections since

1990. (3) Lastly, we argue that the electoral results provide proof of a great divide occurring in the Polish society with mobile, pro-European, younger and better educated electorate from north-western rural areas favouring pro-globalists stances (migration/the EU) on the one hand, and on average older, Eurosceptic and religious Poles with lower incomes occupying the former Solidarity strongholds in rural areas of south-eastern Poland preferring communitarian and nativist attitudes on the other. *This article aims to analyse the structure of political conflict in Poland from the point of GAL vs. TAN dimensions on the example of Polish presidential elections (1990-2020).*

## 2 Political conflict, Migration, and the EU

According to a pioneering work of Lipset and Rokkan (1967), the history of (Western) European political systems has its origins in the interaction of two revolutions producing four basic “political cleavages”. National Revolution produced two of these cleavages: (1) conflict between nation-building centrum and periphery, and (2) conflict between the Church and the Nation state. (3) Owners versus employers and (4) urban versus rural population were result of the Industrial Revolution. Political agents, both parties and individuals, align alongside the political cleavages to attract the votes. At the time of writing, the authors viewed the conflicting lines to be “frozen” within the political systems (left/right, church/state etc.). However, a lot has changed since then. Gradual secularization or deterioration of the nation states led to the overcoming of the Lipset-Rokkan cleavages theory. The political conflicts, or the “current alignments of voters behind the historically given packages” has been changing dramatically in the last couple of decades. Kriesi et al. (2006) is convinced that “four classic cleavages came to boil down to two”, cultural (church vs. state) and socioeconomic (class) cleavage.

Political upheavals, global economic crisis, or the old class conflict and clash of religious identities? One ought to be careful regarding the distinction between political cleavage and political conflict. Kriesi et al. (2006) do not perceive the latest mobilization of the new social movements as a fundamentally new dimension, however, the changing circumstances just transformed the existing ones (cultural and class cleavages). What changed is the meaning of the two residual dimensions. They call it the “embedding hypothesis”. This article deals with the “current alignments” Lipset and Rokkan (1967) wrote about, let us call them “political conflicts”. Political conflicts underline the allegedly “frozen” cleavages. They are basically the political attitudes the parties align around temporarily. See f. i. one of the latest coherent works regarding the evolution of political conflicts from, paradoxically, economist Piketty (2020). The Frenchman fractured the French electorate into four approximately equal conflictual blocs utilizing two principal axes of political conflict, borders/property. He managed to fracture the electorate quasi-evenly among four competing groups (international egalitarians, nativist egalitarians, international inegalitarians and nativist inegalitarians). Though quite a simplistic approximation, as a model of constantly changing political dimensions, it suffices (see also Grande and Kriesi, 2012).

New processes of globalization and decline of the importance of the nation states contributed to the emergence of new political conflicts shaping the structure of political cleavages. Looser capital restrictions, new rules of the international trade and investments, increasing labour mobility with the influx of immigrants to the developed countries, globalization is bringing new and more complex conflicts into the politics deeply rooted within the nation states. Globalized world brought about new political challenges, new lines of political cleavages. No author is really denying the globalization produced both “winners” and “losers” at the same time (see f.i. Stiglitz, 2017 or Rodrik, 2011). New global order is producing an irreconcilable political conflict between the people who spent their life being protected by national boundaries, not having to deal with the fear of losing the socioeconomic status and employment or their sense of cultural and national identity (“losers”) and between the people whose chances became more robust after opening up of the national borders (“winners”). Those people are on average more mobile, more educated, and less connected to the feeling of national identity (Kriesi and Schulte-Cloos, 2020).

Various authors used different labels to refer to the conflictual dimension. Inglehart (1990) structures the dimension along postmaterialist and materialist lines colluding around the “post-materialistic” revolutions of the 1968. Kitschelt (1994) differentiates the authoritarian (traditionalist) and the libertarian (green, left) pole. On the other hand, Bornschier (2010) uses libertarian-universalistic/traditionalist-communitarian, De Wiele (2019) cosmopolitan/communitarian, while De Vries (2018) cosmopolitan/parochial distinctions. All the labels serve as an approximation of two sides of political conflict, “losers” of the globalization as well as “winners” of the globalization.

Chapel Hill Expert Survey has been using GAL/TAL dimensions since the 1999 (Bakker et al. 2015). Hooghe et al. (2002) assumed these two dimensions. One combining “Greenness” (ecology), “alternative politics” (participatory democracy) and “libertarianism” ergo the abbreviation “GAL”, while the other supports “traditions”, “authority” and “nationalism”, thereby “TAN”. GAL/TAN political conflict depicts both the cultural and identarian aspect of globalization (migration, European integration), and the economic aspect of globalization (ecology, market stance).

Hooghe and Marks (2018) consider the European Union (EU) and diminishing costs of the international trade and migration to be such a shock to national authority that attitudes towards the EU and immigration constitutes the cleavage on its own – “transnational cleavage”, not just a conflict underlying given socioeconomic patterns (cleavages). Transnationalism is in their view a clash between those who have no prospect of upward mobility, fear the lose of national and cultural identity and resent the global elite, and between those who benefited from the gains from freer international trade, have mobile assets and despise the value of national citizenship. “The promise of transnationalism has been gains for all, but the experience of the past two decades is that it hurts many”, what ultimately triggered a populist backlash (Hooghe and Marks, 2018). We can demonstrate a thin line between the theoretical foundation of political cleavages and political conflicts on the example of the “transnational cleavage”. Having opted for the more contemporary option in the beginning of the chapter, we will assume the GAL/TAN approach.

Having explained basic contours of the impact globalization has on the political conflicts, the authors agree upon two main vectors, attitudes toward migration and the European union (in the context of the EU of course). Both come to the antagonism between those who profit from the two, or between those whose standard of living dramatically declined as a result of free trade, migration influx and looser capital controls. On the extreme sides of the GAL/TAN poles are populist Radical Right Parties (RRP) in case of TAN, and the Greens in case of GAL (Hooghe et al, 2002). Parties from the mainstream European political families (Christian-democrats, Socialists, Liberals etc.) oscillates between the two poles, leaning more toward the TAN in case of conservatives, and toward the GAL in case of socialists and liberals. Extreme TAN parties (Lega, Rassemblement National, Freiheitliche Partei Österreichs FPÖ) endorse xenophobic form of nationalism – “nativism”, combining strong anti-immigration narratives with Euroscepticism and aversion for globalization (Mudde, 2007). Parties leaning toward GAL on the other hand, assume “green” (ecological), “progressive” (anti-capitalistic) and libertarian (positive freedom) attitudes within the GAL/TAN poles. Those are the “Greens” of course, or the parties belonging to the European United Left-Nordic Green Left in the current parliament (Europarl 2020).

Following our conceptualization of the globalization as a crucial factor regarding the current condition of political conflict in the EU, we assume the TAN/GAL dimensions to be the most suitable for our further analyses. Encompassing both the stance toward the EU as well as the preference of migration, TAN/GAL concept allows us to assess the state of pro-immigration/anti-immigration attitudes within Polish society. In order to make the assessment as comprehensive as possible, the analyses will be based on the 2<sup>nd</sup> round of presidential elections in Poland. Second round candidates in every Polish presidential election since 1990 will be sorted within the TAN/GAL scale. Albeit being parliamentary democracy, binary selections is the most efficient in case of the analyses of political conflict (Piketty 2018). Following the last presidential elections in Poland, we will simply assume the political conflict (dimensions) in parliamentary political systems carry over to the presidential elections as well. The electorate transmits its attitudes (migration/EU) into political conflict and political party/political agent align accordingly, regardless of the match between the office they are running for and the competences required to deal with the issues (migration/EU).

### **3 Presidential Elections in Poland (1990-2015)**

President of the Republic of Poland, head of state and constitutional authority, derives its mandate directly from the people for the period of five years with a possibility of one time re-election. If no candidate manages to gain an absolute majority in the first round of Polish presidential election, the candidates with the largest and second largest number of votes proceed into the second round. Apart from 2000 presidential elections, no candidate ever succeeded in winning after the first round. President of the Polish state has various competences. Albeit nominally mostly within the sphere of state representation, president is also a commander-in-chief of the armed forces, he

designates and appoints the PM and ministers, has the right to pardon or veto bills (Prezydent.pl 2020).

In the upcoming section, we will analyse the Polish presidential elections since 1990 from the point of view of GAL/TAN dimensions. Our assessment will be based on the second round of presidential elections, so the bipolar GAL/TAN selection will be more comprehensive. The only exception will be the elections in 1990 and 2000 when the presidential election either ended after the first round (2000), or the representant of one dimension missed in the second round (1990).

Prior to assessing the structure of GAL/TAN conflict we have to put an emphasize on the character of Polish society. One cannot compare the level of GAL/TAN universally, discounting the position of catholic church or conservative values within Polish society, however, the national specificities need to be taken into account. There is no universal scale of “GALNESS” or “TANNESS”, the conflictual positions are analysed relatively to the structure of Polish electorate. If considering the Polish political conflict according to “Western” standards, no GAL dimensions would be found whatsoever.

### **3.1 Waleśa vs Tymowski (1990)**

After more than 40 years, former trade union from the Gdansk shipyards and coal mines of Silesia managed to defeat the ruling Polish United Workers party and its allies in “relatively free” parliamentary elections in June 1989. Despite the proclamation of remaining apolitical, *Solidarność* (Solidarity) started to morph into a political organization (Heyns and Bialecki, 1991). Analysing the electorate date from these quasi-free parliamentary elections in the mid 1989, Hyens and Bialecki (1991) observed that most consistent support for the union was in predominantly rural voivodships, particularly in the southeast.

Shortly after the victorious parliamentary elections, the ideological heterogeneity of *Solidarność* begun to prevail, when the two most noticeable representatives of the union, the then Prime Minister Tadeusz Mazowiecki and political leader of the Solidarity Waleśa, announced they are both running for president. Unexpectedly, it was businessman Stanisław Tymowski presenting himself as an independent candidate who placed second in the first round and ultimately challenged the notorious Solidarity leader in the second round of presidential elections (Szulkin, 1993).

Following 40 years of non-democratic regime in Poland, political system and especially the electorate was very unstable and erratic. The common denominator among all the candidates was strong anti-communist narrative and a need of pro-market reforms. Previously, Polish society expressed an overwhelming support for Solidarity therefore the political clash was expected to be among competing ideological groups within the union, “liberal” Mazowiecki (the Prime Minister) and “conservative” Waleśa (Heyns and Bialecki, 1991). Waleśa’s attitudes were very anti-elite (pro-people), pro-church and anti-communism, whereas his campaign was marked with a latent anti-Semitism. On the GAL/TAN scale, Wales was known for more authoritarian and nationalistic attitudes. His campaign was established on the critique of Mazowiecki’s government and a requirement of higher social protection for the most affected by the

transition. His electoral success was to a great extent very highly correlated with the religiosity (Grabowska, 2017). Mazowiecki on the other hand, supported by the “intelligentsia” and people with higher education, white-collar workers, and high-income earners less likely to suffer from transformation, promoted more liberal, anti-populist and pro-market stances (Szulkin, 1993). Since Poland as a struggling economy had to cope with the transformation of the economy, immigration was not an issue in the 1990 elections. On the other hand, Szulkin (1993) also provides electoral data that clearly states that electorate of Tyminski and Walesa was on average much more nativist and anti-Semitic than the Mazowiecki one (in term of the potential privatization of Polish firms to Americans or Jews).

Had the outcome of the first round been this binary, delimitation of the dimensions would be very straightforward, Mazowiecki (GAL) vs. Wales (TAN). However, the sudden rise of Tyminski, outsider to Solidarity and former businessman from Canada dexterously filled up the vacant space for the electorate criticizing Solidarność and managed to get into the second round (Walesa 40%, Tyminski 23%, Mazowiecki 18%). Both Tyminski and Walesa gained support primarily from the manual workers and self-employed as opposed to Mazowiecki (white-collar workers and other professionals). Tyminski’s and Mazowiecki’s electorate was more secular than that of Walesa (scepticism toward the Church), nevertheless, voters supporting Tyminski were mistrust towards liberal economic reforms and in general showed signs of anti-liberal values and discontent with Solidarity (Zukowski, 1991). Despite clearly secular attitudes, electoral of Tyminski was largely nativist with anti-market stances. In the second round where the two TAN candidates met, Walesa won with an overwhelming majority 74,25:25,75% over Tyminski.

### **3.2 Walesa vs. Kwasniewski (1995)**

Elections in 1995 were supposed to be a certainty, a problem-free path toward re-election for the Nobel peace prize laureate, President Walesa. However, Solidarity-led coalition that rose to power after 1989 elections started to fragment and suffered a major defeat in 1993 what allowed the reorganised (post) communist Alliance of the Democratic Left (SLD) to form a government just four years after the fall of communism with the Peasants party. Five year presidency of Walesa was known for interventionist approach to a party politics in times, when the parliamentary nature of Polish political system was not very well established (Modrzejewski, 2015). The electorate started to regard his actions as controversial and highly partisan.

Presidential run very quickly narrowed down to just two relevant contenders. Rising star of the SLD, chairman Aleksander Kwasniewski, young and well-spoken politician managed to win the primary round with over 6 million votes and proceeded to second round with Walesa. Kwasniewski was on average supported by younger electorate with higher education from bigger cities situated in the north-western and central part of Poland. Walesa, on the other hand, drawn his support from Solidarity strongholds, south-eastern parts of the country. Walesa’s electorate was on average older, with lower formal education occupying rural areas (Pienkos, 1997). According to Pienkos (1997), the runoff was based on two conflictual positions. Kwasniewski supported by SLD

represented moderation and professionalism. The candidate of the Left clearly promoted progressive ideas with slightly statist appeal (protection of the unemployed and agrarians), strong secularism and Polish integration within the EU and NATO. It is ultimately not accidental that Kwasniewski later recognized British prime minister Blair to be his mentor and ideal when it comes to formulating social liberalism (Modrzejewski, 2015). Wales represented totally opposite set of values. The contestant gained an audacious endorsement from Roman Catholic church, built his worldview on socially conservative agenda and authoritarian practices. In case of the 1995 elections, it is very straightforward to link the winner of the elections, Kwasniewski (51,5%) to GAL, while Walesa (48,5%) to TAN.

### **3.3 Kwasniewski (2000)**

Kwasniewski's first term as a president was characterized by bipartisanship and cultivated manners on the international stage what even further enhanced his popularity. It came as no surprise that the incumbent president was again nominated to be the SLD's candidate. Furthermore, no relevant candidates were challenging Kwasniewski politically, perhaps except for the Roman Catholic Church with no real impact on the development of presidential elections. Polls were largely content with President Kwasniewski leading by immense margins, oscillating between 50 and 70% of popular vote. President Kwasniewski managed to achieve, what has never been done before or after in the history of presidential elections in modern Polish. He won his re-election without a need for runoff with 53,9% before Krzaklewski (17,3%) and Olechowski (15,57%), with Walesa securing barely 1% (Pienkos, 2000).

Pienkos (2000) points out, that although Kwasniewski won in all sixteen Polish provinces, the lowest support was again evident in former Solidarity strongholds (south-eastern Poland). President managed to attract two-thirds of votes from people between the ages of 25 and 60, significant number of college-educated and urban electorate and people with secularist worldviews. Ideological background of Kwasniewski's electorate was ideologically ranging naturally from centre to left, heavily supported the entrance into the EU and abortion legalization (Jasiewicz, 2001). The largest and best organized political party – SLD, repeatedly succeeded in taking over the Polish presidency with the pure GAL agenda.

### **3.4 Kaczynski, L. vs. Tusk (2005)**

Era of dominant centre-left was nearing its end. SLD-led government between 2001 and 2005 experienced an economic slowdown combined with rising unemployment and even though the economy recovered, conflicts within the government and with the SLD-backed President prevailed, not to mention various corruption scandals. As both major (parliamentary and presidential) elections approached in 2005, new partisan divide occurred. Civic Platform (PO) with its candidate Donal Tusk promoting liberal, pro-European, and pro-market "GAL" attitudes, while socially conservative Law and Justice (PiS), represented by mayor of Warsaw Lech Kaczynski in presidential election, praised national and Christian identity of the Polish nation. Kaczynski's



positions were clearly on the “TAN” side, defending the interests of the majority affected by transformation (Szczzerbiak, 2007). Long time allies of the former president Walesa, Kaczynski twins decided to fulfil the vacant space left by Solidarity and its successors.

Following the EU enlargement (2004) and Poland’s accession to NATO, the issue of euro-Atlantic dimensions ceased to form major voter alignment. Elections in 2005 were characterised by the conflictual lines of human (gay) rights and “winners”, respectively “losers” of the post-transformational Poland. Albeit Tusk won the first round, he lost to Lech Kaczynski in the runoff 45,96:54,04%. Once again, Poles heavily supported the TAN candidate in the southeast and poorer parts of Poland. Donald Tusk (GAL) drawn his support from pro-European, better educated, and richer urban electorate (Pienkos, 2006).

### **3.5 Kaczynski, J. vs. Komorowski (2010)**

After a great tragedy when an official aeroplane crashed and none of the 96 passengers aboard including President Kaczynski survived, interim president Komorowski (speaker of the lower house of the Polish parliament) announced the presidential election will be held approximately three months prior the previously planned date. The tragedy had a crucial impact on the development of the campaign. As the polls revealed, the only two relevant contestants remained the interim president Komorowski from PO and Jaroslaw Kaczynski as a substitute for his deceased twin brother. The polls proved to be right and the two candidates proceeded to runoff (Lupion, 2017).

Rosset (2011) concludes that the socioeconomic basis of the presidential vote confirmed the usual patterns. Komorowski gathered the usual electorate of liberal PO or SLD (GAL), with disproportionate support from younger, more educated voters in the economically more developed urban areas, whereas Kaczynski built his base on the conservative, elderly and less educated south-eastern electorate of Poles, clearly professing TAN values. Contrary to the expectation of electoral outcomes (sticking to the incumbent party) after the tragedy, in the second round the ratio shifted 53:47% in favour of the GAL candidate.

### **3.6 Komorowski vs. Duda (2015)**

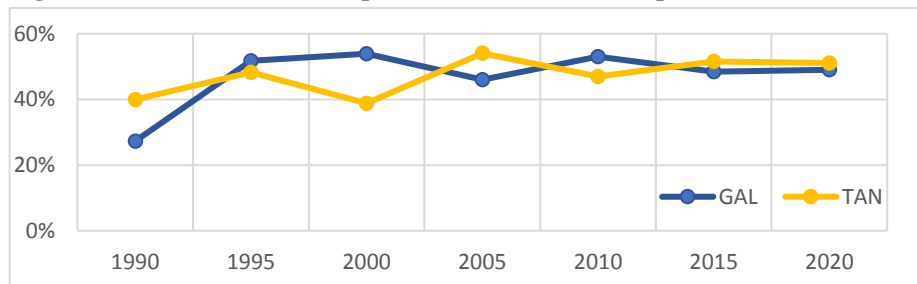
Only second time in the history of modern Poland had the two major elections (presidential and parliamentary) taken place in the same year. According to Marcinkiewicz and Stegmaier (2016), the second term of PO-led government was approaching its end with the rising backlash in popularity (“waiters’ tapes”, ACTA, retirement age etc.). The incumbent president Komorowski failed to distance himself from the PO and became an embodiment of the 8 years of PO governments. His main challenger, MEP Andrzej Duda from PiS dexterously took advantage of that fact and presented himself as a mix of social conservatism and patriotism. Not even backing from the “EU” (former leader of PO Tusk president of European council) discouraged the electorate to opt for the unexperienced second rate politician from PiS. (Peszyński, 2016).

Clearly, Duda represents the “TAN” alignment. Surprisingly, he managed to take over the young electorate opting for unconventional candidate Kukiz in the first round (around 20%), despite standing for clearly traditionalist and authoritarian values. After a long time, TAN candidate succeeded in attracting young votes and winning both rounds (34,76%; 51,55% respectively). The only votes Komorowski was able to attract *en masse* were the most educated people from bigger cities, predominantly in northern and western parts of Poland (Peszyński, 2016).

#### 4 Legacy of the 2020 Presidential Election

The last presidential election that took place in July 2020 was the first time in modern history of Poland when the TAN candidate won two elections in a row. It came by no surprise that the tight race narrowed down to just to relevant candidates from the early on, candidate of PO Rafał Trzaskowski and the incumbent President Duda. The result of the second round was so small that the contestants had to wait for the announcement by the National Election Commission the following day. In context of the political development in Poland, the results from 2020 presidential elections are crystal clear and complete the holistic evolution of GAL/TAN political conflict in modern Polish political history (Fig. 1).

**Fig. 1. Evolution of GAL/TAN political conflict in Polish presidential elections**

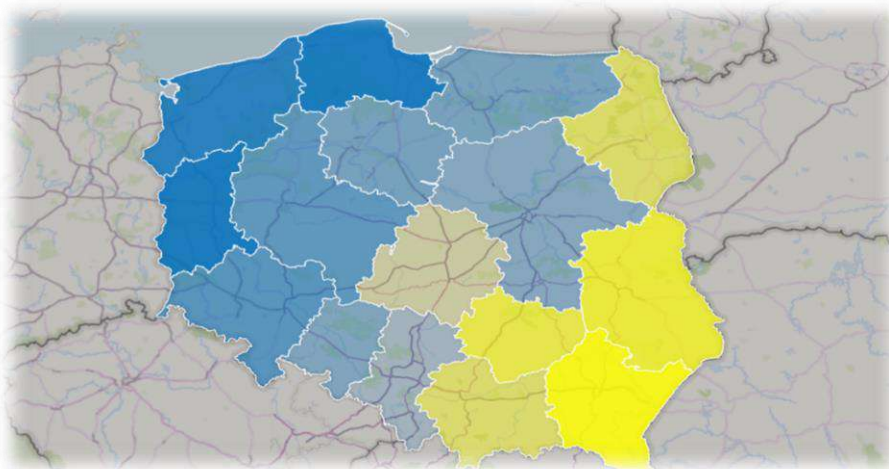


*Source: Own processing based on Państwowa Komisja Wyborcza data.*  
*Note: The electoral results are from the 2nd round except for the elections in 1990 and 2000. In the former, only the TAN candidates proceeded to second round. In the latter, the GAL candidate won in the first round. In these two cases, the result of all TAN and GAL candidates in the first round were summed up together.*

The incumbent President succeeded in obtaining votes from the less educated, on average poorer, older, and more religious electorate from rural areas of the south-

eastern Poland (Solidarity stronghold). Trzaskowski on the other hand, lured votes from the younger, more educated, secular electorates with higher incomes living in larger cities of the north-west and central Poland (tvn 24). The results of all presidential elections in Poland (1990-2020) serve as a proof of a “great divide” within Polish society (see Fig. 2, it was similar in almost every election). These two groups of electorates represent two equally large (depending on the circumstances) sides of political conflict. First group (GAL) sees the outcomes of globalization (migration, the EU) in a rather positive way. It is prone to praise civil liberties, has social and ecological awareness and sees the EU and global world as an opportunity. This electorate is on average younger, more educated, more mobile with higher incomes and lives predominantly in urban parts of north-western and central parts of Poland. Their (centre-left) candidates were Mazowiecki, Kwasniewski, Tusk, Komorowski and Trzaskowski. On the other hand (TAN), there is a part of society sharing unequal part of the global division of labour and perceives migration and the EU as a threat to national identity and economic security. This electorate is older, less mobile with lower incomes and inferior education. The electorate is on average situated in the former rural Solidarity strongholds of south-eastern parts of Poland. This electorate opted for Walesa and Tyminski, Krzaklewski, Kaczynski twins and Andrzej Duda. As we can see, the GAL/TAN political conflict delineates the contours of the “Great Polish Divide”, occurring since the 90s.

**Fig. 2. „Great Polish Divide“**



*Source: Own processing based on Państwowa Komisja Wyborcza data.  
Note: Results of the 2nd round of Polish presidential elections 2020. The Voivodships where Trzaskowski dominated are in blue, Duda's in yellow. The very same division occurred in almost every election since 1989.*

## 5 Conclusion

Following the explanation of basic structure of political cleavage theory and approaches to political conflicts, we described the terminology of GAL/TAN political conflict upon which the analyses was established. Proceeding to presidential elections in Poland between the years 1990 and 2020, each candidate in the 2<sup>nd</sup> round was sorted according to GAL/TAN alignment. Our analysis ended with the legacy of last presidential election in 2020. Circumstances of the postponed presidential election in Poland complete the picture of Poland as a deeply divided society. As we have demonstrated in this article, there exist a “Great Polish Divide” occurring alongside the lines of GAL/TAN political conflict (Fig. 2). There is a less mobile and older population with lower incomes and inferior education living predominantly in rural areas of south-eastern Poland (former Solidarity stronghold) having sceptical attitudes toward immigration, the EU and globalization as a whole and a younger, more affluent and better educated electorate from urban areas of north-western and central areas of Poland having pro-globalist (pro-EU and pro-immigration) stances. We demonstrated this conflict on a binary selection of candidates, who align with either “GAL” (Mazowiecki, Kwasniewski, Tusk, Komorowski and Trzaskowski) or “TAN” (Walesa, Tyminski, Krzaklewski, Lech and Jaroslaw Kaczynski and Andrzej Duda) dimension (Fig. 1).

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# Does subsidizing rail transportation help to improve air quality?

## A case study from Slovakia.

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**Abstract.** Transportation is among the greatest contributors to air pollution in the European Union, but also worldwide. Therefore, governments are implementing policies that are aimed at mitigating externalities produced by the transportation sector. For example, research has shown that subsidising public transport has not only positive welfare effects, but it also helps to reduce negative externalities produced by the use of automobiles. This paper investigates the causal effect of the introduction of rail transportation subsidy in Slovakia on air pollution. The causal effect is estimated using the difference-in-differences estimation method and is derived from the changes in pollution that are caused by the introduction of the subsidy scheme. The identification strategy relies on an exogenous variation in the date of the introduction of rail transport subsidy. We find that introducing rail transportation subsidies in Slovakia helped to reduce the concentration of two tailpipe pollutants, carbon dioxide and sulphur dioxide. However, we also find that the concentration of inhalable coarse particles PM10 increased.

**Keywords:** Government policy, Air pollution, Transportation subsidies, Difference-in-differences

**JEL classification:** I 38, Q 53, H 23, C 31

## 1 Introduction

In the past decades, in Slovakia the increasing living standard has led to the increasing use of automobiles, especially in more urbanised and affluent regions of the country. At the same time, increasing car ownership has led to increased traffic and traffic congestion which contributes to negative externalities associated with automobile usage.

According to the data collected by the navigation technology company TomTom (2020), commuters in the capital city of the country - Bratislava lose daily almost one hour in rush hour and the traffic has been worsening, e.g. in 2019, the level of congestion in Bratislava increased by 3 percent compared to 2018. The increasing traffic and congestion also negatively affect air quality, which on top of time lost in the traffic jams has an adverse effect on people's lives.

According to the European Environment Agency (2019), the measurements of air pollutant concentrations across the European Union suggest that Europeans are exposed to concentration of pollutants that exceed the EU legal standards and the guidelines of the World Health Organisation. Even though the data points to improving air quality across the EU, citizens are still exposed to air pollution, especially those living in urban areas, where the population density is much higher. In the past decades, there has been a call for a fight against the climate change. Since air pollution is among the greatest concerns regarding global warming and climate change (European Commission, 2010), countries around the world have started to implement policies to fight these problems. In the EU, policies aiming to reduce air pollution are specifically targeted at the transportation sector, which is one of the greatest pollutants in the EU (European Environment Agency, 2018).

In our study, we analyse, whether subsidising public transportation, particularly rail transportation, which is perceived as more environmentally friendly, can contribute to the improvement of air quality. In the context of this study, we will look at the environmental impact of predominantly socially focused rail transportation subsidies, which have been in place in Slovakia. We carry out the analysis using the data from the Bratislava region and consider the policy change linked to the increased subsidies on rail transportation for selected groups of population, which were introduced in 2014. The paper is structured as follows: first, we review relevant literature; then, we describe the details of the targeted policy intervention; subsequently, we discuss the data and the methodological approach. In the following section, we present and evaluate the results of the data analysis. Finally, we discuss the results and conclude the paper.

## **2 Review of Relevant Literature**

Many societies use their public policies to ensure adequate minimum living standards for their inhabitants. Even though the tools are similar across different countries, the extent to which individual policy instruments are used and how much intervention takes place varies widely across different countries. In this context, it has been recognized that access to transportation is important for people's lives, especially for poorer people, since it may allow them access to jobs and improve their standards of living and those of their families (Todd, 2014). Transportation subsidies can pursue different objectives, among them to facilitate mobility and to make transportation more affordable for the poor but also reducing negative environmental externalities and promoting allocative efficiency through a reduction of private car usage.

Seberinsky et al. (2009) point out that both in developed and developing countries, transport subsidies are implemented to increase the public transport usage and to reduce externalities, such as greenhouse gas emissions and congestion, and to make transport more affordable, particularly for the poorest. However, many of the arguments are



“second-best” in nature, since subsidies compensate for generated externalities in other parts of the economy, specifically in private transportation use (Elgar & Kennedy, 2005; Vassallo & Perez de Villar, 2007; Seberinsky et al., 2009).

Basso and Silva (2014) also find that in absence of other policies, public transport subsidies help to reduce negative externalities produced by automobiles and increase marginal welfare. However, if other policies are in place, e.g. congestion pricing or bus lanes, the effect of public transport subsidies diminishes. Nevertheless, all subsidies have also a distributional effect on income.

The allocative efficiency argument of subsidies is based on two explanations. Firstly, it is related to under-pricing of certain means of transportation (mostly the ownership and usage of automobiles). This under-pricing implies that the users do not pay the full cost that they impose on the society, e.g. related to the infrastructure usage, or environmental externalities such as pollution, or congestion. Second, there exist economies of scale (i.e. increasing returns to scale in rail transportation) known as the “Mohring Effect” (Mohring, 1972; Jara-Díaz & Guevara, 2003). The “Mohring Effect” arises because the total cost of a trip does not only comprise the price directly paid for the given mean of transport, but it also includes the users’ cost of time. Increased demand for rail transport leads to increased frequency of train services, decreased waiting times, thus, it further triggers the increase of the demand for rail transport (Mohring, 1972). Furthermore, the “Mohring Effect” suggests that higher investment in rail transit infrastructure incentivises car users to switch to a different mode of transport, hence, reducing air pollution.

Chen and Whalley (2012) focus on quantifying the effect of an opening of a new urban rail transit in Taipei on air quality by estimating the effect of the opening of a new rail transit on the concentration of major tailpipe air pollutants. The motivation for their study comes from the “Mohring Effect” explained above. Consequently, the switch in the mode of transportation should reduce air pollution. They find that the opening of a new Taipei metro line led to a 5 to 15 percent reduction of concentration of carbon monoxide (CO) in the air. Moreover, the authors find similar impact on the concentration of nitrogen oxides (NO<sub>x</sub>), yet they find these estimates to be less precise. Furthermore, a study from Indonesia found that opening a new monorail system significantly helped to reduce the usage of cars and motorbikes (Ambarwati & Indriastuti, 2019). The authors found that apart from improving the accessibility from suburban areas, opening a new monorail system helped to improve the air quality during the morning rush hour. Consequently, the cost related to air pollution declined between 26 up to 67 percent compared to the period before the opening of the new monorail line.

The studies of the transportation systems and transport subsidies in Slovakia are limited. Based on the 2001-2011 censuses, Michniak (2016) identifies main trends in commuting in Slovakia. This study points to an increasing number of out-commuters, an increasing number of cross-border commuters as well as an increasing number of commuters to Bratislava and to other commuting centres. Šveda and Barlík (2018) used mobile positioning data to identify the commuting patterns of more than 190,000 phone ID users during the period of selected fourteen days of 2017. Their analysis showed that the majority of people commuted to work from satellite villages and towns to central area of Bratislava, predominantly to the historical city centre and surrounding parts of the city. The fact that the central train station is located close to the historical

centre of Bratislava, where parking is at premium, may explain why rail transportation has become more widely used by commuters to this area of Bratislava in recent years. The increasing number of commuters to Bratislava may contribute to rising air pollution in the capital. Therefore, alternative and more environmentally friendly ways of commuting should be promoted in order to improve the air quality in this urban area. Thus, this research explores, whether subsidising rail transportation can help to reduce concentration of certain tailpipe pollutants and thus, also to improve the quality of life.

### **3 Transportation Subsidy in Slovakia**

In Slovakia, both supply side as well as demand side subsidies are in place for public transportation, i.e. bus and train transportation. These are provided locally, by administrative regional units, or at the central level. In this paper, we will focus on centrally implemented demand side subsidies for rail travel.

On 22<sup>nd</sup> October 2014, the Slovak government passed a law which would allow certain groups of population, namely children, students and pensioners, to use trains as a mean of transport within the Slovak Republic free of charge. The governing party (Smer-SD) promoted this policy within its social package formulated before the 2012 parliamentary elections.

A study by Lennerova (2018) examined the economic position and living standards of pensioners in Slovakia. She found that the pension received by the elderly is insufficient compared to the cost of living. Thus, to secure a better living standard, many pensioners are employed. Thus, improving the lives of pensioners by minimising travel expenses was among the main aims of the rail transport subsidies. Moreover, the goals of this policy were to encourage the use of rail transportation and to alleviate parents' expenditure burden related to their children's commuting costs.

On 17<sup>th</sup> November 2014, which is also celebrated as the International Students' day in Slovakia, the Amendment of the Act 513/2009 and the Act 514/2009 (Central Government Portal, 2015) granting free rail transportation to selected groups of population came to force.

The opponents of the policy claim that the provision of the rail travel free of charge to selected groups of population shifts the cost burden partially to people, who do not benefit from the rail subsidy. In addition, it is also pointed out that due to the lack of rail infrastructure in more remote locations of the country, in reality, up to two thirds of citizens eligible for the subsidy do not have access to free rail travel, even though they are eligible to use it free of charge. Even though the subsidy has also been widely criticised by analysts, mainly on the grounds of poor quality of railway infrastructure, which is in need of financial resources for its updates instead of overcrowding the train services by free of charge travellers, it has been in place up to now and the new coalition government, which came to office in March 2020, does not plan to modify this existing policy.

In 2014, in addition to the subsidies covering 100 percent of the train fare described above, the government introduced also a 30 percent discount on commuter fares. This discount is applied on the regular fare and also on weekly and monthly travel passes. Since 1<sup>st</sup> February 2015, the discount on fares and travel passes for commuters was increased to 50 percent of full fare. The government introduced this

measure to further stimulate the demand for rail travel and to make commuting for employees less expensive, too (SITA, 2015).

Between 2016 and 2019, the number of free of charge trips increased by approximately 13 percent and reached almost 30 million trips per year. Out of this, 50 percent of the trips were made by students above the age of 16 and 31 percent of these trips were made by pensioners (ZSSK, 2016, 2020). This documents that after the rail transport subsidies were introduced, the demand for rail transportation increased.

Due to the high demand for rail travel after the introduction of free of charge rail subsidies, the frequency of the most heavily used services was increased to meet the increased demand of travellers.

It is also important to note that rail fares were subsidised by the government even before the law on free rail travel for selected groups was introduced in 2014. Compared to Western European countries, as Slovakia was part of the former Soviet Union communist block, subsidies were high in some sectors of the economy and in some cases, they persisted even after the collapse of the block. According to Sachs and Woo (1994), in ex-communist countries mainly the services provided by state owned firms and services linked to employment were especially subsidised by the governments. This conclusion is supported also by the subsidies on train travel in Slovakia.

## **4 The Data**

Main sample of the data used in our analysis is for the period between November 2013 and November 2015. The data include the capital city Bratislava and its surrounding areas. We use two different data sources to study the impact of rail subsidies on air quality.

The data on the travel patterns and usage of “free of charge rail travel” subsidies presented above was obtained from the statistical data of the Slovak Rail Company (ZSSK). In addition, the data on the subsidies and the details of the policy itself were obtained from official government press releases, government legal acts and regulations and from newspaper archives.

### **4.1 Pollution Data**

The daily data for the period November 2013 - November 2015 on concentration of main pollutants were obtained from the Slovak Hydrometeorological Institute (SHMU), which measures the concentration of air pollutants across Slovakia. In our sample, we include two measuring/monitoring stations from the Bratislava region. We focus our attention on the concentration of three main tailpipe chemicals that are produced by an automobile, while in use, i.e. nitrogen dioxide ( $\text{NO}_2$ ), sulphur dioxide ( $\text{SO}_2$ ) and inhalable coarse particles with a diameter of 2.5 - 10 micrometres ( $\text{PM}_{10}$ ).

### **4.2 Weather and Holiday Data**

The location-specific daily weather data were obtained from the Slovak Hydrometeorological Institute (SHMU) for the period November 2013 - November

2015. These include daily measures of temperature (maximum and minimum daily temperature), amount of precipitation in millimetres and average wind speed. We use the weather data to control for the effects of the weather conditions on the level of air pollution. In addition, we control for the effects of holidays on the quality of air in the Bratislava region. We constructed a dummy variable that carries the value of one for days of school/public holidays, and zero otherwise. The information about school/public holidays comes from the website of the Ministry of Education, Science, Research and Sport of the Slovak Republic (Ministerstvo školstva, vedy, výskumu a športu Slovenskej republiky).

## 5 Methodology and Empirical Strategy

In this section, we outline the methodology and the empirical approach used to analyse and evaluate the impact of the introduction of rail subsidies on the concentration of selected tailpipe pollutants in the Bratislava region (Slovakia).

The main analytical tool that we use to identify the causal effect is the difference-in-differences estimation method (DID). The difference-in-differences method allows us to analyse the treatment effect of the introduction of the transportation subsidy. The DID method enables to compare the outcomes before and after the treatment, i.e. we can compare the outcomes before and after the “free of charge travel” policy came into action on 17<sup>th</sup> November 2014.

The difference-in-differences design is a method of estimating the average treatment effect on the treated (ATT). In difference to other empirical methods, difference-in-differences approach (DID) compares the changes in outcomes across time periods. For DID to be valid, the treatment does not need to be randomised, but the treatment has to be exogenous. As long as the treatment and control groups differ in some initial characteristics that remain fixed over time, DID estimates will be unbiased.

The date, when the rail transportation subsidy came into action, i.e. 17<sup>th</sup> November 2014, tells us that those eligible, can travel free of charge since that day and others can take advantage of reduced prices of weekly/monthly travel cards. Thus, we can exploit this threshold to study the effects of this policy.

As the policy came into action nationwide, it is not possible to use a natural control group. Therefore, we designed a synthetic control group so that we were able to obtain average treatment effect of the rail travel transportation subsidy. We chose a measuring station in the Bratislava outskirts, where people do not use rail transportation as a mean for commuting. Thus, even after the introduction of the rail transportation subsidy, those living in this area do not take advantage of the free rail travel subsidy. Nevertheless, the connection from these locations to Bratislava is facilitated by public bus transportation (this was the case also before the introduction of the rail transportation subsidy). The observations in the treatment group come from the measuring station located in Malacky. The town Malacky has access to a rail line to Bratislava, which is widely used by commuters.

We use the following difference-in-differences specification to estimate the causal effect of the introduction of rail transport subsidies on air quality:

$$(1) \quad y_t = \alpha + \beta_1 After_t + \beta_2 Rail_i + \beta_3 (After_t \times Rail_i) + \beta_4 X_t + \varepsilon_t$$

where  $y_t$  is the natural logarithm of air pollutant concentration at time  $t$ ,  $After_t$  is a dummy variable indicating whether the rail transport subsidy was in place at time  $t$ ,  $Rail_i$  is a dummy variable indicating whether the location of measuring station  $i$  has access to rail transportation,  $After_t \times Rail_i$  is an interaction term which gives us the estimated treatment effect,  $X_t$  is a vector of other explanatory variables such as the average wind speed, maximum and minimum temperature, precipitation and controls for holidays and working days, and  $\varepsilon_t$  is the error term.

We are interested in the coefficient  $\beta_3$  which is the difference-in-differences estimate. As suggested by the previous research (e.g. Chen and Whalley, 2012), we would expect the introduction of rail fare subsidies to be negatively related to the concentration of the studied tailpipe pollutants. However, Chen and Whalley (2012) suggest that the demand for rail transportation is positively correlated to the demand for automobile travel. In addition, train ridership tends to be high, when automobile usage is high, because of the fact that the demand for rail and automobile travel tends to be high during the same time period, e.g. people tend to travel/commute most during peak times and during the working days of the week. Thus, the expected relationship between air pollution and train ridership would be ambiguous. Since the standard errors can be biased because of serial correlation, we will use robust standard errors.

In order to obtain unbiased difference-in-differences estimates, the common trend assumption needs to be satisfied – in the absence of the introduction of the rail transport subsidy, the concentration of the studied air pollutants would follow the same trend in both the treatment and control groups. Another assumption that has to be satisfied in order to obtain unbiased estimates is that the composition of the treatment and control groups does not change during the period studied. We believe that these assumptions are satisfied, thus we expect the estimated results to be unbiased.

If the subsidy has not been introduced, there would have not been any new incentives at that specific point of time to switch from using cars to using rail transportation for commuting.

## 6 Results

In this section, we present the estimation results of the difference-in-differences analysis outlined in the previous section. In addition, we also present the results of the sensitivity analysis.

The estimated results of the concentration of major air pollutants (i.e. nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and inhalable coarse particles with a diameter of 2.5 – 10 micrometres (PM<sub>10</sub>)) are summarised in *Table 1*). We present the results of the analysis considering various time specifications – we perform the analysis using 365-, 180- and 30-day bandwidth around the policy introduction date.

We find that in Slovakia, the introduction of rail transportation subsidies had a negative effect on the concentration of nitrogen dioxide and sulphur dioxide in the area with access to rail transportation, i.e. it helped to improve the air quality.

The results in *Table 1* suggest, that the introduction of rail subsidy helps to reduce the concentration of certain tailpipe pollutants. In particular, we find that it led to a statistically significant reduction of the concentration of nitrogen dioxide, by approximately 31–46 percent.

However, we find that the introduction or “free rail subsidy” has a positive effect on the concentration of the inhalable coarse particles with a diameter of 2.5–10 micrometres (PM<sub>10</sub>) in the treated area, which is contrary to what we expected to find out. Specifically, we find that after the rail subsidies were introduced, the concentration of inhalable coarse particles (PM<sub>10</sub>) increased by approximately 13 percent if we consider the 365-day bandwidth, and by almost 32 percent if we take into account the 180-day bandwidth around the policy introduction threshold in the area with the access to rail transportation. Nevertheless, in the short-run (i.e. 30-day bandwidth), the estimated results for the concentration of nitrogen dioxide and inhalable coarse particles PM<sub>10</sub> are found to be statistically insignificant.

Moreover, the estimated results for the concentration of sulphur dioxide are mixed. We find that in the short-run, the introduction of rail subsidies in Slovakia led to an increased concentration of sulphur dioxide in the area with the access to rail lines, whereas, in the longer-run the estimates suggest that it leads to a decrease in the concentration of sulphur dioxide of up to almost 35 percent. The estimated results are statistically significant at 5 and 1 percent level of significance respectively.

**Table 1.** Impact of the introduction of rail subsidy on air pollution

	<i>Col.1</i> <i>DID</i> $\pm 365$ days	<i>Col.2</i> <i>DID</i> $\pm 180$ days	<i>Col.4</i> <i>DID</i> $\pm 30$ days
<i>Dependent variable</i> <i>logNO<sub>2</sub></i>			
<b><i>After × Rail</i></b>	-0.4577 *** (0.0407)	-0.3067*** (0.0458)	0.0737 (0.0862)
<i>Number of observations</i>	1,157	655	121
<i>Dependent variable</i> <i>logPM<sub>10</sub></i>			
<b><i>After × Rail</i></b>	0.1341** (0.0577)	0.3258*** (0.0923)	0.0896 (0.1507)
<i>Number of observations</i>	1,106	537	121
<i>Dependent variable</i> <i>logSO<sub>2</sub></i>			
<b><i>After × Rail</i></b>	-0.3490*** (0.0418)	-0.1856*** (0.0523)	0.2468** (0.1200)
<i>Number of observations</i>	1,262	676	117

*Robust standard errors are reported in the parentheses. \*\*\* Significant at 1%, \*\*Significant at 5%, \* Significant at 10%.*

Overall, we find that the introduction of rail transport subsidies helps to reduce concentration of tailpipe pollutants, and thus, it helps to improve the air quality in the area with access to rail transportation. Rather surprisingly, we find that the introduction of the rail transport subsidies has a positive and statistically significant effect on the concentration of particles of PM<sub>10</sub>. Why this is the case should be studied by further research.

A possible threat to the credibility and unbiasedness of our estimates can be based on the number of observations. In particular, some of the observations are missing due to technical problems and the maintenance of the measuring stations. In addition, the estimates seem to be overestimated. This may be due to factors affecting pollution, which we were not able to account for, for example, atmospheric or weather anomalies that could affect the concentration of the tailpipe pollutants in the air and therefore, also affect air quality. Due to the fact that we consider only one measuring station in the treatment group and one in the control group, the results may be specific only with regard to these two locations. Therefore, the external validity of our estimates can be limited and questioned.

## **7 Conclusion and Discussion**

Based on the analysis carried out, we can conclude that the introduction of rail transportation subsidies in Slovakia on 17<sup>th</sup> November 2014 helped to reduce the concentration of some air pollutants in the air. We found that the introduction of such policy had led to the reduction of the concentration of nitrogen dioxide and sulphur dioxide in the air. However, our analysis also indicates that the introduction of the “free rail travel subsidy” led to an increase in the concentration of the inhalable coarse particles (PM<sub>10</sub>) in the location studied. The results of the empirical analysis also suggest that after the introduction of the rail transport subsidies, the demand for rail travel has been increasing on annual basis and this also applies to the demand by those, who are not eligible for free rail travel subsidy. This suggests that introducing rail subsidies also attracted more users, who might have used an alternative transportation mode such as a car before. The results of our research suggest that subsidising public rail transportation contributes to reducing the concentration of air pollutants in the air and countries trying to reduce air pollution could use similar policies using rail services.

Our analysis contributed to the research of public rail travel subsidies and their impact on air pollution, especially with regard to the study of related policies in Slovakia. However, further research is needed to deepen the robustness of these results. As we only used one pollution measuring station in the treatment and one in the control group, more robust estimates would be achieved, if the data from other measuring locations were also used. Thus, this would increase the precision and validity of the estimated effects. Moreover, since the observations for some days were missing in our dataset, the preciseness of our estimates can be slightly negatively affected. Further research could also focus on including other factors that could have affected the air pollution but were not accounted for in our analysis.

The analysis of the effects of public transport subsidies is an important topic with high policy relevance. In the current economic recession caused by the COVID-19 pandemic associated with increasing unemployment rates and its larger negative effects on lower income strata of the population, the issue of public rail travel subsidies becomes even more relevant. Next to the current economic downturn, the world faces the climate change crisis and this study also contributes to the discussion of transportation subsidy policies as a way to limit the negative impact of car traffic on the environment. However, this research could be further extended and focus also on the study of the effects of rail transport subsidies on other variables such as life satisfaction, gender equality and others. In addition, it would be also important to study the effects of the policy on those groups of population that the policy is targeted at. But to study these effects, we would need a different dataset and also use other analytical methods we use.

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# The differences in Innovation Performance and Competitiveness among the Regions of Slovakia

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**Abstract.** Innovation is considered as one of the characteristics of success in a business environment and is considered an essential element for achieving customer satisfaction. Development of the company depends on its ability to develop competitive advantages that allow it to gain customer loyalty and expand market share through product innovation. Innovation performance and competitiveness are interlinked economic categories whose impact is reflected in different economic, financial and social areas. The aim of the paper is to compare innovative indexes (European Innovation Scoreboard, Regional Innovation Scoreboard) and the index tracking the competitiveness (European Regional Competitiveness Index) among the regions of Slovakia and to identify the strengths and weaknesses of the regions according to individual indexes. Regional differences in innovation performance are reflected in differences in the competitiveness of individual regions. The weakness of all regions in innovation performance is the area of intellectual property - the number of granted patents and designs.

**Keywords:** Innovation, Competitive advantage, Regions

**JEL classification:** O 30, M 10, R 58

## 1 Introduction

Most activities inside companies are more or less routine-based. Exploiting existing technologies, addressing existing markets and talking and selling to well-known customers and clients covers the majority of actions companies execute. Exploring new things, finding new clients, discovering new needs, developing new technologies are only limited actions. Limited in terms of attention of top management, limited in resources dedicated towards these goals, and limited in terms of recognition of its importance by most people inside companies. Rationally the notion of innovating is easy to understand, but being part of, or partner in an innovation process is a very

emotional experience. Innovating means accepting change. Putting it stronger, innovating will kick you out of your comfort zone. You have to give up the important things you know and trust. So, if they can, people will avoid innovating (Buijs, 2012).

Innovation is said to account for 80 percent of productivity growth in advanced countries, and productivity growth accounts for some 80 percent of Gross Domestic Product (GDP) growth overall. This places the importance of innovation in context. It is the key to improved competitiveness, growth and, in consequence, employment (Cooke et al, 2000).

### 1.1 Literature Review

Enormous strategic opportunities are emerging as we stand at the intersection of increasing globalization, rapid technology changes and newer lifestyles. Innovation has become the major differentiator in the competitive race and innovative companies have learned to sustain themselves over long periods of time (Bowonder et al, 2010).

Almost 100 years ago, Schumpeter (1911) realized that the national economy got in progress by "new combinations" of production factors, such as the use of new machines, the introduction of mass production, the use of cheaper sources of raw materials and more advantageous trade routes, the exchange of existing goods for cheaper ones, entry into new markets and the introduction of the production of completely new products. In the following years, he already used the term "innovation" instead of the original "new combination" and found it as an act of creative destruction, through which new products and services were placed on the market and also labor productivity and economic growth were increased. Schumpeter defined five basic types of innovation: the introduction of a new product, the introduction of a new production method, the discovery of a new market, the use of a new source of primary inputs (raw materials, semi-finished products) and a change in business organization (Urbančíková, Burger 2010).

According to the Oslo Manual 2018, an innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).

Innovation is essentially about change, and diffusion is essentially consumer willingness for change. Fundamental to the change brought by product innovation is how the new offering will interact with the actual needs and desires of consumers'' (Veryzer, 2003).

A nation's competitiveness depends on the capacity of its industry to innovate and upgrade. Companies gain advantage against the world's best competitors because of pressure and challenge. They benefit from having strong domestic rivals, aggressive homebased suppliers and demanding local customers. In a world of increasingly global competition, nations have become more, not less, important. As the basis of competition has shifted more and more to the creation and assimilation of knowledge, the role of the nation has grown. Competitive advantage is created and sustained through a highly localized process. Differences in national values, culture, economic structures,

institutions, and histories all contribute to competitive success. Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense, including both new technologies and new ways of doing things. They perceive a new basis for competing or find better means for competing in old ways. Innovation can be manifested in a new product design, a new production process, a new marketing approach, or a new way of conducting training (Porter, 1990).

One of the accompanying effects of globalization is the still more important role of regions in the economic development of national economies. Increasing the competitiveness of regions is based on the ability to innovate.

Tödtling and Trippel (2005) recognize three types of regions while each of them should have a different innovation policy. The innovation policy of metropolitan regions should be focused on the improving of their integration and position in the global economy, on the strengthening of the mutual links among companies and links between the research and the business. In addition, it should support the establishment of new companies and the radical innovations in sectors that are strongly supported by research. The second group are the old industrial regions. The innovation policy in these regions should be based on supporting of new trajectories and on stimulating of the product and process innovation for new markets. Tools used to achieve the objectives of this policy are the promotion of the attracting foreign direct investment, the support of the network structure transformation and the support of risky investments. The third group are peripheral regions, which are often characterized by a high proportion of rural population and by a focus on agriculture. The priority of the innovation policy aimed at these regions is the need of learning how to achieve the organizational and technological transformation. This means the support of the behavior change, of the stimulation of innovative attitudes, the support of potential clusters and also the orientation on innovation in low-tech sectors.

Based on several studies (Audretsch and Feldman, 1996; Bottazzi and Peri, 2003; Cooke, 2002; Ratti et al., 1997), a new policy model has emerged in the field of innovation and regional policy, often stressing the following elements:

- focus on high-tech, knowledge based or “creative” industries;
- building up of research excellence;
- attraction of global companies; and
- stimulation of spin-offs (Tödtling and Trippel, 2005).

The regional innovation system concept is new, recognizing a growing perception that the regional level of economic co-ordination has an important role to play as a functional correlate to the increasing power of globalization as a general economic force, especially with respect to innovation (Cooke, 2000).

## 2 Methodology

Innovative activities do not only affect the performance and competitiveness of companies, but also the regions and the whole national economy. Because of the need to solve this issue right at the regional level innovative indexes (European Innovation Scoreboard and Regional Innovation Scoreboard) and the index tracking the

competitiveness of regions (European Regional Competitiveness Index) have been compiled. The aim of the paper is to compare these indexes and their values among the regions of Slovakia, to identify the strengths and weaknesses of the regions according to individual indexes. In this paper we will use analysis, synthesis, induction, deduction and comparative methods. At the end of the paper we will present proposals for improving the innovative potential of Slovakia and the regions of Slovakia.

EIS – European Innovation Scoreboard and RIS - Regional Innovation Scoreboard launched by the European Commission measure how member states are performing in innovation. They assess the relative strengths and weaknesses of national and regional innovation systems and help countries identify areas they should focus on. The scoreboard divides EU countries according to their innovation performance into four groups: innovation leaders, strong innovators, moderate innovators, and modest innovators.

The European Regional Competitiveness Index (RCI) monitors the performance of 268 regions at NUTS-2 level in the 28 EU Member States. The RCI provides a comparable picture of the level of competitiveness in all EU regions and helps to design better policies and monitors their effectiveness. The RCI helps to highlight the strengths and weaknesses of each region, with the possibility of comparing each of them with the EU average or its peers.

The NUTS methodology (La Nomenclature des Unités Territoriales Statistiques) created by the Statistical Office of the European Union, is used to assess and evaluate the regions of EU countries. Based on the NUTS methodology, the Slovak regions are divided into 5 categories (NUTS I - Slovakia, NUTS II - Bratislava Region, Western Slovakia, Central Slovakia, Eastern Slovakia, NUTS III - Regions of Slovakia, NUTS IV - Districts of Slovakia, NUTS V - Municipalities of Slovakia).

Using the Regional Innovation Scoreboard and the European Regional Competitiveness Index, the EU regions are evaluated at the NUTS 2 level (in the case of the Slovak Republic, these are western, central, and eastern Slovakia and the Bratislava region).

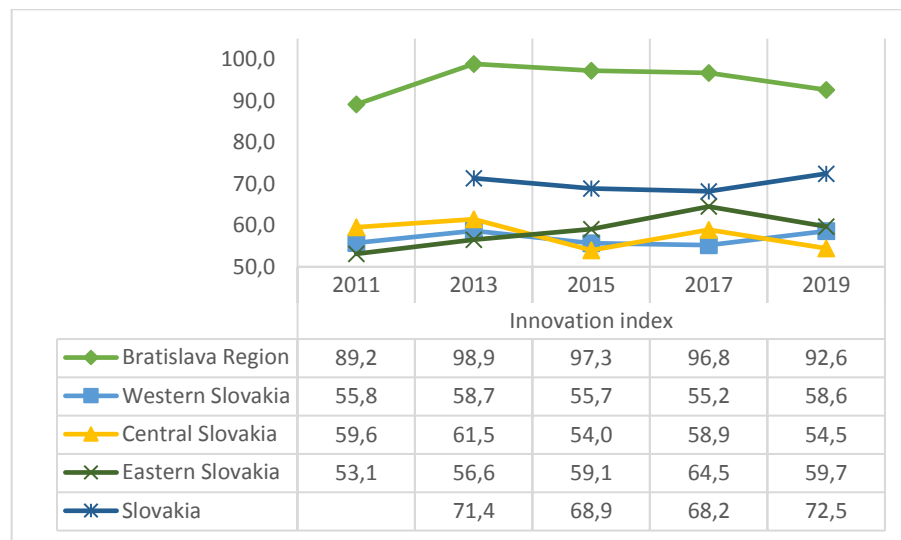
### **3 Results**

In this part of the paper we analyse and compare the eco-innovation performance and competitiveness of Slovak regions according to individual indexes. Based on the results of the latest surveys, we identify the strengths and weaknesses of each region.

#### **3.1 The innovation performance of the regions in Slovakia**

According to the latest results for 2019 (EIS 2020), Slovakia belongs to the group of moderate innovators, whose performance is from 50% to 90% of the EU28 average. Slovakia performs below the EU average for most indicators. Relative strengths are in employment fast-growing enterprises of innovative sectors, in sales of new to market and new to firm's innovation and in exports of medium and high technology products.

Relatively large weaknesses are in venture capital expenditures, finance and support, in R&D expenditures in the public and business sector and in design and patent applications. The innovation performance of individual regions of Slovakia is shown in Fig.1. Differences in innovation performance between the Bratislava region and the other regions have been evident since 2011. All regions have also shown a constant trend of their innovation performance.



**Fig. 1.** Innovation activity among the regions of Slovakia. *Source: own processing according to RIS 2020*

The relatively large weakness of all regions is mainly in the field of intellectual property, where they lag significantly behind the EU average, especially in the field of patents. This can be partly explained by the higher value of the indicator – non R&D innovation expenditure (includes investment in equipment and machinery and the acquisition of patents and licenses) and on the other hand by the lower value of the indicator – R&D expenditure. The Bratislava region achieves more than 200% performance in employment in medium high/high tech manufacturing and knowledge intensive services, other regions also achieve very good results in this indicator. The Bratislava region also achieves above-average values for other indicators - percentage population aged 30-34 having completed tertiary education, number of scientific publications with at least one co author based abroad, sales of new to market and new to firm's innovation (Table 1).

**Table 1.** Comparison of innovation performance indicators in the regions of Slovakia in 2019

Indicator	Region			
	Bratislava Region	Western Slovakia	Central Slovakia	Eastern Slovakia
Population with tertiary education	197,89	72,15	66,24	62,03
Lifelong learning	51,49	25,74	19,80	26,73
Scientific co-publications	198,08	49,37	58,82	87,09
Most-cited publications	57,64	38,51	43,73	54,16
Public-private co-publications	98,93	20,46	15,11	68,76
Employment medium and high tech manufacturing & knowledge-intensive services	204,00	169,33	107,30	89,05
Sales of new-to-market and new-to-firm innovations	130,63	73,40	67,56	72,45
Trademark applications	104,20	52,82	37,76	47,89
Design applications	66,96	76,97	44,04	45,00
EPO patent applications	25,15	25,91	15,48	20,25
Marketing or organisational innovators	65,75	38,65	50,54	44,57
Product or process innovators	64,77	51,41	60,32	49,17
SMEs innovating in-house	62,99	51,09	59,13	43,99
Innovative SMEs collaborating with others	98,85	61,94	70,46	58,71
Non-R&D innovation expenditures	67,70	126,77	123,99	182,67
R&D expenditure business sector	73,97	48,51	47,62	39,84
R&D expenditure public sector	105,90	48,74	62,85	61,55

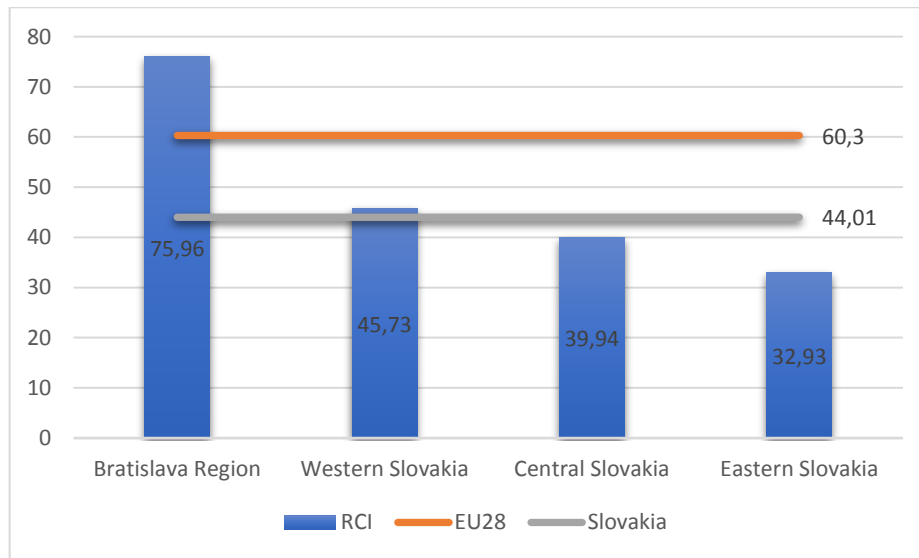
Source: own processing according to RIS 2020

### 3.2 Competitiveness index of Slovak regions

Regional competitiveness index 2019 includes 74 indicators grouped into 11 pillars, which assess the quality of regional and national institutions, macroeconomic stability, quality and availability of infrastructure, population health, education, labor market efficiency, market size, technological readiness regional, business sophistication and innovation.

The results of the last evaluation of the competitiveness of the regions show that the value of the competitiveness index of Slovakia is below the average level of the EU28.

Even in the case of the competitiveness index, can be noticed evident differences between the Bratislava region and the other regions. The score of the Bratislava region (75,96) is well above the level of the total rate of the competitiveness index of Slovakia (44,01) and also above the level of the EU average (60,3). The biggest difference is noticed between the Bratislava region and the Eastern Slovakia, which has by more than half lower rate of the competitiveness index (Fig. 2).



**Fig. 2.** Comparison of the competitiveness index 2019 among the regions of Slovakia with the EU average. *Source: own processing according to RCI 2019*

Weaknesses of Slovak regions include the low level of public health quality, low quality of regional and national institutions (e.g. low transparency of government policy-making, high level of corruption, insufficient rule of law), infrastructure (with the exception of the Bratislava region), little developed business sphere (with the exception of the Bratislava region and Central Slovakia), low level of innovation (with the exception of the Bratislava region). On the other hand, the strengths of the Slovak regions are macroeconomic stability, quality of basic education (e.g. employer sponsored training, access to learning information), quality of higher education and lifelong learning (in the Bratislava region and in Western Slovakia) and in the Bratislava region also the high rate of innovation (Table 2).



**Table 2.** Competitiveness index 2019 - strengths and weaknesses of Slovak regions

	<b>Score (0-100)</b>	<b>Rank</b>	<b>Strengths</b>	<b>Weaknesses</b>
Bratislava Region	75,96	66/268	Innovation Basic Education Higher Education and lifelong learning	Institutions Health Technological Readiness
Western Slovakia	45,73	178/268	Basic Education Macroeconomic Stability Higher Education and lifelong learning	Business Sophistication Infrastructure Institutions
Central Slovakia	39,94	199/268	Basic Education Macroeconomic Stability	Infrastructure Institutions Health
Eastern Slovakia	32,93	217/268	Basic Education Macroeconomic Stability	Infrastructure Business Sophistication Health

*Source: own processing according to RCI 2019*

## 4 Conclusions

Competitiveness and innovation performance are two interconnected economic categories and their synergistic effect is reflected in different economic, financial and social areas. To assess and evaluate the level of innovation performance and competitiveness is more appropriate to look at the regional level instead of the national level. This is particularly beneficial for designing better policies, regional development strategies and monitoring their effectiveness. The aim of the paper was to compare indexes (European Innovation Scoreboard, Regional Innovation Scoreboard, European Regional Competitiveness Index) and their values among the regions of Slovakia, to identify the strengths and weaknesses of the regions according to individual indexes.

Regional differences in innovation performance are reflected in differences in the competitiveness of individual regions. Three regions of Slovakia achieve approximately the same below-average level of innovation performance. Only the Bratislava region differs significantly in the case of both indexes. The weakness of all regions in innovation performance is the area of intellectual property - the number of granted patents and designs. In connection with that, all regions lag behind in expenditure on research and development. The area of research and development is the key how to increase the innovation performance and related competitiveness of regions. Expenditure on research and development constitutes one of the main drivers of

economic growth and can significantly affect competitiveness and wealth of the regions. To support research and development, it is necessary to create a comprehensive concept of systematic support at the regional level.

For the future, it will be necessary to mobilise all financial sources in the area of innovation support in order to ensure that innovation activities performed by business entities receive the same level of funding as those in advanced EU countries. In connection with the efforts towards the most effective use of allocated financial resources, the state will have to provide indirect aid to profit-generating projects implemented by SMEs, i.e. it will have to use financial engineering instruments such as guarantee funds, credit funds, venture capital funds and municipal development funds (Lesáková, et al, 2017).

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# WHAT CHARACTERISTICS OF HOUSEHOLDS INDICATE INDEBTEDNESS? Evidence from Slovakia

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**Abstract.** The increase in the indebtedness of Slovak households is one of the most significant among the countries of the European Union. The favourable economic situation, the reduction of the unemployment rate to historically low, rising wage levels, and the expansionary monetary policy of the European Central Bank create suitable conditions for increasing household debt. More affordable loans today can lead to the financial instability of indebted households in the future. The main goal was to analyse the tendency of Slovak households to be indebted. This analysis was based on microeconomic data collected through a survey on Household Financing and Consumption in 2017. The performed descriptive analysis identified socio-economic and demographic factors related to household indebtedness. The statistically significant factors on indebtedness are the level of wealth, the number of household members and children, work status, education, and age of the reference person in the households.

**Keywords:** *HFCS, indebtedness, Slovak households, socio-economic and demographic factors, microeconomic data analysis*

**JEL classification:** *C25, D14, D31, G51*

## 1 Introduction

Rising living standards contribute to the growing needs of the population. These needs are usually satisfying by consumption. Consumption is, however, limited by one's financial capacity. Households can cover their needs easier and almost instantly by borrowing the additional financial resources through credit market. Lower interest rates and easing the access to the loans steamed demand for the debt over the past two decades. Rising households' indebtedness may lead to deterioration of the financial and monetary stability of economy. Indebtedness of the households can be expressed by the Debt-to-Income ratio (DTI). For the last ten years, DTI ratio in Slovakia doubled from

approximately 35% in 2008 to 69% in 2018.<sup>1</sup> Therefore, understanding the factors that drive households into debt is key for policymakers, regulators and financial institutions.

The observed trend in the rapid credit expansion can be explained by households' individual propensity towards indebtedness. Literature explains the households' debt choices according to economic, social and psychological circumstances (Livingstone & Lunt, 1992). From the perspective of economic theory, the financial situation of households is mainly connected with socio-economic and demographic factors, such as disposable income, amount of saving, expenditure on basic needs, social status, age structure, educational qualification, family size, etc. (Costa & Farinha, 2012).

The aim of this paper is to investigate the debt distribution over Slovak household sector according to selected relevant socio-economic and demographic characteristics. Which of these characteristics increases the probability of indebtedness?

The analysis is based on the data from the latest European Central Bank's (ECB) survey on the financial situation and households' consumption (HFCS). The third wave of HFCS was conducted across countries in euro area<sup>2</sup> in 2017. The main objective of the HFCS is gathering structural microeconomic data on households' wealth<sup>3</sup>, income and consumption, as well as various economic<sup>4</sup> and demographic information of surveyed individuals (NBS, 2020). This type of information allows us to separately analyse the situation of indebted households and the details behind debt distribution. At the same time, this makes it possible to reveal factors that statistically increase the probability of indebtedness (Costa & Farinha, 2012).

Based on the results of the ECB's HFCS report (2020), the share of indebted households in the euro area decrease by 0.8 percentage point between 2014 and 2017. However, indebtedness markedly increased across the upper-middle parts of the net wealth distributions. This group consists mainly of the youngest households (below 35 years of age), whose mortgage debt rose by 12.7%.<sup>5</sup> On the other hand, due to increases in house prices, indebted homeowners experienced gains in their median wealth (13.9%). Within the comparison of the European Union countries, the indebtedness is most significantly growing in Slovak Republic. In accordance with the European Commission's country report (2020), the debt of Slovak households reached a record high of 42.8% of GDP in the second quarter of 2019. Main reason was higher mortgages due to rising property prices. It is expected that house prices will grow faster than disposable income. This will reduce affordability mainly for lower-income groups. Despite the rapidly increasing debt of Slovak household, overall indebtedness is still relatively low compared to other OECD countries (Sivák et al., 2018).

The growing risk of financial instability of indebted subjects, especially in a recession, when unemployment and interest rates are rising and investment activity decreasing, may lead to the insolvency or default in the worst-case scenario. Similarly, as in other EU countries, the level of Slovak private debt is growing faster than the

<sup>1</sup> Source: Eurostat database, available online at <http://appsso.eurostat.ec.europa.eu>.

<sup>2</sup> And some countries outside the euro area: Poland, Hungary, Croatia, Romania, the Czech Republic.

<sup>3</sup> In the HFCS, the wealth of households is divided into financial assets, real assets and financial liabilities.

<sup>4</sup> For instance, household income, intergenerational transfers, selected categories of consumption and credit constraints, age, education or occupational status of respondents, etc.

<sup>5</sup> Specifically, the average mortgage debt for the youngest households increased from approximately EUR 110,000 (2014) to more than EUR 124,000 in 2017.

corporate one. However, based on an ex-post credit risk analysis since 2008, in the event of an unfavourable phase of the economic cycle, households show better payment discipline compared to enterprises (IFP, 2019). Recent years have been marked by favourable economic emergence within the EU. In Slovak conditions, economic growth was reflected in the net wealth increase of households. Between 2014 and 2017, the median of net wealth increased by approximately 40%. However, this growth is negatively affected by the growth of financial liabilities, and although the share of indebted households did not change significantly (36.6%), total volume of debt almost doubled (Kucserová & Strachotová, 2019).

In terms of financial stability, it is important to know the socio-economic and demographic characteristics of households participating in credit market. The factors that determine this participation may vary depending on the type of debt. For this reason, performed analysis of general indebtedness is complemented by the characteristics of households that hold mortgages. This paper consists of the descriptive analysis of the relationship between households' indebtedness level and their characteristics.

The paper is divided into three parts. Section 2 presents the methodology and using variables. In section 3 is described the demographic and socio-economic characteristics of participants in the credit market. The last section includes the main conclusions.

## 2 Methodology and variables

The aim of the work is to provide a systematic and comparable overview of the situation of households' participation in the credit market. Mainly to analyse the level of households' indebtedness in according to some relevant socio-economic and demographic characteristics. The following section presents the results of logistic regressions<sup>6</sup> in which binary dependent variables are the participation in the credit market with separately focus on the mortgage market (equal to 1 if participate, 0 if not). Explanatory variables were selected in relation to the economic Life cycle theory and consumption hypothesis developed by Franco Modigliani and Richard Brumberg (Ando & Modigliani, 1963).

The economic decisions regarding consumption as well as investment, and thus also indebtedness, are based on the individual expectation about the level of wealth and lifetime income which consists from the current income and the discounted value of future income achieved within the expected life expectancy. Individual assumptions regarding the future development of income and wealth are related to the achieved level of education, as well as the representation of economic active members of the household, its size and structure.

Based on the above assumptions, in the analysis of households' characteristics influencing indebtedness, we examined the level of income, type of household, number and age distribution of members living in one household, achieved the level of education and work status of the reference person.<sup>7</sup>

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<sup>6</sup> For more information about the methodology see for example O'donnell et al. (2007)

<sup>7</sup> The term reference person is used to refer to a person with financial information about a household - the head of the family.

Undertook adjustments of explanatory variables are partly in accordance with the HFCS analysis performed by Sónia Costa and Luisa Farinha (2012). In the analysis are used households' income as the sum of regular income received by all household members,<sup>8</sup> and the value of real assets<sup>9</sup>. Each of the selected variables is divided into subcategories according to their specification. Subsequently, from these adjusted variables were created new artificial variables (dummies).<sup>10</sup>

In the analysis is used data from the latest ECB survey on the financial situation and consumption of Slovak households. The HFCS dataset is a probability sample of households. From this reason, all the results in this paper were obtained taking into account the final sample weights. The study is based on the analysis of 10,895 interviews with Slovak households.

### 3 Demographic and Socio-economic characteristics

This section of the paper presents a descriptive analysis of the characteristics of the indebted Slovak households. In the analysis, the subjects are divided mainly into two groups according to their indebtedness status, namely indebted (Any debt) and non-indebted (No debt). Indebted households are then examined in terms of mortgage liabilities. The first part of this section includes a descriptive analysis of the percentage of households participated in the credit market in relation to the relevant characteristics. The second part of this section presents the results of logistic regression. This approach was used to estimate the probability of households entering to debt market based on the socio-economic and demographic characteristics of households.

#### 3.1 Univariate analysis

Table 1 presents selected characteristics of households participating in credit market in 2017. Based on data from the latest HFCS, more than 36% of Slovak households hold at least one financial liability and less than 21% of households repay a mortgage for housing.

The results in Table 1 point to a common development between growing household income and mortgage indebtedness. The percentage of indebted households increasing with households' income. This phenomenon can be explained both by better access to loans due to better financial stability as well as by the expectations of individuals that their incomes will grow over time.

**Table 1.** Univariate analysis, HFCS 2017

<b>PERCENTAGE OF HOUSEHOLDS HOLDING DEBT IN 2017</b>
As a percentage of the number of households in each class

<sup>8</sup> The sum of employee income, income from self-employment, income from businesses and income from the social security system.

<sup>9</sup> The sum of the value of real estate, motor vehicles, self-employment businesses and other valuables.

<sup>10</sup> We divided financial indicators into five subcategories (quintiles) depending on the amount of household income or the value of real assets. The purpose of categorizing other variables was to simplify analysis of the results.

Household characteristics	% of households	No debt	Any debt	Mortgages
<b>Total</b>	<b>100,00</b>	<b>63,36</b>	<b>36,65</b>	<b>20,68</b>
<b>Income percentile</b>				
Less than 20	12,58	10,47	2,11	0,54
Between 20 and 40	14,70	11,03	3,67	1,68
Between 40 and 60	18,78	12,47	6,31	3,87
Between 60 and 80	24,03	13,72	10,32	5,78
More than 80	29,91	15,67	14,24	8,81
<b>Real wealth percentile</b>				
Less than 20	18,00	12,75	5,25	1,52
Between 20 and 40	17,63	11,43	6,20	3,27
Between 40 and 60	19,16	11,97	7,19	4,53
Between 60 and 80	21,82	13,18	8,64	5,50
More than 80	23,39	13,68	9,71	6,82
<b>Work status</b>				
Employee	47,23	22,79	24,44	15,15
Self-employed	12,11	6,96	5,15	3,67
Unemployed	3,32	2,15	1,18	0,36
Retired	34,63	29,88	4,75	1,11
Other	2,71	1,59	1,12	0,40
<b>Education</b>				
Below secondary	0,57	0,30	0,27	0,03
Secondary	78,08	50,19	27,89	15,17
Tertiary	21,35	12,87	8,48	5,50
<b>Age</b>				
Under 35	9,57	3,50	6,08	4,07
35-44	22,04	8,73	13,31	8,42
45-54	19,22	10,10	9,12	5,80
55-64	22,06	16,95	5,11	1,56
65-74	17,39	15,05	2,33	0,63
75 and over	9,71	9,03	0,68	0,21
<b>Household size</b>				
One	17,66	14,29	3,38	1,57
Two	29,71	23,00	6,71	3,56
Three	21,68	11,47	10,21	6,49
Four	19,34	8,57	10,77	6,06
Five or more	11,61	6,04	5,57	3,01
<b>Household type</b>				
One adult	17,66	14,29	3,38	1,57
Several adults	42,24	31,28	10,96	5,16
Adult(s) and child(ren)	40,10	17,79	22,30	13,96
<b>Children</b>				
None	59,9	45,6	14,33	6,7
One	20,7	9,7	11,01	7,1



Two	14,6	6,1	8,52	5,0
Three or more	4,8	2,0	2,78	1,9
<b>Gender</b>				
Male	66,2	40,5	25,72	15,5
Female	33,8	22,9	10,92	5,2

**Source:** Household Finance and Consumption Survey 2017

**Notes:** Table 1 presents the results of a survey of Slovak households conducted by the ECB ( $N = 10,895$  observations = 100% of households). Table 1 is divided into several sectors according to categorized variables. The first 2 parts of the table assess the financial situation of households, especially in terms of total household income and assets. The rest of the table presents the relevant social and demographic characteristics in relation to the tendency of households to enter the credit market.

The distribution of wealth among households seems to have a similar effect on their level of indebtedness. The positive relationship is likely to be explained by the higher value of real assets owned by wealthier households, and therefore there is a higher demand for debt financing. However, debt growth is smoother between sub-categories compared to income distribution. The distribution of wealth in the sample is relatively balanced. Regarding the work status of the reference person (RP), if the RP is economically active have a higher share in debt market, while the highest share has employed RP (24% and 15% for mortgage debts). This group also dominates over other subcategories of the employment status (almost half of all RP are employed). The lower participation in the debt market for the other households is likely to be explained by poorer creditworthiness due to lower financial stability. The level of education attained also seems to be a significant predictor of household indebtedness. RPs most often achieve secondary education (78%) and at the same time, their households have the highest share in the debt market (~ 28% and 15%). The second fastest indebted group are university graduates (~ 8% and 6%). The impact of the age structure of RPs on indebtedness suggests that the share of households in the mortgage market is declining with age. A similar trend can be observed in the frequency of total household debt. This profile confirms Modigliani and Brumberg's hypothesis about the impact of the life cycle on individual consumption, where younger households have a greater need to finance their higher expenditures through debt, especially households in the second age category. This age is commonly associated with the acquisition of first residence. In terms of household size, the most frequently indebted households are three- and four-member households (~ 10% and 6%). Household composition is probably linked to the level of household consumption. HFCS results suggest that these households could have one or two children. Relatively interesting results were obtained by comparing the probability of indebtedness within gender, which suggests that if the head of the family (RP) is a woman, the probability of indebtedness is more than 50% lower compared to a situation where the reference person is a man (at the mortgage debt this probability is threefold lower). However, this significant difference in results may be due to the more frequent enforcement of man as head of the family (66%).

In summary, the lowest share of household in debt market is in the lowest income and wealth sub-categories as well as in older households with a basic educated RP who are not economically active and have three or more children.

### 3.2 Regressions analysis

The following subsection presents the results of the logistic regression. The dependent variable is the probability of household indebtedness. Compared to a univariate analysis, this approach is more appropriate for differentiating the characteristics of indebted and non-indebted households. The first column in Table 2 presents the results of the probability that Slovak households have any type of debt, and the second column contains the probability of having the mortgage debt. These dependent variables are binary (1 if the household has the debt, 0 if not). The explanatory variables remain the same as in the previous subsection. Household income did not have a statistically significant effect on the probability of holding any type of debt. Therefore, the estimated coefficients for this category are not included in Table 2.

**Table 2.** Regression analysis, HFCS 2017

<b>REGRESSION RESULTS FOR THE PROBABILITY OF HAVING DEBT</b>		
	<b>Any debt</b>	<b>Mortgages</b>
<b>Real wealth percentile</b>		
Between 20 and 40	0.664*** (0.109)	1.477*** (0.158)
Between 40 and 60	0.513*** (0.112)	1.543*** (0.153)
Between 60 and 80	0.582*** (0.108)	1.697*** (0.151)
More than 80	0.479*** (0.111)	1.753*** (0.153)
<b>Work status</b>		
Self-employed	-0.286** (0.0925)	-0.196 (0.102)
Unemployed	-0.723*** (0.164)	-0.997*** (0.199)
Retired	-0.157 (0.128)	-0.916*** (0.157)
Other	-0.382 (0.206)	-0.660* (0.270)
<b>Education</b>		
Secondary	-1.121** (0.402)	0.550 (0.481)
Tertiary	-1.194** (0.407)	0.520 (0.489)
<b>Age</b>		
35-44	-0.283* (0.117)	-0.472*** (0.121)

45-54	-0.879*** (0.119)	-0.903*** (0.128)
55-64	-1.914*** (0.134)	-2.403*** (0.166)
65-74	-2.313*** (0.179)	-2.386*** (0.235)
75 and over	-2.861*** (0.224)	-2.559*** (0.347)
<b>Household size</b>		
Two	0.296 (0.242)	1.187*** (0.307)
Three	0.831*** (0.242)	1.414*** (0.293)
Four	1.098*** (0.225)	1.303*** (0.269)
Five or more	0.999*** (0.165)	0.964*** (0.189)
<b>Household type</b>		
Several adults	0.0210 (0.237)	-0.805** (0.298)
<b>Children</b>		
One	0.0131 (0.217)	-0.457 (0.273)
Two	-0.220 (0.187)	-0.789*** (0.237)
<b>Gender</b>		
Female	0.287*** (0.0715)	-0.0116 (0.0908)
<b>Constant</b>	0.655 (0.427)	-2.599*** (0.498)
Observations	10225	10225

**Source:** Household Finance and Consumption Survey 2017

**Note:** The results from the regression must be interpreted against the omitted categories of explanatory variables used in this logit model. These omitted categories correspond to households with income and real wealth below the 20<sup>th</sup> percentile, with only one household member and zero children, whose reference person is male, has less than 35 years, is employed and has an education level corresponding to basic education. The coefficients represented in the table are regression coefficients whose magnitude cannot be interpreted as the marginal effect of explanatory variables on dependent variables (indebtedness). In the logit model marginal effects have the same sign and significance of the estimated coefficients but vary in the values of the regressors. Robust standard errors in parentheses \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The results of the regression of financial variables (households' income and wealth) did not confirm the expected effect of these variables on indebtedness from the previous analysis. None of the income subcategory was statistically significant. Although the estimated effect on the distribution of wealth is statistically significant for each quintile

(at a 1 per cent confidence level), the effect of wealth is slightly opposite compared to the univariate analysis. With increasing levels of wealth, the probability of indebtedness decreases relatively. Conversely, in the case of mortgages, the coefficients reflect the results obtained in the previous analysis. Wealthier households are more likely to have mortgage debt. Coefficients associated with working status mean that self-employed and unemployed RPs have a statistically significantly lower chance of holding any type of debt compared to employed RPs, with the exception of self-employed RPs in mortgage debt where the coefficient is not statistically significant. RPs also have less chance of getting into debt on mortgage market when they retire. Surprisingly, in terms of the level of education attained, households with higher education are less likely to participate in debt market compared to households in which RPs have only basic education. The effect of education was not statistically significant for the mortgage debt. Due to the age structure of households, older RPs are less likely to hold any debt as well as mortgages. In line with results of the univariate analysis, there is a higher and statistically significant probability of indebtedness of three- and four-member households. However, households with two children have statistically significantly lower probability to participate in mortgage market. The predicted coefficient of the impact of gender on household indebtedness is at odds with the direction of the effect supported in the previous analysis.

The results of the regression generally suggest that the likelihood of holding the mortgage debt increasing with increasing levels of wealth, while the level of household income does not have a statistically significant effect on debt distribution. The probability of indebtedness (of any debt) also increases in three- and four-member households as well as with women as RP. On the other hand, economic inactivity and higher educated RPs reduce the likelihood of households holding any debt. The age of RP has a similar effect on household indebtedness. The older the RPs are, the less likely households participate in debt market.

## 4 Conclusion

The increase in indebtedness of Slovak households is one of the most significant among the countries of the European Union. Understanding the factors that drive households into debt is key for policymakers, regulators and financial institutions.

This article analyses the tendency of households to participate in credit market. Presented analysis is based on microeconomic data collected through the Household Financing and Consumption Survey in 2017. The HFCS dataset provides relevant information on the economic, social and demographic characteristics of households that are representative of the country's population. The main goal was to find statistically significant factors that indicate the indebtedness of households.

Univariate analysis revealed a potential relationship between the subset of selected socio-economic and demographic characteristics and the households' indebtedness. Subsequently, the logistic regression model was used to examine identified relationships and estimate the probability of being indebted.

The debt of households should be considered together with the wealth of households. The results suggest that the likelihood of household participation in the credit market increases with increasing levels of wealth, while the level of household

income does not have a statistically significant effect on debt distribution. Also, households with a larger number of members are more likely to hold any debt. Conversely, households with two children are less likely to participate in mortgage market than households without children. Similarly, the negative effect was observed in households where the reference person was economically inactive or achieved a higher level of education. Furthermore, the increasing age of the reference person has also a negative impact on participation in debt market. This finding is consistent with Modigliani and Brumberg's hypothesis about the life cycle of households' consumption and investment decisions.

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## Efficiency of tax administration in Slovak republic

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**Abstract.** Perhaps no other activity accompanies a person for life as faithfully as paying taxes. These are direct taxes affecting income and property tax and, on the other hand, they are indirect taxes, in the form of value added tax and excise duty. Although tax policy is a symbol of the national sovereignty of each individual Member State, our accession to the European Union has committed ourselves to complying with applicable European legislation, which also results in the harmonization and coordination of a uniform tax policy within the Union. The reason for the effort to create a common tax policy is not only the single internal market, but also the effort to remove barriers to free trade. The aim of the presented work is to point out the role of taxes in fiscal policy, tax principles and requirements for the tax system, tax efficiency and the method of measuring the efficiency of tax collection.

**Keywords:** tax principle, tax efficiency, direct and indirect administrative costs, measuring the efficiency of tax collection

### 1 The role of taxes in fiscal policy

The main and ultimate goal of fiscal policy and the public sector is to create a certain level of product, price level, and unemployment with the help of aggregate supply and demand. To do this, the fiscal policy uses the so-called built-in stabilizers, which include, among other things, automatic changes in tax revenues, which account for up to 90% of public budget revenues in most countries of the European Union. Tax revenues, therefore, play an important role in fiscal policy (Slaný, 2003).

Within the fiscal policy, three main functions of taxes are distinguished – redistribution, allocation, and stabilization. If the government decides through fiscal policy to mitigate cyclical fluctuations in the economy in order to ensure sufficient employment and price stability, then we are talking about the stabilization function. In other words, in a period of favorable economic conditions, taxes draw a higher share in budgets and at the same time create reserves for worse times. This role of fiscal policy

is a much-discussed topic, as it is clear that as the income of the population and the profits of companies increase, so does the tax burden (Kubátová, 2015).

Among other functions, Kubátová, (2015) ranks the allocation and redistribution functions. The allocation function is related to the placement of resources in the economy and is applied when the market shows inefficiency in the allocation of resources. This means that the state spends its resources in the sectors such as road construction, education, etc. or, conversely, withdraws funds from an area where there are too many (resources). In this case, the state may provide an advantage through tax relief in the form of deductible items, while the tax relief can be used as a deductible item from the tax base of the payment, eg for pension or life insurance, or house financing. According to the author, the last function of redistribution is to redistribute the income of the population. Taxes are a suitable tool for reducing income disparities and are intended to draw some of the income from the wealthy in the form of a higher tax and shift it in the form of a transfer to the poorer sections of the population.

The role of the public sector is therefore to collect and redistribute taxes in the most efficient possible way. The big issue of tax collection is thus the control of taxpayers whether they pay the tax correctly. These controls are usually provided by (financial) authorities set up by government bodies. The administrative activities associated with the collection of taxes and their control represent a large amount of work involved. This amount of time spent calculating and filing the statement of taxable income increases with the complexity of the tax system, and the greater the amount of time, the more inefficient the tax system, which increases the more administrative costs. Every tax system should therefore strive for simplification, as simpler taxation has a significant impact on tax efficiency. (Pudil, 2004)

## **2 Tax principles and requirements for the tax system**

Tax principles represent a free, open-chain evolving with the development of economic theory and labor. From the very beginning, individual economists approached the definition of tax principles in different ways. Adam Smith, the author of classical economics, was the first to introduce tax principles and requirements for the tax system (fairness, the convenience of payment, efficiency, and accuracy) (Smith, 2001).

Based on these principles, the requirements for the tax system were further expanded or slightly changed based on the preferences of certain authors.

For example, Peková (2011) states that taxes should be, if possible:

- Fair and decent, ie. they should respect the taxpayer's ability to pay the tax and respect the taxpayer's benefit from taxation.



- **Effective.** The principle of efficiency requires that taxes do not cause distortions in prices and benefits from different types of activities and that they do not cause so-called excessive tax burdens. The costs of administering and collecting taxes should be kept to a minimum and the state should strive to minimize these costs for both taxpayers and tax administrations.

- **Legally perfect and transparent.** This principle requires that it be clear who pays the tax and what the tax pays from so that the taxpayer is clear about the structure of the tax.

- **They should provide tax security.** Tax laws should apply for a longer period of time so that taxpayers can plan their available resources in the long term and divide them into consumption and investment.

Musgrave and Musgrave (1984) state that the tax revenue flowing into the public budget should be sufficient and thus allow the government to take the necessary steps in the area of the state's fiscal policy. The authors do not state the principles as such, but formulate the following seven basic requirements for an effective tax system:

1. sufficient tax revenue,
2. equal distribution of the tax burden among citizens in a fair manner,
3. allocation of taxes both according to the place of their collection and according to the place of their actual impact,
4. minimizing the interference of tax collection in economic decisions,
5. The tax system should facilitate the use of stabilization and pro-growth fiscal policies.
6. the tax system should be comprehensible to the taxpayer and allow for cheap and uniform administration,
7. the lowest possible administrative costs.

Most authors who dealt with tax principles or requirements for a quality tax system considered two principles to be the most important - efficiency and fairness. The problem is that these requirements are a bit mutually exclusive. According to Široký (2008), it is impossible to meet them to the maximum, because if the government focuses on tax justice, it will automatically reduce their effectiveness. In practice, it would seem that if, for example, the state tried to prevent tax evasion as much as possible, it would lead to an increase in the number of tax audits and thus to the employment of more officials. As a result, justice would increase, but at the same time administrative costs would increase and efficiency would be reduced.

The tax system must therefore be simple and easy to apply in order to be administratively efficient. Tax flexibility lies in the fact that the tax system should be able to react immediately to changes in economic conditions. In other words, every citizen of a given state should have a comprehensive overview of when they have to pay, how much they have to pay, and for what (Stiglitz, 1997).

The latter requirement is defined by Smith (2001, p. 733) as a principle of accuracy, referred to as: *"The due date, the method of payment and the amount to be paid by each individual should all be perfectly clear to the taxpayer and anyone else."*

### **3 Taxation efficiency - Administrative costs (Direct and indirect administrative costs, Excessive tax burden)**

In general, a tax system is effective when it is simple, fair, and when the tax revenue exceeds the cost of collecting it.

In addition to the requirements for an effective tax system, Smith (2001) discusses four sources of tax collection inefficiency, which may be the reason why the cost of tax collection is often higher than their revenue:

1. The collection of taxes requires the involvement of a large number of officials.
2. Taxes discourage citizens of the state from starting a business.
3. The reason for the high tax burden may be tax evasion, while subsequent executions may lead to the taxpayer's bankruptcy and thus prevent his subsequent contribution to the state treasury.
4. Tax collection is associated with injustice, bullying, and inconvenience. The cost is therefore the mental harm of the taxpayer.

Based on these sources, it can be stated that the effectiveness of taxes can be affected by many sources and can thus be examined from several angles. The key sources of inefficiency are considered to be, in particular, the administrative costs borne by the public sector, the administrative costs of taxpayers, and finally the tax distortion causing deadweight costs.

Prušvic (2006) defines the main methodological problems of taxation efficiency:

- the development of administrative costs for tax collection is key for assessing the development of efficiency, but parallel changes with the efficiency of the tax system (which are reflected, for example, in increased tax collection) can change the value of the indicator without actually changing the efficiency of tax administration.
- changes in tax rates rapidly change the efficiency of the tax system and thus the results of the indicator, although nothing significant may change in the operation of the tax administration,
- atypical and volatile changes in macroeconomic developments (especially inflation) may change the results of the indicator, although nothing significant may change in the operation of the tax administration,
- one-off large investment costs or costs associated with the introduction of new taxes or extensive tax reform may deviate the values of the indicator in the short term, although in the long run, the efficiency of tax and insurance administration may not change much,

- changes in the material scope of tax-collecting institutions may fundamentally change the results of the indicator, although from the point of view of internal efficiency the system of tax and insurance collection may not have changed,

- this indicator does not directly take into account the efficiency of the tax system and the tax administration in terms of the difference between the actual collection and the potential possible collection.

The very existence of the tax system entails certain expenses that the system uses to function properly. It concentrates these expenses (costs) mainly on current and investment activities of individual tax administrators. It is clear from this that the expenses incurred by each individual tax administrator reduce the amount of tax collected, which the public budget collects as a result of the collection of taxes. These are the so-called costs of the tax administration. In addition to administrative costs, which are on the side of the public sector, there are also costs for taxpayers; they are referred to as cost and excessive tax burdens arising from the disruption of resource efficiency conditions. Tax revenues to the public budget are significantly affected by the efficiency of tax collection, which ensures not only the stability of revenues to the public budget, including the control of taxpayers paying the tax but also respect for fairness and fairness in relation to taxpayers and taxpayers. The aim of the tax system is therefore not to reduce the costs of collecting taxes, but rather to minimize them as much as possible and to ensure that tax revenues are higher than the costs of collecting and administering taxes. In other words, try to reduce inefficiency to the lowest possible level. (Pudil et al., 2004)

According to Pudil et al (2004), there are six possible aspects to examine administrative costs.

Time aspect:

- current recurring administrative costs related to the collection of taxes
- extraordinary administrative costs related to the introduction of a new tax or a fundamental change in tax/taxation
- fluctuations in costs in terms of administration of one taxpayer (registration, start or end of the taxable activity, etc.)

The aspect of the impact on the relevant economic sector:

- administrative costs borne only by the public sector
- administrative costs that affect the private sector

The aspect of the impact on the respective government level:

- administrative costs are borne by the central government
- administrative costs borne by the sub-central governments

The aspect of the type of public administration office where costs are incurred:

- preparation of laws at the executive level (ministries)
- preparation and approval of laws at the parliamentary level

- enforcement of tax law - especially courts, police, prosecutors, investigators, prisons, lawyers, etc.

Chronology of tax costs (analogy of articles of the budget process):

- draft laws
- approval of laws
- implementation of tax laws
- control and enforcement of the law

From the point of view of the structure of administrative costs:

- wages including insurance premiums
- securing premises and their equipment
- investments in tangible assets
- time
- costs for the professional level of employees (investments in human capital)
- others

### **3.1 Direct administrative costs**

The direct administrative costs of the tax system can be defined as the total costs on the part of the public sector associated with the collection of taxes at all levels of government and at all points in the tax process, including opportunity costs.

Direct administrative costs include the costs of determining and collecting taxes, which cannot be done without staff and the appropriate equipment. Direct administrative costs can be considered, for example, the costs of state administration for the functioning of the tax system, registration of taxpayers, collection of tax obligations, control in this area, etc. This is related to the detection of taxpayers who deliberately try to avoid paying taxes (Pudil et al., 2004).

Kubátová (2015) states that the amount of direct administrative costs increases due to the complexity of the tax system and depends mainly on the number of types of taxes collected and their rates, the complexity of depositing tax payments, tax exemptions, the number of withdrawals other circumstances. The author further states that direct administrative costs often tend to increase excessively, due to insufficient control of the public sector by the market, which would force it to allocate resources efficiently. This means that the public sector has a certain monopoly and thus provides services without competition.

### **3.2 Indirect administrative costs**

Indirect or induced administrative costs are borne by the private sector compared to direct administrative costs. These costs include the costs of calculating the tax liability and paying the tax. (Peková, 2011)

According to Šíroký (2008), the incurred costs also mean, in addition to the costs of fulfilling the tax agenda, also the costs of tax advisors, lawyers, payroll accountants, and high time costs for completing the tax return or the overall tax agenda.

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Pudil et al. (2004) classified Induced Taxation Costs as follows:

- Taxpayers' costs (time, fees to external suppliers, staff costs, technical equipment of the premises).
- Costs that arise as a result of paying tax before a certain economic transaction takes place (cash-flow costs). It occurs only in a situation where the entity is responsible for the administration of the tax and has to pay it without obtaining the tax base by the time of payment (eg unpaid income that is part of the income tax base or payment of its own tax liability in the case of VAT).
- “Psychological costs”, which may be significant in some cases, but there are no empirical studies that can quantify them accurately.

### **3.3 Excessive tax burden**

In addition to administrative costs, the economy bears another type of cost that reduces the efficiency of the economy. We can define them as the cost of distortion, and from a broader perspective, almost every tax is distorted and has a pension and substitution effect.

The income effect means that each type of tax is paid from the taxpayer's income, thus reducing his budget limit. The magnitude of this effect depends on the amount of tax. In contrast, the substitution effect is related to distortion taxes. It is associated with the substitution of the taxpayer for a less taxed factor, with a change in his preferences depending on the change in marginal utility. In other words, it can also be said that the taxpayer tries to avoid a higher tax burden by finding a substitute that is taxed less. This effort of the taxpayer to avoid higher taxation naturally brings damage both to the public sector, which therefore has a lower tax revenue, but also to the taxpayer himself, who may not be satisfied with the demand for the goods. In fact, both pecuniary and non-

pecuniary damage may occur. This is an absolute or dead loss or excessive tax burden. (Peková, 2011)

The excessive tax burden is therefore related to the substitution effect, as the loss occurs on both sides, while the monetary loss increases with the size of the substitution.

## **4 Method for measuring the efficiency of tax collection**

### **3.4 Recalculated employee method**

In the case of tax administration, the measurement of direct administrative costs can be performed using the recalculated employee method, which shows the distribution of employees of territorial financial authorities according to the content of their activities and the construction of conversion coefficients to identify costs related to the collection of a specific tax.

The generally proposed procedure was described by Pudil et al. (2004) as follows:

1. Distribution of employees by activities:
  - non-tax,
  - individual taxes,
  - overhead,
  - overhead tax,
  - narrower overhead tax.
2. Reduction of overhead costs by the number attributable to non-tax activities.
3. Distribution of adjusted total and tax overheads between individual taxes.
4. Distribution of narrower tax overhead costs between personal income tax, corporate income tax, real estate tax, real estate transfer tax.
5. Determining the number of employees per tax.
6. Determination of the percentage share of costs of individual taxes and non-tax activities from the total costs of territorial financial authorities.
7. Determination of the absolute amount of costs attributable to individual taxes with their profitability.
8. Comparison of the absolute amount of costs attributable to individual taxes with their profitability.

For the calculation of direct administrative costs, according to Pudil et al. (2004) recommends the following procedure:

First of all, it is necessary to divide the employees of territorial financial authorities into groups according to individual types and activities:

$$TE_{ce} = DE_{dpfo} + DE_{dppo} + DE_{dph} + DE_{spd} + DE_{sd} + DE_{dn} + DE_{dpn} + DE_{nc} + IE_{dc} + IE_{ec} \quad (1)$$

where:

$TE_{ce}$  = total number of employees of territorial financial authorities,

$DE_{dpfo}$  = number of employees directly involved in the collection of personal income tax,

$DE_{dppo}$  = number of employees directly involved in the collection of corporate income tax,

$DE_{dph}$  = number of employees directly involved in the collection of value added tax,

$DE_{spd}$  = number of employees directly involved in the collection of excise duties,

$DE_{sd}$  = number of employees directly involved in the collection of road tax,

$DE_{dn}$  = number of employees directly involved in the collection of real estate tax,

$DE_{dpn}$  = number of employees directly involved in the collection of real estate transfer tax,

$DE_{nc}$  = number of employees directly involved in non-tax activities,

$IE_{dc}$  = number of overhead employees of tax activities,

$IE_{ec}$  = number of overheads remaining (non-differentiated).

To determine the number of employees of the tax administrator who participate in the collection of specific tax liability (in this case personal income tax), we use conversion factors.

First, we define the coefficient  $K1_{dpfo}$ , which determines the number of narrower overhead employees of tax activities involved in the administration of personal income tax compared to employees directly involved in the collection of all taxes:

$$K1_{dpfo} = \frac{DE_{dpfo}}{DE_{dppo}} + DE_{dph} + DE_{spd} + DE_{sd} + DE_{dn} + DE_{dpn} + DE_{nc} \quad (2)$$

The determination of the number of employees participating in the administration of personal income tax, including overhead employees of tax activities, who participate in the collection of personal income tax ( $PE_{dpfo}$ ), is determined by the relationship:

$$PE_{dpfo} = DE_{dpfo} + K1_{dpfo} * IE_{dc} \quad (3)$$

Another coefficient is  $K2_{dpfo}$ . This coefficient is used to determine the number of non-differentiated overheads and involved in the administration of personal income tax and is defined by the relationship:

$$K2_{dpfo} = \frac{PE_{dpfo}}{PE_{dppo}} + PE_{dph} + PE_{spd} + PE_{sd} + PE_{dn} + PE_{dpn} + DE_{nc} \quad (4)$$

The value of  $K2_{dpfo}$  makes it possible to quantify the total number of employees participating in the collection of personal income tax:

$$TE_{dpfo} = PE_{dpfo} + K2_{dpfo} * IE_{dc} \quad (5)$$

The last coefficient used is  $K3_{dpfo}$ , which expresses the ratio of the total number of employees participating in the collection of personal income tax to the total number of employees of territorial financial authorities and is used to recalculate expenditures that fall on personal income tax.

$$K3_{dpfo} = \frac{TE_{dpfo}}{TE_{ce}} \quad (6)$$

After determining all the coefficients, it is possible to proceed to determine the absolute administrative costs directly attributable to personal income tax ( $TC_{dpfo}$ ):

$$TC_{dpfo} = K3_{dpfo} * CC_{to} + K3_{dpfo} * TNC_{to} \quad (7)$$

where:

$CC_{to}$  represents the current expenditure of territorial financial authorities,

$TNC_{to}$  expresses the investment expenditures of territorial financial authorities.

The actual calculation of direct administrative costs of personal income tax is given by the ratio of the total expenditure of this tax compared to its collection ( $TR_{dpfo}$ ) according to the relationship:

$$AC_{dpfo} = \left( \frac{TC_{dpfo}}{TR_{dpfo}} \right) * 100 \quad (8)$$

where:

$AC_{dpfo}$  express the administrative costs of territorial financial authorities as a percentage of personal income tax collection.

## Conclusion

Economic conditions have recently improved, but the European Union is still facing the consequences of the crisis, including a lack of investment and growing inequalities. Citizens across the European Union are calling for more attention to be paid to social justice.



The tax system plays a central role in shaping a just society and a strong economy. It can help address inequalities, not only by promoting social mobility but also by reducing inequalities in market income.

Tax policy can have a significant impact on employment decisions, investment levels and the willingness of entrepreneurs to expand, all of which lead to greater growth.

In view of the above, the policies of the tax system are assessed according to four priorities, namely promoting investment, promoting employment, ensuring compliance with tax rules and reducing inequalities.

Enforcement has been and remains an important tool for achieving greater fairness in tax systems. It is about making full use of the powers of the public sector body to force taxpayers to do what is right. This includes effective audits and access to information and intelligence, cross-border cooperation, as well as rapid enforcement procedures.

Promoting trust, transparency and a culture of compliance, effectively informing taxpayers about the value gained through tax revenue, monitoring the performance of tax authorities, encouraging taxpayers to behave more ethically when paying taxes, and explaining why it is important through communication and education campaigns are also essential. That everyone pays their fair share. Campaigns should be aimed in particular at young people - future taxpayers, working with businesses to improve tax compliance, using behavioral economy findings to encourage taxpayers to do the right thing at the right time.

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## Universities in the patenting arena

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**Abstract.** Intellectual property devices, such as patents, were meant to promote innovation activities of firms on the one hand and secure the widespread diffusion of its benefits on the other. Universities, however, are quite new actors in the patenting arena. The patenting activity of European universities increased substantially since 1990s. Nonetheless, European Commission argues that they do not perform well in the technology transfer domain when compared to their American counterparts. This paper offers contradictory position on the phenomena, advocating that more than the half of patents invented by European universities are not owned by them and therefore the university-owned based analysis will always underestimate the share of patents that are invented by universities.

**Keywords:** Patent, University, Invention, Bayh-Dole Act

**JEL classification:** O34

### 1 Patentability

A patent is a form of intellectual property, a document, issued, upon application, by a government office (or a regional office acting for several countries), which describes an invention and creates a legal situation in which the patented invention can normally only be exploited (manufactured, used, sold, imported) with the authorization of the owner of the patent. Invention means a solution to a specific problem in the field of technology whether in form of a product or a process. In other words, a patent is the right granted by the State to an inventor to exclude others from commercially exploiting the invention for a limited period (generally 20 years), in return for the disclosure of the invention, so that others may gain the benefit of the invention. (World Intellectual Property Organization, 2004).

To be eligible for patent protection, an invention must meet several criteria. These are often referred to as “*Conditions of Patentability*” or “*Patentability requirements*”.

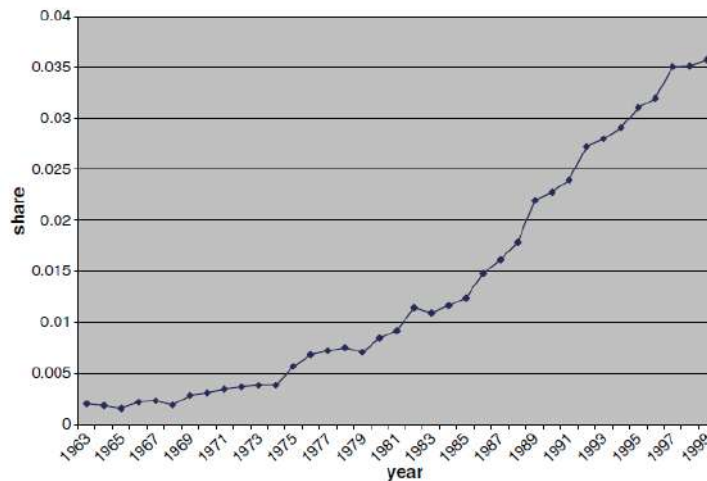
First, the invention must consist of patentable subject matter, that is to belong to any field of technology within the scope of patentable subject matters. Second, it must be possible to apply the invention for practical purposes. This criterium is often referred to as “*Industrial Applicability*”. If the invention is a product, then it must be possible to make the product and if the invention is a process, then it must be possible to carry out or use the process in practice. The term “*industrial*” is therefore considered in its broadest sense, not excluding inventions belonging to any kind of industry. Third criterium is that the invention must be novel or new. The novelty, however, is not something that can be proved or established, only its absence can be proved. An invention is new if it is not anticipated by the prior art, that is, it cannot be assumed on the basis of the knowledge that existed prior to the filing of a patent application, whether it existed by way of written or oral disclosure. The composition of prior art, however, is often subject to discussion. Fourth, invention must exhibit sufficient “*inventive step*” - it cannot be obvious to a person having ordinary skill in the art. It is intended to exclude the best expert that can be found, rather it is a person of average level of skill that is to determine whether the invention is obvious or not. Moreover, it must be possible for the person skilled in art to carry out the invention independently. For this purpose, an invention must be sufficiently disclosed in the patent application (World Intellectual Property Organization, 2004).

## 2 To promote and diffuse innovation

The patent system is one of the oldest institutions of market societies, and it is designed to promote and diffuse innovation (Archibugi, 1992). It is a legal device, yielding both certain rights and certain obligations for its owner. Conditions of patentability, such as novelty, inventive step, and disclosure requirement are meant to encourage and diffuse innovation through an economic mechanism, as opposed to administrative mechanism which would allocate some amount of resources to the inventor – a patent gives its owner the right to market exclusivity, yet the influence of customers remains decisive. If the invention is not of sufficient quality, if it is too expensive, or if competitors offer better inventions, customers will not accept to pay a premium price. It is only by convincing customers and outperforming competitors that patent holder captures benefits of her invention (Guellec and Pottelsberghe, 2007). To what extent then, patent system promotes innovation? To have the incentive to undertake a research and development, a firm must be able to appropriate returns sufficient to make the investment worthwhile. Customers derive greater benefits, however, if the innovation is replicated and improved by competitors, so that it may be purchased at more favorable terms. Patent law, in theory, seeks to resolve this tension between incentives for innovation and its diffusion, for it promises “*perfect*” appropriability of returns for a limited time in return for public disclosure that ensures widespread diffusion of benefits when the patent expires (Levin et. al., 1987).

### 3 Academic patenting

The patenting activity of universities, which increased substantially since the 1980s in the United States and the 1990s in Europe, is the result of two events: (1) the emergence of new technologies in which distinction between basic and applied research is unclear, (2) and the adoption of the Bayh-Dole Act in the USA (Guellec and Pottelsberghe, 2007). The Bayh-Dole Act encouraged universities to be more proactive in their efforts to commercialize scientific discoveries: *“The act allowed universities to patent the results of federally-funded research and license the resulting technology to businesses and other entities”* (Joint Economic Committee US Congress 1999 – in Guellec and Pottelsberghe, 2007:184). Inspired by the subsequent rise in academic patenting in the United States, many European countries were soon to follow similar policy-making approach.



**Figure 3.1** US research university patents as share of all domestic-assigned US patent (Mowery, Sampat; 2005: p120)

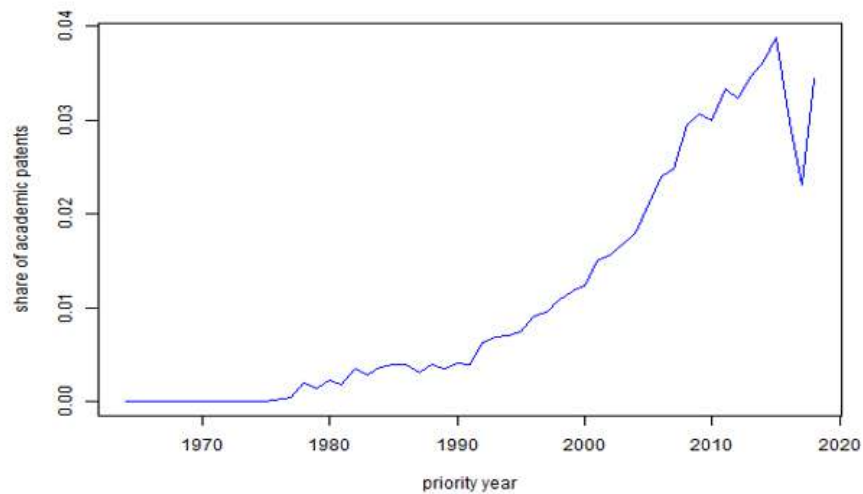
Mowery (2002) argues that the increase in academic patenting had little to do with the Bayh-Dole Act, rather it was the rise of biomedical research and inventive activity that was associated with the phenomena. Molecular biology and techniques of genetic engineering became increasingly prominent in university research after the 1970s. Academic researchers also pioneered in the development of new ways to use computers in research, and in the arena of computer science. The university research findings and techniques in these two arenas were especially interesting to industry. Over the same time, the range of patentable inventions had increased, and this was particularly true for biotechnology (Colyvas et. al., 2002). Advocates of Bayh-Dole argue that many

discoveries of federally (state) funded research would have never left the laboratory, while the critics emphasize that the exclusive license is not necessary when it comes to technology transfer. Historically, primary ways for industry to learn about academic research were and remain academic publications, meetings, and consulting. Technologies would therefore be transferred even in the absence of the Bayh-Dole Act (Thursby and Thursby, 2003). On the other hand, exclusive licensing seems to be needed when embryonic inventions are being transferred, that is, inventions that require further development before use (Thursby and Thursby, 2003; Colyvas et. al., 2002). The role of patents in academic inventions varies from case to case. In some cases, it is unlikely that technology would have been successfully transferred absent intellectual property rights. In others, patents did facilitate universities earning income, but the technology would have been used in industry even without the licensing (Colyvas et. al., 2002). Although the effects of the Bayh-Dole Act on the increase in university patenting are far from being decisive, universities (and other public research institutions) are protecting their inventions, whether genetic discoveries or software programs, with the expectations of generating additional funds for research (Audretsch and Göktepe-Hultén in Link et. al., 2015).

#### **4 Patenting activity of European Universities**

Since the mid-1990s, number of European countries have adopted similar Bayh-Dole Act legislations (e.g. UK National Health Service circular of 1998; Germany in 1998; and Belgium in 1999). Subsequently since early 2000s, many European countries (e.g. Austria, Denmark, Germany, and Norway) have abolished the so-called professor's privilege that granted academics the right to own patents. The right to own patent (or any other form of intellectual property) has been transferred to the universities while the academic inventors are given a share of royalty revenue in exchange (Audretsch and Göktepe-Hultén in Link et. al., 2015; Guellec and Pottelsberghe, 2007). Nonetheless, Europe is perceived to be lagging behind the US: *"Compared to North America, the average university in Europe, generates far fewer inventions and patents. This is largely due to a less systematic and professional management of knowledge and intellectual property by European universities."* (European Commission, 2007 - in Conti and Gaule, 2011:123). European Commission stresses that European research institutions are good at producing academic research outputs, but they are not as good at transferring them to the economy. This is also known as *"European Academic Paradox"*. Some studies, however, claim that the Europe's academic institutions lag behind the US in both producing research outputs and their ability to convert these outputs into wealth-generating innovations (Dosi et. al., 2006). Others argue that the European Academic Paradox is not so significant and that the gap between the US and the Europe is exaggerated due to limited number of university-owned patents in Europe –two thirds of the patents with at least one university inventor are not owned by universities (Crespi et. al., 2006). These, most presumably, are patents that were published before the adoption of Bayh-Dole-like policies and under the professor's privilege. Similarly, Lissoni et. al. (2008) show that in France, Italy, and Sweden most

academic patents are not university-owned and that the European universities contribution to domestic patenting appears not to be much less intense than that of their US counterparts. While majority of patents in Europe are assigned outside the university, the opposite is true for US – over 62% of patents are university owned (Thursby, et. al., 2009). Hence, a large share of university-invented patents is not owned by universities. This results in different structures to academic patenting behavior in Europe and calls for methods to account for patents that have not been filed by the university itself (Dornbusch et. al., 2012).



**Figure 4.1** The Evolution of University Owned Patents (Author's work based on OECD, REGPAT database, July 2019)

To European Patent Office, more than one million, six hundred sixty thousand patent applications were submitted since 1960s. In 2014, almost four percent of them were owned by universities. Figure above, however, does not comprise patents invented but not owned by universities and therefore underestimates the share of academic patents. Nonetheless, it depicts the swift increase in academic patenting after 1990s.

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# Would Croatia meet the fiscal Maastricht criteria better if it were part of the Eastern enlargement of the European Union in 2004? – inverse synthetic control method approach

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**Abstract.** We examined the effect of the accession to the European Union using the inverse method of synthetic control groups. This method enabled us to compare the performance of the Croatian economy with a combination of countries that accessed the European Union on the 1<sup>st</sup> May 2004. We constructed the synthetic Croatia as a synthetic control unit from a donor pool. The donor pool in our model consisted of 10 actual member states of the European Union which accessed the European Union in the Eastern enlargement of the European Union. Our approach left us with 11 countries in our dataset and quarterly observations for the period from 2000\_Q1 to 2020\_Q1 for general government debt. The results indicate that decision not to access EU in 2004 could significantly increase general government debt in Croatia. It is noteworthy that the difference between actual public debt in the Croatia and the synthetic one increased considerably in the postcrisis period. In the case of Croatia, not entering European Union in 2004 may have been not the best choice, especially following the sovereign debt crisis.

**Keywords:** Maastricht criteria, Croatia, general government debt

**JEL classification:** F 15, F 45, H 60

## 1 Introduction

One of the most discussed topics among economists in recent days has been the enlargement of the Eurozone since Croatia and Bulgaria joined ERM II on the 12<sup>th</sup> of July 2020. Economists turn their attention on consequences of the enlargement of the monetary union, its benefits, and disadvantages not only for these two candidate countries but also for the eurozone. Croatia and Bulgaria must spend at least two years in ERM II before adopting the euro. This may mean that in two years there may be a



further enlargement of the eurozone since 2015, when Lithuania has adopted this common currency. How is Croatia prepared for adoption the common currency in the terms of meeting the Maastricht criteria? Does Croatia meet the criteria, and would it meet them better if it joined the European Union earlier? To answer this question, we construct inverse synthetic model in this paper.

## 2 Literature review

The main reason why Croatia did not join the European Union in 2004 among other countries was Croatian domestic policy. The post-Yugoslav wars in the 1990's directly affected Eastern European countries as Croatia. And also this bad condition of Croatian domestic policy was according to Jović was caused by authoritarian style of governance during the last decade of the 20<sup>th</sup> century (Jović, 2006). According to Drinković, Croatia should face no major problems while fulfilling the Maastricht criteria on time, to be able to enter the ERM II. But Croatia ought to put a big emphasis on its economic policy to lower the most problematic criterion – the budget deficit and the general government debt. According to her study, it should be highlighted that the hard work will not be over after euro adoption, but hard efforts to strengthen competitiveness of the Croatia, as small and open economy, in the European Union will then only begin (Drinković, 2009). Dan analyzed three candidate countries in his study - Croatia among Bulgaria and Romania. It shows that when it comes to business cycle synchronization and current account to GDP ratio, an adequate degree of convergence is present. It indicates that these three countries could potentially accept the monetary policy of the ECB (Dan, 2019).

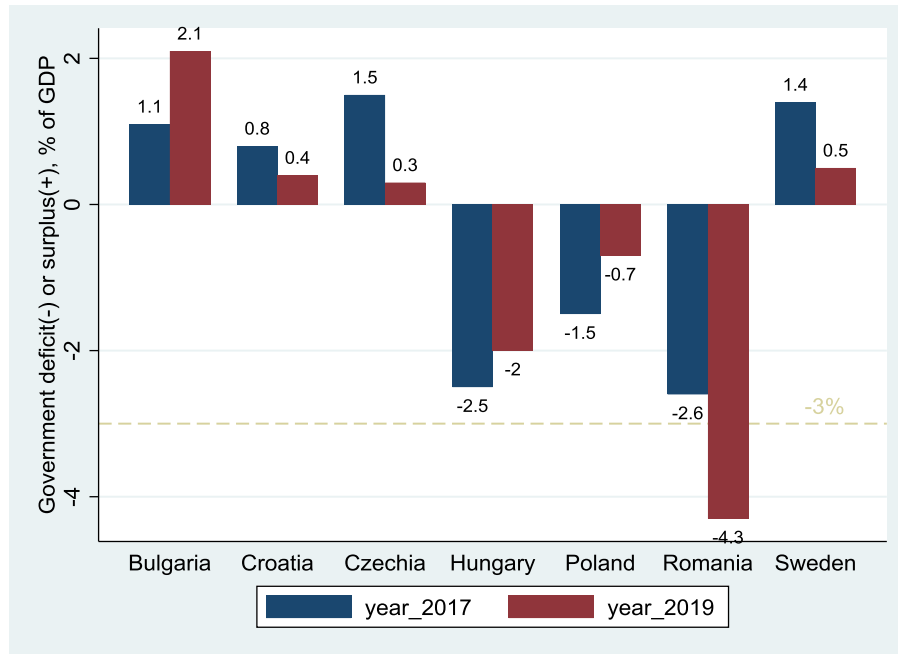
Šimović in his analyses shows that general debt in Croatia was sustainable until year 2008. From 2009 to 2014 all fiscal indicators showed a high degree of unsustainability. The growth of public debt was mainly influenced by negative economic trends and the lack of fiscal adjustment. He also mentioned that these outcomes were worsening in financing terms and the increase of the interest rates in the period of the recession. It is positive that fiscal indicators have improved since 2015, and because Croatia has made in 2016 a big fiscal adjustment. This led to the reduction of the public deficit below the reference value 3% of GDP, and to the stabilization of the public debt trajectory. But compared to the other candidate countries, Croatia is still excessive (Šimović, 2019). According to Palić the exchange rate depreciation could have had an effect on overall Croatian economy especially on public finance. The impact of depreciation could have had a positive effect on increasing of external indebtedness. This increase in external indebtedness and possible depreciation could decelerate the fulfilment of the nominal criteria in Croatia. This would not only prolong the process of entering the eurozone, it could also postpone efficient public debt management taking into account high euroization (Palić, 2018).

Among the biggest challenges for the Croatian economy Koerner considers structural problems. Croatia must continue in the implementation of the structural reforms, in particular tackling a rigid labor market, an overblown public sector and a weak business climate. Labor costs are relatively high compared to the productivity. Another issue in

this economy is a low diversification of Croatia's export, which mainly relies on shipyards as well as tourism, which are strongly procyclical sectors in economy. Furthermore, the international competitiveness of Croatia is very low (Koerner, 2013). To address the important systemic causes of debt and other issues in eurozone and European union are liberalization and deregulation measures. According to Lennerová, it should be reduced state intervention, including a significant reduction in the level of redistribution through public spending (Lennerová, 2014). In the light of the financial crisis in 2009 linked with huge decrease in GDP growth rates, debt that seemed rather sustainable was increasingly moving towards unsustainable position. One of the issues is public debt.  
(Šimurina, 2010)

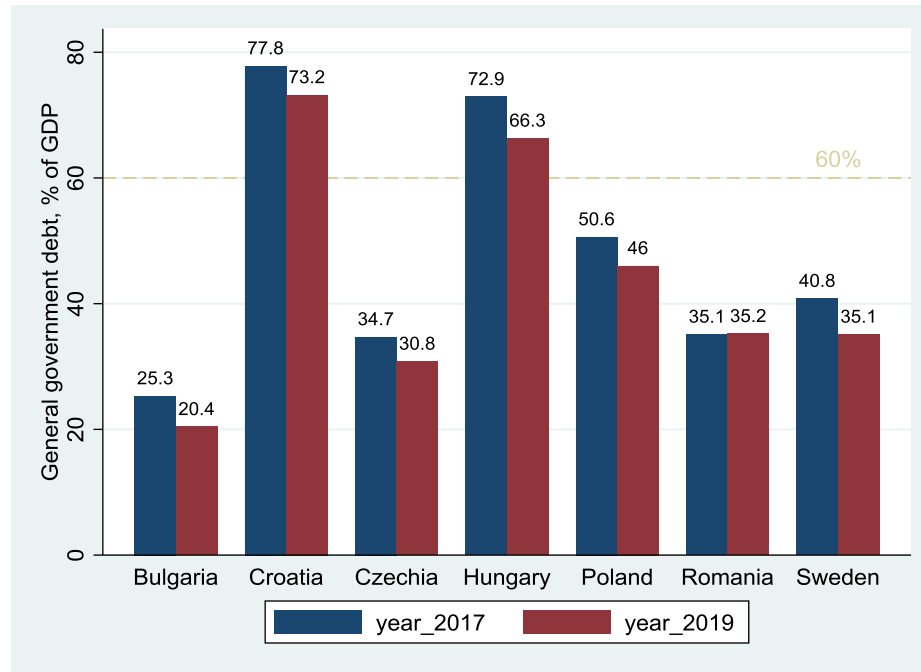
## **2.1 Fulfilling the Maastricht criteria – requirements for fiscal discipline**

Between 2017 and 2019, as seen in Fig. 1, the budget balance deteriorated in Croatia along with Romania, Czechia, and Sweden. This deterioration in the general government balance can be explained mainly by the easing of the fiscal position, which was partly offset by more favorable macroeconomic development in this period. According to the Convergence report from June 2020, the European commission estimates that in 2020, due to the pandemic, the deficit as a percentage of GDP will be above the 3% reference value in all countries. The deterioration in the general government balance should be accompanied by a sharp decline in economic activity and economic policy's measures taken to reduce the crisis. The budget balance is projected to deteriorate by around 7.5 percentage points in Croatia (Convergence report, 2020).



**Fig. 1.** Government deficit (-) or surplus (+), % of GDP in candidate countries – Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Sweden. Reference value is -3% of GDP. Source – own research, Convergence report (2018), Convergence report (2020), Eurostat.

Only in two candidate countries, Croatia and Hungary, the ratio of the general government debt of the GDP exceeded 60% in years 2017-2019. In other countries the debt ratio was below this reference value, as seen in Fig.2. Between 2017 and 2019 the general government (as percentage of GDP) decreased, except Romania, where it is essentially stabilized. The debt ratio decreased by 4.6 percentage points in Croatia. According to the Convergence report (2020), in the longer term, from 2010 to 2019, the government debt among candidate countries increased the most in Croatia (by 15.4 percentage points), while in other countries this debt to GDP ratio has decreased. Due to the pandemic in 2020, economists expect that the government debt will increase in all candidate countries. The projections of the European Commission suggest that the debt ratio will remain below the reference value, except for Hungary and Croatia.



**Fig. 2.** General government debt (% of GDP) in candidate countries – Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Sweden. Reference value – 60% of GDP. Source – own research, Convergence report (2018), Convergence report (2020), Eurostat

As we have seen in Fig.1. and Fig.2, Croatia is achieving the worst results in terms of the fiscal Maastricht criteria in the period under review. As for the remaining criteria, that is inflation rate and Long-term interest rate, Croatia is achieving convenient outcomes. In 2018 (April 2017 – March 2018), the HICP inflation (expressed as average annual percentage changes) in Croatia was 1.3%, while the reference value in the observed year was 1.9%. In 2020 (period April 2019 – March 2020), the HICP inflation in Croatia was 0.9% and the reference value 1.8%. Out of all seven candidate countries, Croatia has achieved the best results in terms of inflation criteria. According to the Convergence report from June 2020, Croatia also achieved excellent results within the criteria of long-term interest rates. In 2018 (period from April 2017 to March 2018), long-term interest rates in Croatia were at 2.6%, while the reference value was 3.2%. By the year 2020 (April 2019 – March 2020) the measures have declined by 1.7 percentage points to the 0.9% while the reference value also declined to 2.9%.

### 3 Methodology

Following (Abadie and Gardeazabal, 2003), (Abadie et al., 2010), (Abadie et al., 2015) and using the synthetic control method we created a synthetic Croatia. Our assumption was that the actual Croatia would have developed as the synthetic Croatia if this country

accessed the European Union in 2004. We could quantify the costs of this decision as the difference between actual Croatia's performance and the synthetic Croatia's performance.

We constructed the synthetic Croatia as a synthetic control unit from a donor pool. In the donor pool we included actual member states of the European Union which have joined the European Union on the 1st May 2004. This approach left us with 11 countries and quarterly observations for the period from 2000\_Q1 to 2020\_Q1 for general government debt. Data for general government debt were expressed as percentage of GDP. Croatia was the only country in our dataset which was not directly affected by the treatment. We used the inverse synthetic control method – it means that treatment did not occur in Croatia, but it occurred in our donor pool countries. Our sample encompassed the Croatia and 10 European countries, namely Czechia, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, and Slovakia.

Our procedure assumed that a possible treatment effect materialised after 2004. The sample was divided into two periods: a control period before Eastern enlargement of the European Union in 2004, and a treatment period after the biggest enlargement. The synthetic Croatia was expressed as a weighted average of the countries in the donor pool. The weights were determined by minimising the distance between general government debt of the actual Croatia and the general government debt of the synthetic Croatia prior to the treatment. Our data – general government debt (expressed as percentage of GDP) were taken from the Eurostat Database.

Vector  $X_1$  was a set of characteristics of Croatia, as the observed country, in the period before the change. The time of change in our model was the 2004\_Q2. Vector  $X_1$  contained exogenous variables which could explain the macroeconomic indicators in Croatia. Matrix of identical variables  $X_0$  was describing macroeconomic indicators in the control group. The control group in our model included 10 European countries which would be used to construct the synthetic Croatia. This method searched for a set of weights  $W$  on a set of control countries. Moreover, it minimised the difference between the model estimate and the actual general government debt in the Croatia in the period before 2004\_Q2 defined by the expression

$$(X_1 - X_0 W)V(X_1 - X_0 W) \quad (1)$$

The permissible interval for the weights of the individual countries was in the range  $<0,1>$  and the sum of the weights in the vector  $W$  was equal to 1. Vector  $V$  and the vector  $W$  minimised the estimation error between the synthetic estimate and the actual development in the preintervention period. Combining the vector of weights  $W$  and the matrix  $Y_0$  we could obtain the counterfactual estimate in the postintervention period, and it contains the values of the variables of the control group in the post enlargement period. By comparison of the actual development in the Croatia and the contractile estimate based on the synthetic control method, we were able to get the effect of the intervention. In our paper, the effect of the intervention was the possible effect of the enlargement of the European Union in 2004 on the general government debt in Croatia.

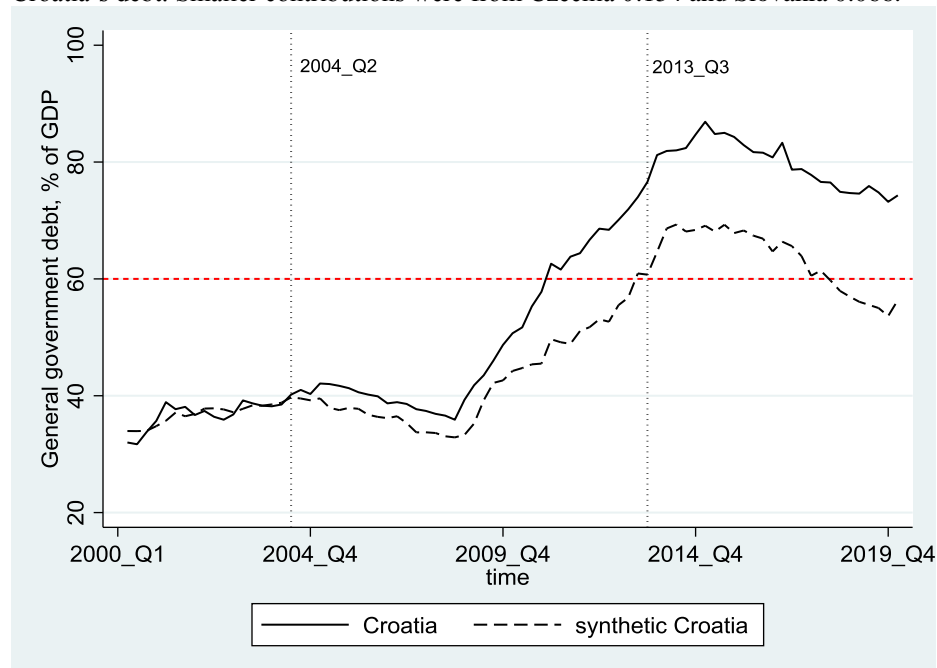
## 4 Results

**Table 1.** Donor pool countries -weight

Country	Weight
Czechia	0.154
Malta	0.247
Slovakia	0.066
Slovenia	0.533

Source – own research.

The synthetic Croatia was the weighted average of countries in the donor pool. Slovenia and Malta were assigned the largest weights. The weight of Slovenia was 0.533 and the weight of Malta was 0.247. Together they accounted for more than 78 % of the synthetic Croatia's debt. Smaller contributions were from Czechia 0.154 and Slovakia 0.066.



**Fig. 3.** Actual and synthetic general government debt (% of GDP) in Croatia. Quarterly from 2000\_Q1 to 2020\_Q1. Source – own research based on data from Eurostat.

\*reference value – 60% of GDP

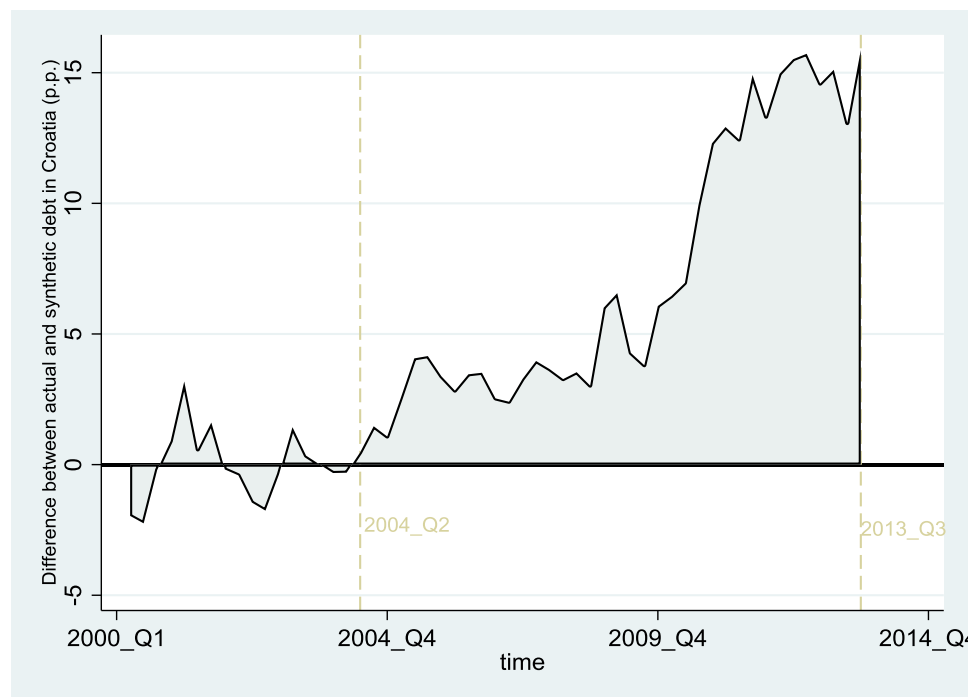
\*\* Eastern enlargement of European Union 1.5.2004 – 2004\_Q2

\*\*\*Accession of Croatia to the European Union 1.7.2013 – 2013\_Q3

The results already indicate that Croatia not entering the European Union in 2004 has had a substantially negative impact on the general government debt. As seen in the Fig. 3, actual general government debt in Croatia was higher than the synthetic

indicator. Also, the gap between the actual and synthetic debt had been widening. We could quantify the costs of the Croatian decision not to access the European Union among other 10 countries by the gap between actual and synthetic general government debt. As seen in Fig. 3, the gap between the actual and synthetic public debt widened in the period from 2004 to 2020. The difference however widened the most during the postcrisis period. Our model estimated that if Croatia accessed the European Union in 2004, the general government debt would be around 60.735 % of GDP in 2013\_Q3. On the 1<sup>st</sup> July of 2013 Croatia entered the EU, and her actual general government debt was around 76.6%. Our model estimates the difference between actual and synthetic Croatian debt for more than 15.86 percentage points.

The most problematic Maastricht criteria for Croatia is the debt criterion. Croatia has not met this fiscal criterion for long period of time. Since the beginning of year 2011, Croatian debt is higher than 60% reference value. If Croatia joined the European Union in 2004, according to our model, it would meet this criterion until the second quarter of 2013. It should be noted that the development of synthetic Croatia cannot be easily interpreted after third quarter of 2013, as Croatia joined the EU at that time, and we cannot clean up the consequences of this issue in our model.



**Fig. 4** Gap between actual and synthetic general government debt (percentage points) in Croatia from 2000\_Q1 to 2013\_Q3. Source – own research based on data from Eurostat.

\* Eastern enlargement of European Union 1.5.2004 – 2004\_Q2

\*\*Accession of Croatia to the European Union 1.7.2013 – 2013\_Q3

## 5 Conclusion

This paper provided a few preliminary results. Our study suggested that the Croatian decision not to access the European Union had a significant impact on economic performance of this country. The most problematic Maastricht criteria for Croatia is the debt criterion. Croatia has not met this fiscal criterion for long period of time. We observed the beginning of the widening of the gap between actual and synthetic Croatian fiscal performance, expressed as general government debt as percentage of GDP, in 2004. The difference however widened the most during the postcrisis period. If Croatia accessed the European Union in 2004, our model estimated that general government debt would be around 60.735 % of GDP in 2013\_Q3. On the 1st July of 2013 Croatia entered the EU, and her actual general government debt was around 76.6%. Our model estimates the difference between actual and synthetic Croatian debt for more than 15.86 percentage points.

Also, placebo tests would have to be performed in further research. However richer data sets and more rigorous estimation methods would be needed to improve our understanding of the enlarging the European Union and Eurozone, which proved to have important implications for macroeconomic policies not only in the Croatia but also in other European countries.

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## Equity as an indicator of the sustainable development of companies

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**Abstract.** The concept of sustainable development has become a generally accepted starting point for a possible solution to today's global problems related to social and economic protection, which also interfere with environmental protection. The concept of sustainable development is associated with socially responsible business, which is based on the concept of triple bottom line, where the company focuses primarily on three areas, namely economic, social and environmental. Within the economic area, sustainable development is primarily an effort to ensure long-term business. A sustainable company is a company, that is not only concerned with achieving immediate maximum profit, but with the long-term provision of certain values. The main economic advantage of applying the principles of sustainable development is the creation of a stable business environment in which capital is safe and people do not have to worry about their investments. The aim of the paper is to analyze the impact of equity on sustainable development on a sample of commercial banks operated in the Slovak Republic in 2019. Based on selected indicators of financial analysis, namely capital adequacy, indebtedness and return on equity, we evaluate the structure of equity and impact on sustainable development of analyzed commercial banks.

**Keywords:** sustainable development, sustainability, corporate social responsibility, equity

**JEL classification:** *M 14, M 41, O 16*

### 1 Introduction

The terms sustainability and sustainable development began to be used in the early 1970s, especially in the context of the recognition that any uncontrollable growth (population, production, consumption, pollution, etc.) is unsustainable in an environment of limited resources. (Pakšiová, 2016). Sustainability is a long-term goal,

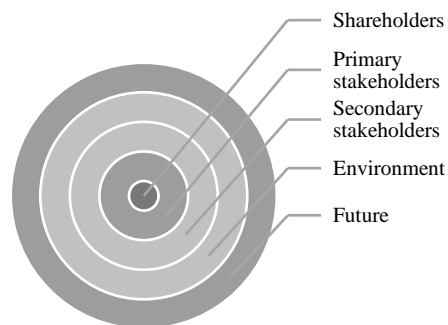
while sustainable development is a way of getting closer to that goal. It always contains specific steps and activities aimed at achieving the desired condition (Pedro et al., 2020). According to Bláha and Černek (2015) sustainable development is a way of social development in which economic and social progress are reconciled without damaging the environment. This is a development that respects certain limits of economic growth, which result primarily from the environmental and social context. Siong (2020) understands sustainable development to keep trade, the environment and other resources at a level that prevents their irreversible destruction. Sustainable development is an overarching concept for achieving a balance between the needs of human and nature, a system of beliefs and patterns of action that protects biodiversity and natural resources while preserving economic opportunities, but also a vision describing the future in which we would like to live (Amos and Uniamikogbo, 2016). According to Profant (2019) sustainable development satisfies the basic needs of current and future generations. The application of corporate social responsibility is considered to be a basic precondition for sustainable development, which greatly influences the social, ecological and social aspects of the society in which companies operate (Petera et al., 2014). Sustainable development is characterized by the need for purposeful human action to implement environmentally friendly business practices (Ulbrych, 2016). It is important to note that these practices should be seen as permanent and unchanging, not just as one-off measures to temporarily improve the situation. In applying the concept of sustainable development, it is important to consider the relative economic costs, relative social impact and relative environmental impacts of each new project (Ding and Runeson, 2020). The problem arises when these effects are contradictory, for example, if a new company offers a lot of new jobs, which on the one hand increases the social quality of life, but on the other hand there is a deterioration of the environment in connection with company production. To solve these problems, experts have developed a number of complex calculations, including SEA – strategic environmental assessment, EIA – environmental impact assessment, SIA – sustainability impact assessment and ISA – integrated sustainability assessment (OECD, 2008).

In connection with sustainable development, the concept of sustainable company, known as “*green business*” or “*corporate social responsibility*”, is connected. The United Nations Environment Program (UNEP) defines sustainable business as business that leads to the improvement of human well-being and social equality, while significantly reducing environmental risks and environmental scarcity. The Green Economy Coalition (GEC) understands sustainable business as a business that creates a better quality of life for all within the ecological limits of the planet. According to the United Nations Conference on Trade and Development (UNCTAD), sustainable business leads to improved human well-being and reduced inequalities, without exposing future generations to significant environmental risks and ecological deficiencies.

Corporate social responsibility (CSR) intervenes in the economic, social and environmental spheres. According to Slámečka (2012), when using a CSR strategy in the economic field, the company should primarily focus on the following facts:

- **a code of ethics**, which should be clearly worded, binding and enforceable and should be followed not only by managers but also by employees after the last charwoman,
- **transparency of the company**, which means transparency in negotiations, predictable reactions, correctness, act logically and clearly. The opposite is the actions of the company, which can be described as unpredictable,
- **good management,**
- **corruption and a clearly defined attitude of the company to it** - for all employees of the company corruption is exclusively an unacceptable form of behavior, but at the same time management creates an environment in the company that does not allow corrupt behavior and in case of corruption strictly sanctions,
- **ethically positive relationships** that management seeks to establish and maintain with shareholders, customers, consumers and suppliers.

Stakeholders, therefore stakeholders in corporate activities, can be considered as entities of corporate social responsibility. Stakeholders represent, in addition to persons, also institutions and organizations that have an influence on the company or are in some way influenced by the operation of the company itself. Musová (2013) distinguishes two groups of stakeholders (Fig. 1), namely direct (for example, shareholders, investors, employees, customers, business partners, etc.) and secondary (for example, trade unions, competition, media and other interest groups).



**Fig. 1.** Stakeholder division. *Source: Crowther and Aras, 2008*

### 1.1 Pillars of corporate social responsibility

The pillars of corporate social responsibility are defined by experts in the field in two ways. The first of them is the application of the triple bottom line concept, where the company focuses primarily on three areas, namely the economic, social and environmental areas. The second model is a philosophy containing four dimensions on which the solo company should focus.

The triple bottom line concept, known as “*Triple E*” or “*Three P*”, represents three equally important and interconnected pillars of responsibility, each of which must be maximized in order to achieve long-term sustainability (Tab. 1).

**Tab. 1.** Triple bottom line

Three P	Triple E	What is it?
People	Equity	Human capital
Planet	Environment	Nature capital
Profit	Economics	Financial capital

Source: Swallow, 2009

Triple bottom line consists of (Fig. 2):

- **people** – business viability requires healthy communities, strong relationships with suppliers, authorized employees and healthy customer relationships. A company that wants to do business in a sustainable way must be committed to providing products and services that comply with social standards and rules, while contributing to improving the quality of life of all stakeholders,
- **planet** – a company that remembers this pillar also offers products and services that contribute to the rejuvenation of the Earth's ecosystems. Sustainability is a key element of its business plan and adapts to the new challenges of the planet. The planet-focused company also identifies ways to alleviate some of the problems caused by past activities (climate change, pollution, overcrowded landfills, etc.). Steps taken by some companies to mitigate the negative impact on the planet include, for example, lower productivity of unwanted waste as well as reduced use of energy or other non-renewable resources,
- **profit** – the company must generate profits and cash flows in order to maintain its solvency and continue to operate. The triple bottom line strategy represents a deep link between long-term profitability, strong relationships with people and a commitment to improving the state of the planet.

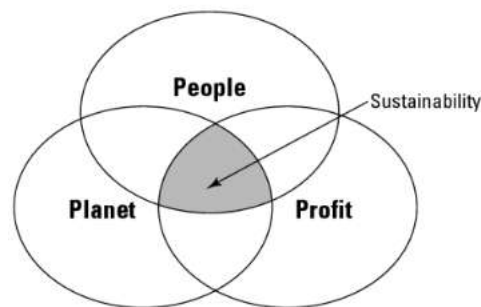
**Fig. 2.** Triple bottom line and sustainability. *Source: Swallow, 2009*

Figure 2 shows that long-term sustainability is the intersection of people, the planet and profit. At the same time, we can state from Figure 2 that there is a deep interrelationship between the financial success of a company and the health of the planet and its people.

According to Pavlík and Bělčík (2010), in the beginning, corporate social responsibility was understood in terms of the responsibility and obligations of the entrepreneur to society. Carroll (1979) defined that in addition to legal restrictions, there are other obligations of an organization to society, which consist of four components:

- **economic responsibility** – the organization's obligations to meet the demands of the market and the valuation of owners' deposits
- **ethical responsibility** – the organization's obligation to adhere to principles of such behavior that are in line with company expectations and are not regulated,
- **voluntary (philanthropic) liabilities** – these are liabilities, which are not socially expected,
- **legal responsibility** – obligations of the company to comply with the legislation of the territory in which it operates.

## 2 Data and methodology

The aim of the paper is to analyze the impact of equity on sustainable development in 2019 on a sample of commercial banks operated in the Slovak Republic. Although commercial banks can be considered as entrepreneurs, they are specific business entities for which specific indicators of optimal capital structure are considered in the financial stability analysis. Quantitative research is carried out on a sample of 12 commercial banks operating in the Slovak Republic in 2019. Information on active banks with legal personality in Slovakia in 2019 published on the NBS website is a relevant source for the selection of specific entities included in the research sample. ([www.nbs.sk](http://www.nbs.sk)).

As of 31 December 2019, 27 commercial banks operated in Slovakia. Of these 12 commercial banks have their registered offices in Slovakia and the rest are branches of foreign banks (Citibank Europe plc, Fio banka, a. s., Komerční banka, a. s., UniCredit Bank Czech Republic and Slovakia, a. s., mBank S.A., Raiffeisen Centrobank AG Slovak Branch, BKS Bank AG, BNP PARIBAS PERSONAL FINANCE SA, Československé úvěrní družstvo, COFIDIS SA, COMMERZBANK Aktiengesellschaft, ING Bank N. V., J & T BANKA, a. s., KDB Bank Europe Ltd., Oberbank AG), which were excluded from the analysis because they do not have legal personality in the SR and are not subject to the regulatory provisions of the NBS regarding own resources and property exposure. The basic descriptive financial information of a selected sample of commercial banks for 2019 is given in tab. 2.

**Tab. 2.** Basic financial information of selected banks (in '000 €)

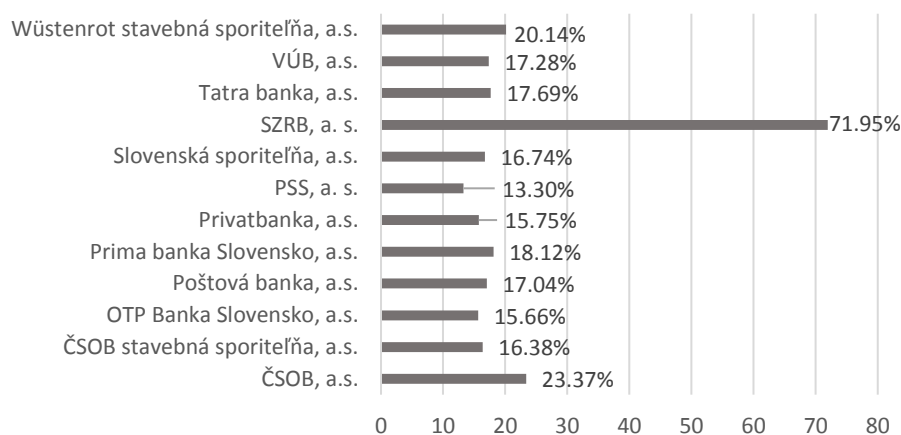
Bank name	Share capital	Share premium	Reserve and other funds	Valuation differences of financial assets in fair value	Retained earnings	Profit/loss for the accounting period after tax
Československá obchodná banka, a.s. (ČSOB)	295,015	484,726	59,003	-204,568	101,574	70,147
ČSOB stavebná sporiteľňa, a.s. (ČSOB SS)	23,900	0	1,616	0,412	-1,669	1,157
OTP Banka Slovensko, a.s.	126,591	0	6,664	0	-20,957	2,297
Poštová banka, a.s.	366,305	0,738	54,988	6,371	168,569	45,728
Prima banka Slovensko, a.s.	226,773	71,190	60,517	1,349	-30,868	17,060
Privatbanka, a.s.	25,121	0	5,024	1,424	53,135	9,117
Prvá stavebná sporiteľňa, a. s. (PSS)	19,845	22,508	-0,034	0	132,907	15,481
Slovenská sporiteľňa, a.s. (SLSP)	212,000	0	268,899	0	860,219	174,436
Slovenská záručná a rozvojová banka, a. s. (SZRB)	130,000	0	153,415	3,782	5,504	0,626
Tatra banka, a.s. (TB)	63,979	292,998	14,446	21,203	528,080	134,876
Všeobecná úverová banka, a.s. (VÚB)	430,819	13,719	87,493	0,330	929,586	114,087
Wüstenrot stavebná sporiteľňa, a.s.	16,597	3,319	7,496	0	19,067	1,522

Source: own processing according to separate financial statements of examined banks

As part of the analysis, we will apply the selection method when selecting a sample of banks and quantitative financial indicators based on data from commercial banks for 2019, published in the public section of the Register of Financial Statements (2020), where companies in the Slovak Republic are required to publish their financial statements. In quantitative research, we apply fundamental financial analysis. Based on selected indicators of financial analysis, specifically capital adequacy, indebtedness and return on equity, we will evaluate the structure of equity and the impact on the sustainable development of the analyzed commercial banks.

### 3 Results

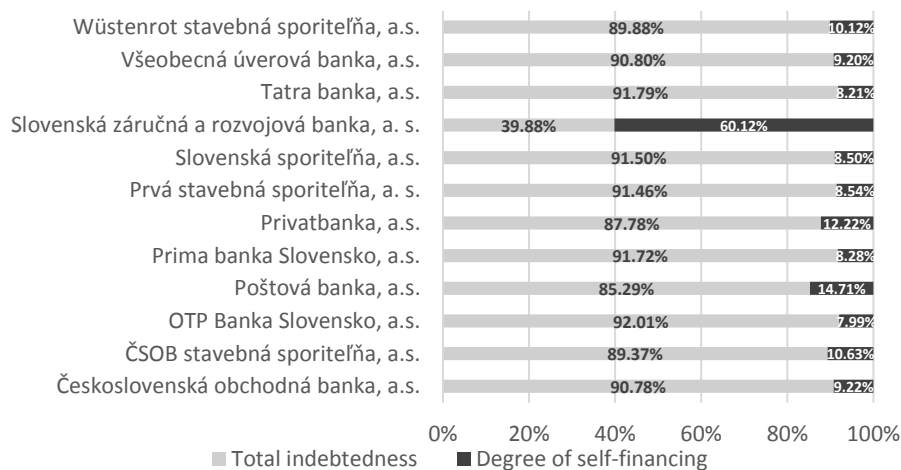
The basic factor in the stability indicator for commercial banks is the ability to maintain the risk-free nature of their transactions. It follows that commercial banks must have an adequate amount of equity and protect themselves against the potential risks of all their transactions. The strength and position of commercial banks in the market largely depends on the bank's capital, specifically on its size and composition. Spyrc and Novota (2013) state that the capital adequacy of commercial banks must be at least 8%. The higher its value, the less risk there is for clients' deposits. The analysis shows that all examined commercial banks meet the criterion of capital adequacy, with the highest value reported by Slovenská záručná a rozvojová banka, in which the capital adequacy reaches the value 71.95%.



**Fig. 3.** Capital adequacy of commercial banks in 2019. *Source: own processing according to separate financial statements of examined banks*

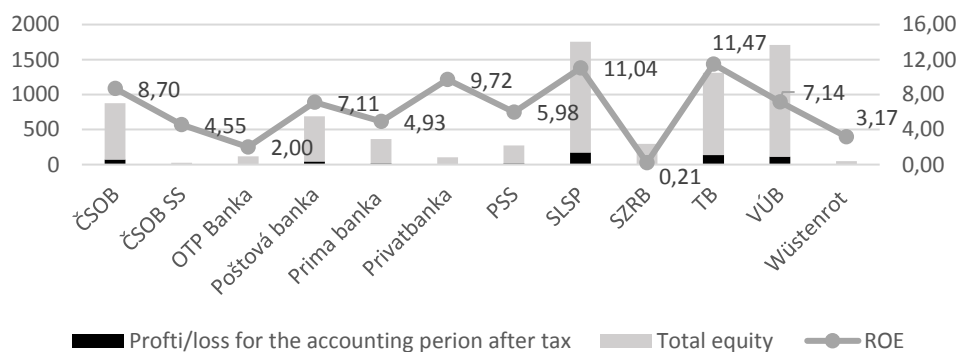
To quantify the use of foreign capital (liabilities) in terms of financing the individual needs of the company, indebtedness indicators are used, which include total indebtedness and the degree of self-financing. The total indebtedness indicator expresses the extent to which the company finances its assets through liabilities. On the contrary, the degree of self-financing expresses the extent to which the company finances its assets with its own resources. It follows that the sum of the total indebtedness and the degree of self-financing must be equal to 100%. Given that the main role of commercial banks is to accept deposits, capital is made up of foreign resources. In almost all commercial banks we choose, foreign capital predominates over equity. An exception is the Slovenská záručná a rozvojová banka, where the amount of equity exceeds foreign resources (Fig. 4).





**Fig. 4.** Indebtedness indicators of commercial banks in 2019. *Source: own processing according to separate financial statements of examined banks*

One of the basic principles of commercial banks is the requirement of profitability, because profit is as important for banks as it is for other business entities. The main function of profit is to express the efficiency of the bank's business activities and the level of its management. In banking practice, profitability can be measured using ratio financial indicators, the most important of which is the return on equity (ROE), which shows shareholders how effectively the capital they have invested in bank shares has been valued. This is a percentage of the profit that the company earned from 1 € of equity.



**Fig. 5.** Return on Equity of commercial banks in 2019. *Source: own processing according to separate financial statements of examined banks*

The analysis shows that in 2019 1 € of equity brought the highest profit to the shareholders of Tatra banka, namely 0.12 €. The opposite situation occurred in the case of the Slovenskej záručnej a rozvojovej banky, where 1 € of equity brought shareholders a profit of 0.002 € (Fig. 5).

## 4 Conclusion

Sustainable development is an effort to make the world fairer in terms of opportunity for future generations. Fairness must be present not only in the social and political spheres, but must also include environmental protection (Brenann, 2015). Sustainability means responsibility. According to Dogan and Schroevers (2019), it is a setting of thinking that focuses on relationships to future generations. This thinking may apply to the whole society, but we can observe it most in the behavior of business entities.

The aim of the paper was to analyze the impact of equity on sustainable development on a sample of 12 commercial banks operated in the Slovak Republic in 2019. Based on the results of the analysis, it can be stated that the commercial banks monitored by us met the basic capital adequacy requirement and kept it above 8 %, which means that the analyzed banks use their clients' deposits effectively.

Based on indebtedness indicators, it can be said that in almost all commercial banks, the amount of total indebtedness in 2019 ranges from 85% to 92%. Due to the fact that banks primarily focus on accepting deposits, their capital is formed mainly by foreign resources, respectively liabilities. An exception is the Slovenská záručná a rozvojová banka, where the total indebtedness reached the value of 39.88% in 2019. Slovenská záručná a rozvojová banka was established as a specialized banking institution to support small and medium-sized enterprises and its sole shareholder and 100% owner is the Ministry of Finance of the Slovak Republic.

In terms of profitability indicators, the analyzed commercial banks can be considered profitable. The owners of the analyzed commercial banks will bring 1 € of equity profit in the amount of 0.02 € (OTP banka) To 0.12 € (Tatra banka). The least profit will bring 1 € of equity in 2019 to the owners of the Slovenskej záručnej a rozvojovej banky (0.002 €). The reason for the low value of return on equity of the Slovenskej záručnej a rozvojovej banky is a decrease in profit in 2019 compared to 2018 by 91%. The decrease in profit was caused by the creation of a provision for investments in subsidiaries and associates, which include Slovak Investment Holding (SIH), National Development Fund I (NDF I), National Development Fund II (NDF II) and the National Central Securities Depository (NCSD). By analyzing the value of the NCSD's assets, the Slovenská záručná a rozvojová banka identified the need to create a provision of € 9,000,000, which represents approximately 84% of the impairment of the total investment in the NCS subsidiary.

## Acknowledgment

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## The Influence of the Amount of Parental Allowance on the Development of Human Capital in the Slovak Republic

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**Abstract.** This paper deals with parental allowance as a form of state social benefit, which acts as a way of social protection of citizens and by means of which the government of the Slovak Republic wants to mitigate the adverse economic impacts on young families with young children and motivate them to start a family or increase the number of offsprings. This process should ultimately contribute to the improvement of demographic development in Slovakia. The article focuses on the issue of unaddressed direction of the benefit and its insufficient amount for disadvantaged families who really need it. The part of the recipients of parental allowance which is not disadvantaged loses during their benefit the quantity of their human capital, which is not developed at this time and thus does not contribute to economic growth and at the same time their value on the labor market decreases. In addition, due to its amount, the parental allowance is not even a motivating factor for improving the demographic curve in Slovakia.

**Keywords:** Parental Allowance, Human Capital, Parental Leave.

**JEL classification:** *J 24, J 11, O 15*

### 1 Introduction

All over the world, the greatest driving force of the economy is people, that is, human capital. Human capital has a positive impact not only on economic development and growth, but also on the quality of life of society as a whole. Therefore, the emphasis is naturally on social protection and a way of helping all those who create human capital. Governments need to motivate the workforce to be more productive and, ultimately, to contribute to the economic growth. Empirical evidence has shown that human resources are becoming the most important factor in competitive advantage between economies. Social and economic policies are closely linked, and it is not easy to decide on a form

of support for the population that is effective for the state and at the same time satisfying for individuals.

## **2 Social Support as a Form of Help for Families**

Social support for the family is a priority for many governments, which perceive it as a suitable tool for tackling adverse demographic developments. This trend is present especially in developed countries, where there is a problem with the so-called aging population. However, we cannot determine whether this trend is strictly linked only to insufficient social support. The aging of the population can have many other causes, such as the ambition of young people to build a career, capitalize on their skills and experience, pursue their hobbies, which perceive a large family as an obstacle, or simply a change in mentality and ways of life that are no longer as tied to starting a family as they used to be.

### **2.1 The Position of Parental Allowance in Slovakia and in the World**

Allowances provided by the Labor, Social Affairs and Family Office include the following - childbirth allowance, multiple concomitant child allowance, child allowance, parental allowance and childcare allowance. In this article, we will pay attention to the parental allowance, as this allowance is not a matter of course in many countries, but rather an exception.

"Parental allowance is a state social benefit by which the state contributes to the entitled person to ensure proper care for a child up to three years of age or up to six years of age if the child has a long-term unfavorable health condition." (Ministry of Labour, Social Affairs and Family, 2020). It is taken over by about one hundred and thirty thousand families. It is a benefit by which the state contributes to the parent's provision of personal care and proper care for a child under three years of age, in the case of a child with a disability under six years of age. The length of parental leave, as well as the amount of the allowance provided during its duration, varies in EU countries. In the United Kingdom, parental leave lasts for 13, in Ireland for 14 and, for example, in Luxembourg for 24 weeks. A parent is entitled to three years of parental leave in Germany, France, Slovakia, but also in Spain and Estonia. Parents in the Czech Republic have four years of parental leave.

Not in all countries is financial compensation provided for the period of parental leave in the form of a parental allowance known to us. They do not have this benefit in Ireland, Greece, the Netherlands or Spain. The parental allowance is provided either as a flat-rate benefit or linked to a period of previous income, such as in Finland and Denmark. Here, the parental allowance represents 60 to 70% of the maternity benefit. In Sweden, this is 80% of previous income. Slovenia has a similar nature of parental allowance, which is part of the insurance system.

The allowance as a flat-rate benefit is provided by the state to parents in Germany for a period of two years, and if they take parental leave lasting only up to 12 months, the amount of the allowance increases monthly. Germany is also specific in that both

parents can take parental leave at the same time, and in addition, each parent can work another 30 hours a week. Parents can use these part-time jobs only with an employer with more than 15 employees, and the law also sets a ceiling on their income from earnings for which the allowance is provided.

Leading officials in the state are under two-way pressure. On the one hand, there are households, which are constantly asking for the parental allowance increase, because mothers but also fathers receiving it are not able to cover even the necessary material needs of the family at its current level, on the other hand, this government expenditure significantly burdens the state budget and spent funds. It would also be beneficial if they were redistributed to other areas, such as health, education or science and research. This contribution, in essence, also has no long-term effect, only the short-term satisfaction of essential needs that do not fundamentally stimulate the creation of capital, neither the physical nor human one, nor consumption.

## 2.2 The Amount of Parental Allowance in Slovakia

In 2020, the amount of parental allowance in Slovakia is 370 euros per month, for those recipients of the allowance who received maternity allowance before the right to parental allowance arose. To clarify the terms, maternity benefit is provided by the Social Insurance Agency not by the Labor, Social Affairs and Family Office as is the case with parental allowance. To be entitled to maternity benefits, a citizen must pay sickness insurance premiums to the Social Insurance Agency for at least 270 days. With the current amount of parental allowance, it is necessary that at least the other parent, or a household member received a full wage per month, i.e. at least in the amount of the minimum wage. Otherwise, the parental allowance is not even sufficient to cover the basic needs of the parent and the child. Especially in the case of larger cities, where only the provision of housing is far above this limit. Slovakia is still in the position of a welfare state and therefore efforts are being made every year to increase the contribution in question, and we can say that these efforts are also successful. The parental allowance in Slovakia will increase by several euros almost every year. However, its amount is still not enough, given that with it the necessary family expenses and the prices of all products on the market increase. For specific data, let's look at the following table, which shows the amount of parental allowance in the Slovak Republic from 2008 to 2020.

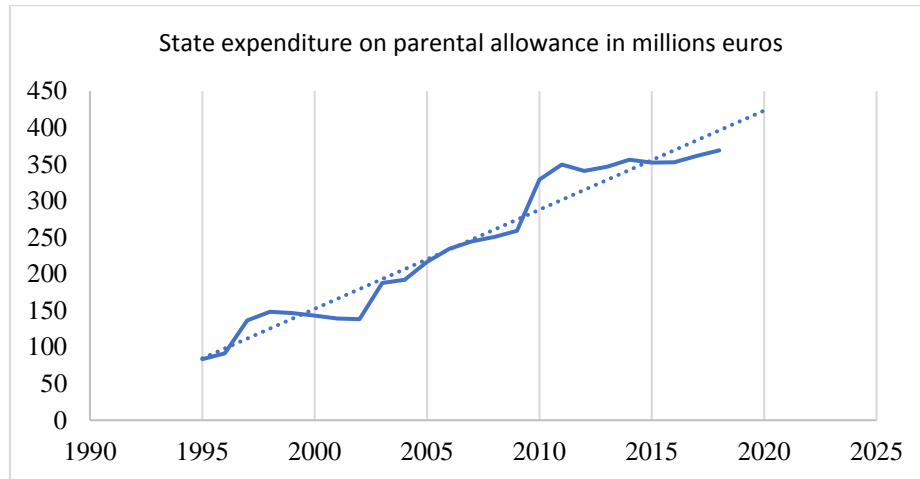
Relevant Year	Amount of Parental Allowance in euros
2008	164,22
2009	164,22
2010	164,22
2011	190,1
2012	194,7
2013	199,6
2014	203,2
2015	203,2

2016	203,2
2017	213,2
2018	214,7
2019	220,7
2020	270

**Source:** Own processing according to data from the Ministry of Labor and Social Affairs

This method of support is reminiscent of the proverb “Give a man fish and feed him for a day. Teach a person to catch fish and feed him for life.” Parental benefit is a suitable way of social protection, especially for those who have no other chance to earn an income, but it is difficult to correctly classify who they are. As an example, we can mention parents with two or more children at the same time, during parental leave. Naturally, when a parent takes care of two or more children at the same time (regardless of whether they are children of the same age or children of a certain age difference), he is not able to perform work that would provide him with any income.

"The state is the organizer and provider of state social support benefits. The aim is that the standard of living of families with dependent children does not fall significantly lower than the level of childless families. It is not the intention of state social support benefits to satisfy the basic needs of the family and to replace the economic activity of its members. The standard of living of families is to continue to be ensured mainly from earnings. The support function of state social support benefits is also expressed by their very name - they are "contributions" in the form of money. Contributions are financed from the state budget by redistributing its revenues based on the principle of solidarity. Both childless families and families with children, people with higher and lower income levels participate in the creation of funds for the financing of state social support benefits, which is an expression of society-wide solidarity." (Padalová, 2005) However, many recipients of parental allowance mistakenly consider this allowance to be the main source of satisfaction of their basic needs and do not need to engage in any other economic activity. Then there are gaps in financial incomes in families which, in addition to providing childcare, are not really able to carry out economic activity.



**Source:** Own processing according to data from the Statistical office of the Slovak Republic

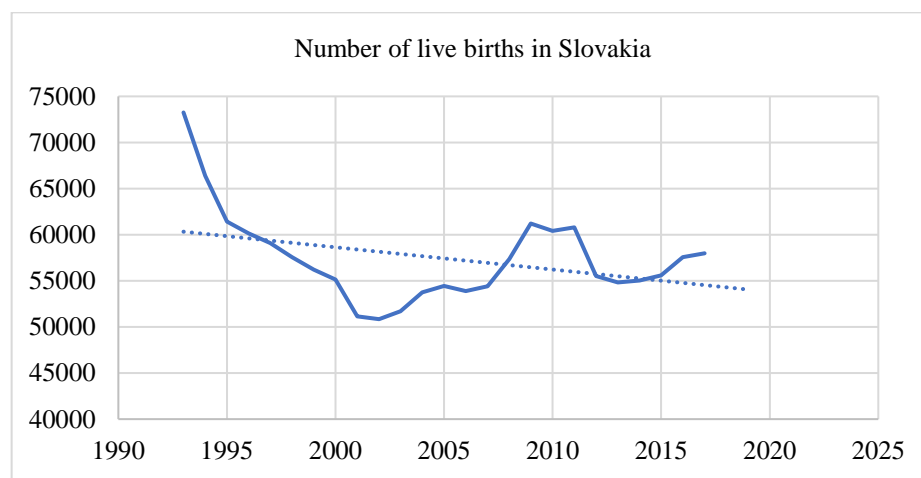
### 3 Parental Allowance and Demographic Development in Slovakia

Graph No. 1 shows how state expenditures on parental allowance increased from 1995 to 2018. These expenditures have a growing trend, yet they cannot even provide a solution to the fundamental problem that governments are referring to, which is the unfavorable demographic development. No matter how the amount of the parental allowance increases year-on-year, the number of children born does not increase. In this case, we can say that parental allowance is not a motivation for people to start larger families. Its height is not enough for such motivation.

As we can see in Graph No. 2, the number of live births has a declining trend. The unfavorable demographic development is clearly but not only affected by the amount of the parental allowance, but by the allowance as such. In recent years, although the demographic curve has shifted from critical values from 1.2 children per woman, the data still point to the fact that Slovakia is exposed to a rapidly aging population. While this problem is referred to as a widespread in the whole Europe, Slovakia is even worse off than some other countries, for example France. While in Slovakia, an average of 1.4 children per woman are born, in France, there are two or more children. The age at which young people start families is also shifting. In Europe today, there is talk of the age of 27 for the birth of the first child. As mentioned in the article, one of the important factors that affects the number of children the family chooses to have, is the price of housing. Especially in the capital, housing prices are extremely high and those that are affordable are old, unreconstructed and require additional costs that young people are unable to finance. The conditions for obtaining a mortgage are also tightened every year, making it more difficult for young families to access their own housing. Young



people do not consider subletting a long-term sustainable option due to high rents and also an absent sense of security. Although starting a family is not just about women, they are still the group that is being pursued more on the subject. Mothers on maternity leave do not have good access to part-time work and therefore have to choose between postponing a career or postponing starting a family. When the mother returns to work after maternity or parental leave, she feels discriminated against by her employer and she also feels that there is an insufficient state support. The fact that there are insufficient capacities in pre-school facilities, especially in Bratislava, and parents often have to deal with private kindergartens for their offspring, which are very costly, does not contribute positively to this.

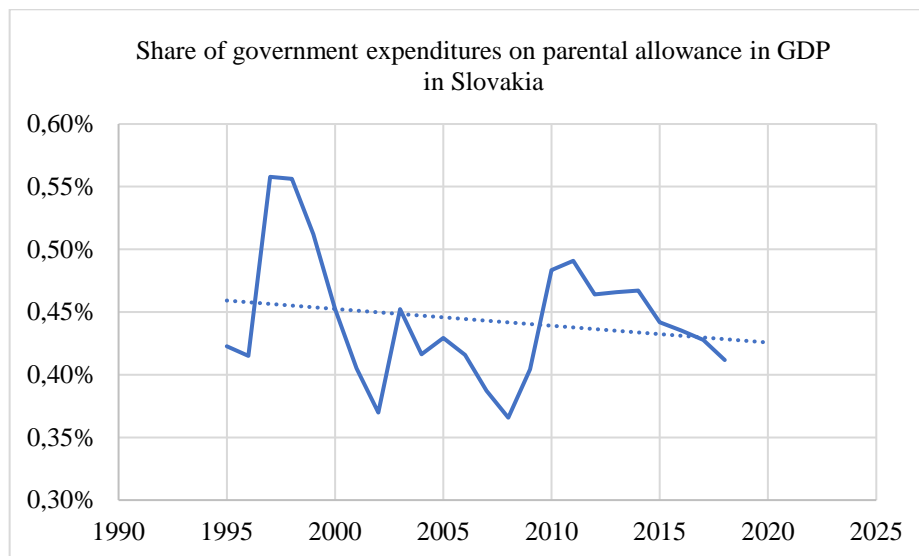


**Source:** Own processing according to data from the Statistical office of the Slovak Republic

#### 4 The Relationship between Human Capital and Economic Growth

It is important for citizens to earn a sufficiently high income on a regular basis to cover at least the minimum basic needs of the family. However, while meeting the minimum needs, there is no room for self-development and human capital growth, which is needed, as mentioned above, for an overall positive economic development. Space for the development of human capital is created where there is a free capacity. Human capital represents practical knowledge, acquired skills and also learned abilities of an individual, which increase his potential productivity. Let's say how human capital affects the performance of the economy. In the performance of the economy, we work with two basic concepts, namely gross domestic product and economic growth. Gross domestic product represents a certain state, while economic growth represents a change in economic variables over time. For the purposes of our article, we will work with the

gross domestic product. The following graph No. 3 therefore shows the percentage share of government expenditure on parental allowance in the GDP of the Slovak Republic and it can be seen that despite the fact that parental allowance is growing, the share of expenditure on GDP in Slovakia has a declining trend, which is probably due to declining trend in infants.



**Source:** Own processing according to data from the Statistical office of the Slovak Republic

The close relationship between human capital and its impact on GDP depends on the ability of individual countries to acquire and benefit from the education, skills and abilities of their citizens. Many empirical studies show that education has a significant impact on its increase.

We can therefore simply measure human capital, for example, by the length of education, or the number of years spent at school. Research shows that people with higher education earn higher incomes, which also increases their consumption, and it is this cycle that contributes to overall growth. Therefore, it is necessary to consider whether the coverage of basic education or investment in the population with higher education is the right way to the future. At the same time, however, it is still true that primary and secondary education are still crucial for developing countries. Cognitive skills are becoming key to the desired effect of economic growth, and thus for government and policy makers to focus on developing these skills, which requires many structural changes. In the late 1980s and early 1990s, several empirical macroeconomists tried to explain the differences in growth rates around the world. (Barro, R., 1991) was the first to address this topic, followed by other economists, concluding that growth rate is a direct function of human capital, a vector of other factors, and random elements. Formal education, which begins in the first year of schooling and ends around the twentieth year of an individual's life, is the only one

component that shapes human capital. More important than the knowledge acquired in this case is the learning process itself, which does not end with the acquisition of any diploma. The emphasis is on lifelong learning.

"Human capital can be characterized as a set of skills and knowledge that people have and that increase their earning opportunities." (Čaplánová, A., 1999) If we take into account that the level of education, but especially continuous learning and education affect human capital, then parental allowance has the following effect on it:

1. The longer a parent receives the parental allowance, so is on parental leave and at that time does not engage in any self-development or education, their human capital decreases or at least stagnates, i.e. the state spends funds that are not effectively returned to it.

2. The amount of the parental allowance covering only the basic needs of the parent and the child shall not create space for the financing of further education of the parent during parental leave. (In this case, there could be an argument that education in Slovakia is free, but during maternity leave, there are no time options for full-time high school or university studies. To increase education, only external study at a university or various thematic, professional supplementary courses are available, all of which are financially expensive.)

## 5 Conclusion

In addition to education, health has also been shown to have an impact on human capital. The better the living conditions of an individual and the better their health, the greater the potential to increase their human capital. However, a parent receiving only parental allowance, which provides only necessities from life, does not have the space to focus their attention on health. There are no free funds to provide quality food, mental hygiene, sports activities and often to provide the necessary medication, whether for acute or chronic health problems. In the case of parents caring for two or more children at the same time, or parents on parental leave with a child with special needs, this possibility is completely nil, because parent is often unable to provide even the most necessary health care for a child with special needs, even though that health care in Slovakia is for free.

Human capital can also be increased by performing work activities in which the individual must constantly learn and expand their knowledge and skills. If parental allowance (or any other allowance from the state) is perceived as the main income, which will also cover only the basic needs of individuals, there will be no free capacity or motivation to acquire new knowledge and skills that would increase human capital. For the state, this means investing millions of euros in something that will never return. Neither in the form of an increase in the number of children born, nor in the form of an increase in human capital.

During the years spent on parental leave, the parent falls out of the work cycle and his / her workplace changes processes and staff at the same time. The solution to the current situation could be to reconcile family and work life and to motivate the parent

to work part-time on parental leave, so that they would not lose work habits and at the same time, could work on their lifelong learning. The state can contribute to this by increasing capacities in pre-school facilities, by favoring working parents, for example in the form of a lower contribution burden. Employees can be motivated by flexible working hours, the possibility of working from home or the prospect of a better job after taking full-time parental leave.

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## Logistics Performance Index as a Significant Indicator of Trade Logistics – its Comparison within the V4 Countries and Assessment of its Dependence on Foreign Trade

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**Abstract.** Logistics can be seen as one of the leading spheres of economic growth, and also an important part of the global economy. In order to optimize the development of a logistical competitive advantage, it is necessary to assess the current performance of the logistics system and to be able to assess which subsystems within the logistics represent a space for optimization and development, and which ones need to be improved. The main aim of the paper was to analyze and compare the logistic performance index of LPIs within the V4 countries, as well as to assess the interdependence between LPI and the foreign trade rate of selected countries with the logistics leader - Germany. After a thorough analysis of the secondary data, we determined the existence of dependency between foreign trade and the logistic performance index of the V4 countries and Germany based on the OLS method. Since we have been able to evaluate the variables in the model as statistically significant in the end, we can say that if the level of logistics services increases and the quality of individual countries' logistics performance increases, we can assume increased ex-port and import of individual countries not only with logistics leader Germany but as well as other major trading partners of the world.

**Keywords:** Visegrad Group, Logistics, Logistics Performance Index.

**JEL classification:** M 31, M 39, F10

### 1 Introduction

The 21st century brings the global changes that are reflected not only in the dynamics of economic processes but also in the decision-making of companies on important issues of the functioning of society. The participation of individual states in the common global market is also a result of constantly changing market conditions. The

movement of information and goods on a global scale is constantly reducing the differences and interfaces between world markets, which have been highly differentiated in the past. On the one hand, this is reflected in production management, which is constantly entering new technologies and automation elements, and on the other, it has a significant impact on the enterprise distribution system. The increase of multinational companies emphasizes global logistics performance. Its quality and level may be influenced by various factors. It can be the distance of a country from the leading economic leaders in the market or the very quality of logistics services.

Countries that are able to produce high-quality products with lower input costs have a high competitive advantage in the international market. On the other hand, when compared to countries that have high logistics costs and a disadvantageous strategic position in transport, their ability to compete with international companies is much lower. In order to optimize the development of a logistical competitive advantage, it is necessary to assess the current performance of the logistics system, both at country and global level, and to know which subsystems within the logistics area are areas for optimization and development that need to be improved and which should be eliminated. In this case, it is possible to use the international logistics rating as a comparative tool, which serves to compare individual indicators, which gives the possibility to concentrate on specific substantial areas within the entire logistics system. Since 2007, the World Bank has been issuing a Logistics Performance Index (LPI) for 160 countries. LPI can be seen as a key part of a global effort to better understand logistics performance in the context of complex supply chains.

### **1.1 Methodology**

The main aim of the paper was to analyze and compare the logistic performance index of LPI's within the V4 countries, as well as to assess the interdependence between LPI and the foreign trade rate of selected countries with the logistics leader - Germany. To order to achieve this goal, it was necessary to work with secondary data from predominantly foreign professional literature, as well as it is based on global logistics performance analyzes of countries in the form of LPI logistic performance indices, which have been published by the World Bank since 2007. In Table 1 we can see an overview of the 60 countries with the best rating for 2018, including all the V4 countries. The best ranking of the V4 countries in the World Bank evaluation is the Czech Republic with an index of 3.68, the worst (53rd place) was the Slovak Republic, which reached an index of 3.3.

The method of analysis was used in the evaluation of foreign trade of individual V4 countries. In the final part of the paper, we used the synthesis method to find out the mutual relations between the studied variables of the given issue. Using mathematical-statistical methods and econometric methods, we were able to determine the degree of dependence between the logistical performance of the V4 countries and foreign trade between Germany and these Central European countries. To obtain relevant results of the paper, we verified the data statistically by means of the p-value

and least squares OLS method. Using graphical methods, we were able to transform the results into clear and readable form using graphs, and figures.

**Table 1.** TOP 60 countries with best results of LPI 2018

LPI Rank	Country	Year	LPI Score		LPI Rank	Country	Year	LPI Score
1	Germany	2018	4.20		31	Hungary	2018	3.42
2	Sweden	2018	4.5		32	Thailand	2018	3.41
3	Belgium	2018	4.4		33	South Africa	2018	3.38
4	Austria	2018	4.3		34	Chile	2018	3.32
5	Japan	2018	4.3		35	Slovenia	2018	3.31
6	Netherlands	2018	4.2		36	Estonia	2018	3.31
7	Singapore	2018	4.00		37	Israel	2018	3.31
8	Denmark	2018	3.99		38	Panama	2018	3.28
9	United Kingdom	2018	3.99		39	Vietnam	2018	3.27
10	Finland	2018	3.97		40	Iceland	2018	3.23
11	United Arab Emirates	2018	3.96		41	Malaysia	2018	3.22
12	Hong Kong, China	2018	3.92		42	Greece	2018	3.20
13	Switzerland	2018	3.90		43	Oman	2018	3.20
14	United States	2018	3.89		44	India	2018	3.18
15	New Zealand	2018	3.88		45	Cyprus	2018	3.15
16	France	2018	3.84		46	Indonesia	2018	3.15
17	Spain	2018	3.83		47	Turkey	2018	3.15
18	Australia	2018	3.75		48	Romania	2018	3.12
19	Italy	2018	3.74		49	Croatia	2018	3.10
20	Canada	2018	3.73		50	Cote d'Ivoire	2018	3.8
21	Norway	2018	3.70		51	Mexico	2018	3.5
22	Czech Republic	2018	3.68		52	Bulgaria	2018	3.3
23	Portugal	2018	3.64		53	Slovak Republic	2018	3.3
24	Luxembourg	2018	3.63		54	Lithuania	2018	3.2
25	Korea, Rep.	2018	3.61		55	Saudi Arabia	2018	3.1
26	China	2018	3.61		56	Brazil	2018	2.99
27	Taiwan	2018	3.60		57	Rwanda	2018	2.97
28	Poland	2018	3.54		58	Colombia	2018	2.94
29	Ireland	2018	3.51		59	Bahrain	2018	2.93
30	Qatar	2018	3.47		60	Philippines	2018	2.90

Source: author's own processing according to <https://lpi.worldbank.org/international/global/2018>

## 2 Results and Discussion

Nowadays, logistics has become one of the leading areas of economic growth and it plays a very important role in the global economy, especially in creating the competitiveness of many countries (Richnák, 2018). As business logistics includes a range of services and processes involved in the safe transfer of goods from one country to another, it can affect different areas. They are transport networks, storage systems, supply chain management, or specific products and services that pass through country borders (Gani, 2017). This can be also seen as the main reason why many authors have been studying logistics performance over the last decade in relation to key indicators of international trade. Beysenbaev (2018) and Gani (2017) focused on examining the fluctuation of logistics processes compared to changes in foreign trade, while earlier

studies focused rather on analyzing distances between countries and their impact on logistics costs. The Logistics Performance Index LPI is used to measure logistics performance of countries, which helps them identify the challenges and opportunities they face in the performance of business logistics in their internal as well as foreign markets. (The World Bank, 2019).

## 2.1 Logistics Performance Index LPI

The A logistics performance index is considered as a key element, which assesses the logistics performance of a country in a multidimensional way. This index shows that linking businesses, suppliers and consumers is key to success in today's global environment, the reliability of supply is becoming an even more important element of supply chain quality than logistics costs alone (Memedovic et al., 2008). The World Bank provided the data on individual indices in 2007 for the first time. The LPI is built on a survey of international logistics and transport companies, and several thousand data are collected for each survey period, which is then subject to a thorough analysis for experts from around the world. Global forwarders and express carriers provide feedback on the logistical 'accessibility' of the countries in which they operate and the countries with which they trade. This feedback is then complemented by quantitative data relating to the performance of key components of the logistics chain in the country (World Bank, 2018). LPI consists of qualitative and quantitative measures and offers two different perspectives: international and domestic. It is a combination of several important indicators from an international perspective, and their construction composed mainly of standard econometric techniques that increase its importance as well as its level of credibility.

Logistic performance is evaluated using a 5-point scale, and the total LPI is aggregated as a weighted average in the following six key dimensions:

- customs - effectiveness of the entire customs procedure,
- infrastructure - quality of business and transport infrastructure,
- international shipments - the ease of handling shipments at competitive prices;
- quality of logistics services,
- ability to track shipments
- and timeliness - the time taken for the consignment to reach its consignee. (OECD 2015)

The following schemes (Table 2 and Figure 1) provide a comparison of the country with the best and worst LPI rating.

**Table 2.** Comparison of Germany and Afghanistan

Country	Year	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timeliness
Germany	2018	1	4.20	4.9	4.37	3.86	4.31	4.24	4.39
Afghanistan	2018	160	1.95	1.73	1.81	2.10	1.92	1.70	2.38



Source: author's own processing according to World Bank



**Fig. 1.** Comparison of Germany and Afghanistan. Source: author's own processing according to World Bank

Germany, considered by LPI to be the leader in logistics performance, achieves values of more than 4 in all key dimensions, except in one case - 3.86 in International shipments. Afghanistan achieved the best rating in this area in 2018, but only 2.10, which is more than two-thirds less than Germany. The weakness of Afghanistan, which ranked last 160th in the 2018 ranking, is the dimension of customs equipment as well as the ability to track shipments in international trade.

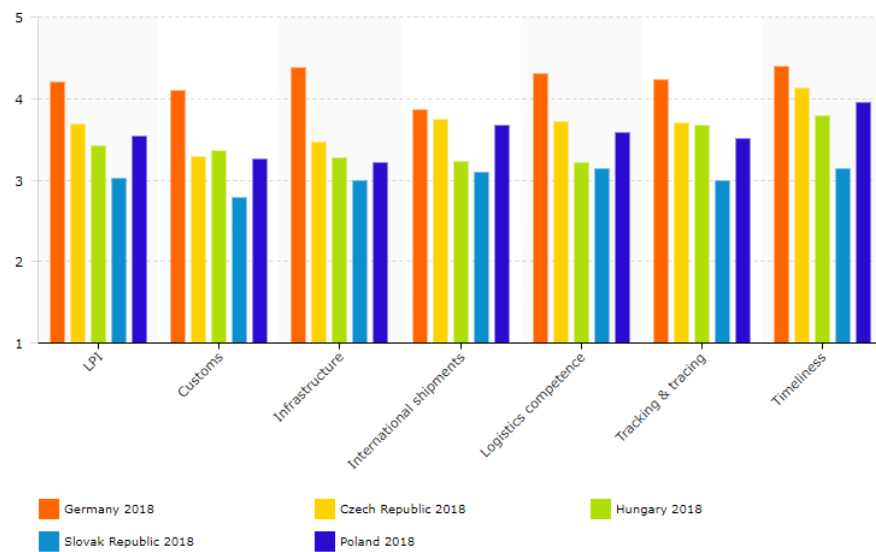
## 2.2 LPI of V4 countries – Slovakia, Czech Republic, Hungary and Poland

The following subchapter is devoted to the comparison of the countries of the Visegrad Four, consisting of the Czech Republic, Hungary, Poland and the Slovak Republic. For the comparative area, we set out the logistics area, and specifically the LPI values recorded by the World Bank as part of the global survey conducted in 2018. The V4 as a whole was compared with the LPI values of the logistics leader of Germany.

**Table 3.** Comparison of V4 countries 2018

Country	Year	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timeliness
Germany	2018	1	4.20	4.9	4.37	3.86	4.31	4.24	4.39
Czech Republic	2018	22	3.68	3.29	3.46	3.75	3.72	3.70	4.13
Poland	2018	28	3.54	3.25	3.21	3.68	3.58	3.51	3.95
Hungary	2018	31	3.42	3.35	3.27	3.22	3.21	3.67	3.79
Slovak Republic	2018	53	3.3	2.79	3.00	3.10	3.14	2.99	3.14

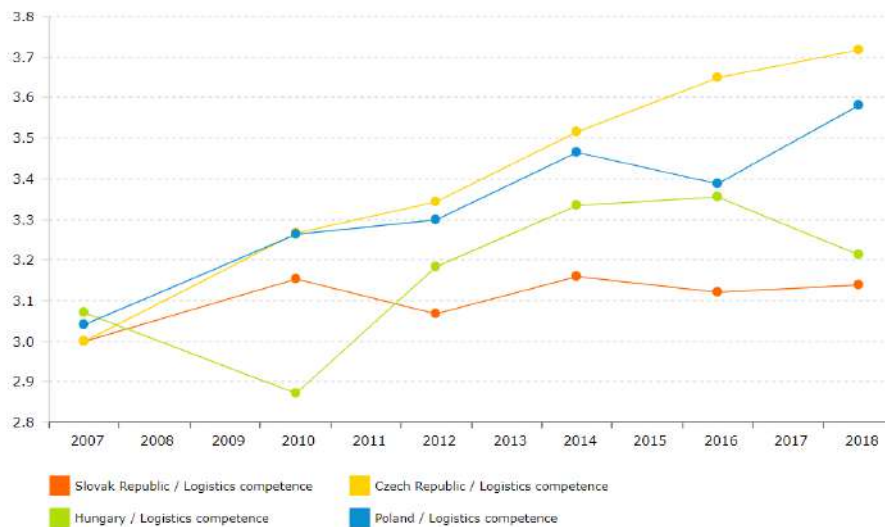
Source: The World Bank

**Fig. 2.** Comparison of V4 countries 2018. Source: The World Bank

The results of the 2018 World Bank Global Survey show that the Czech Republic is the most advanced of the V4 countries in terms of logistics performance, with an LPI of 3.68. The Czech Republic's customs system is the weakest logistics link. 88% of shipments shipped from the Czech Republic meet all quality criteria and that is why the Czech Republic is in the TOP 30 countries of the LPI rating. The second best V4 country in logistics is Poland, whose LPI value is 3.54. Poland's infrastructure is the worst-valued area in logistics, and goods from Poland to other countries are delivered on average in 4 days (3 days in the Czech Republic). The third place out of V4 (and 31st overall) is Hungary with a value of 3.42.

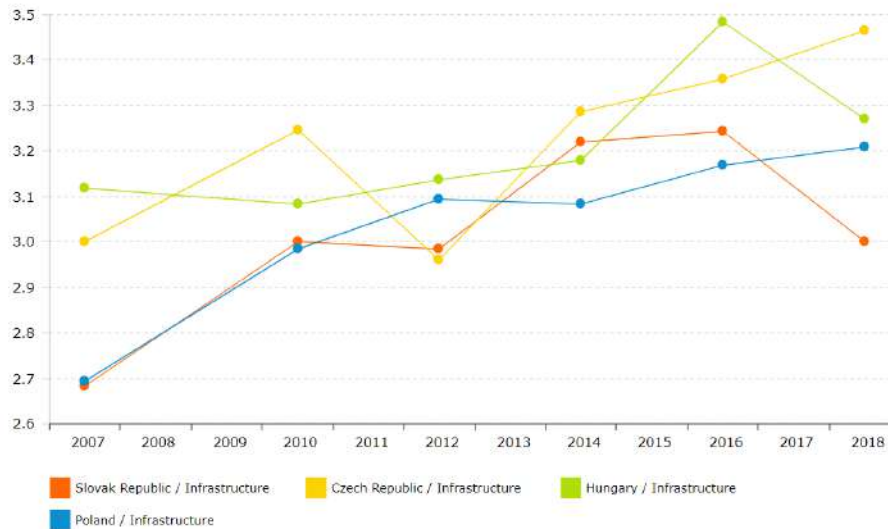
Compared to the better-placed countries, we can see from the table and graph that it achieves better values in competitors' weaknesses. In particular, Hungary achieves higher values than Poland in the area of infrastructure, and better results than the Czech Republic in customs. However, what we consider to be the weakest aspect of the country is the quality of logistics services with an LPI of 3.21. The Slovak Republic with the 3.3 rating is the last in the V4. It is the only country to reach a value of less than 3 in terms of customs clearance and tracking capability. On the contrary,

the quality and timeliness of shipments are the strengths of the country. When comparing the V4 countries as a whole with Germany (Figure 2), we can see that the best rated areas as a whole of the V4 can be considered the timeliness of shipments and their ease of handling. Customs systems and infrastructure are dimensions in which the V4 countries have large reserves against the world logistics leader.



**Fig. 3.** Comparison of Logistics Competence of V4 countries from 2007 to 2018. Source: The World Bank

If we look at the comparison of V4 countries in terms of logistics competence and quality throughout the considered period, we can see that the quality of logistics in all countries has a predominantly increasing tendency. The only decrease is recorded in 2010 and 2016 in Hungary. From a global perspective, the graph clearly shows us that since 2012, the level of Slovakia's logistics performance has been the lowest. As the logistics performance of individual countries is closely related to their infrastructure, in the following figure we enclose a clear illustration of the development of infrastructure in all V4 countries. For the last period, we can consider Hungary to be the leader in this category, which from 2007 to 2016 showed the most progressive development of infrastructure in the country. The decrease is recorded from 2016 to 2018 in Hungary and Slovak Republic. The highest achieved value in this category was 3.5, which belonged to the just mentioned Hungary.



**Fig. 4.** Infrastructure Development in V4 countries from 2007 to 2018. Source: The World Bank

### 2.3 Foreign trade of V4 countries with Germany

Logistics initially focused on supply chain analysis to optimize the flow of components needed for production processes. However, globalization and market modernization have led to a continuous expansion of logistics functions (Kirch et al., 2017). It is logistics that is an important part not only of domestic but also foreign trade, in which logistics services are carried out between countries transporting their goods from their place of origin to their destination. The aim of the paper was not only to monitor the development of the logistic performance index within the V4 countries but also their foreign trade with Germany. Based on the data analysis (Tables 4 and 5), we were able to deduce the degree of dependence between two variables - LPI and foreign trade - in the final part of the paper.

**Table 4.** Import from Germany to V4 countries

GEO/TIME	2018	2017	2016	2015	2014	2013	2012
Czechia	44 224 737,0	41 704 034,0	38 094 832,00	36 479 917,00	33 469 139,00	31 053 689,00	31 287 119,00
Hungary	24 534 200,0	23 971 285,2	22 051 073,52	20 885 108,46	19 294 195,53	18 223 077,61	17 557 086,85
Poland	59 606 800,00	57 596 425,30	50 018 739,34	48 775 525,35	54 112 198,30	48 994 435,17	46 742 921,49
Slovakia	14 056 000,00	13 370 000,00	12 320 273,33	11 409 948,07	10 198 886,57	9 969 212,82	9 854 478,37
<b>TOTAL:</b>	<b>142 421 737,00</b>	<b>136 641 744,50</b>	<b>122 484 918,19</b>	<b>117 550 498,88</b>	<b>117 074 419,40</b>	<b>108 240 414,60</b>	<b>105 441 605,71</b>

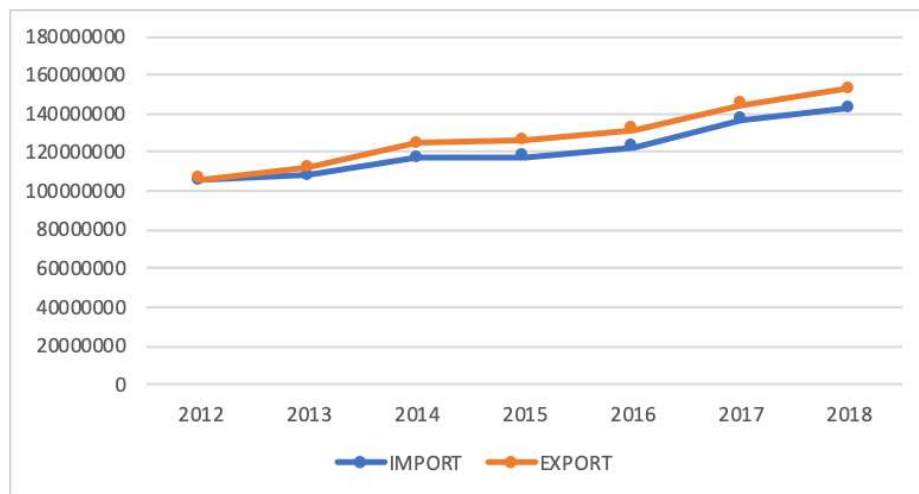
Source: author's own processing according to Eurostat and MZV SR

**Table 5.** Export from V4 countries to Germany

GEO/TIME	2018	2017	2016	2015	2014	2013	2012
Czechia	47 739 351,00	45 744 517,00	42 247 357,0	39 193 412,00	36 760 213,00	33 010 308,00	32 492 972,00
Hungary	28 577 100,00	27 887 445,09	25 629 096,2	24 610 618,76	23 128 874,19	20 810 860,08	19 746 818,01
Poland	62 229 600,00	56 794 100,00	50 080 287,12	48 430 079,80	51 932 013,45	46 152 443,20	41 831 083,80
Slovakia	14 491 000,00	13 813 929,96	13 737 123,35	13 639 764,34	12 851 250,64	12 168 649,98	12 040 719,68
<b>TOTAL:</b>	<b>153 037 051,00</b>	<b>144 239 992,05</b>	<b>131 693 863,7</b>	<b>125 873 874,90</b>	<b>124 672 351,28</b>	<b>112 142 261,26</b>	<b>106 111 593,49</b>

Source: author's own processing according to Eurostat and MZV SR

The highest foreign trade is recorded between Poland and Germany (both export and import), while the Slovak Republic exports and imports the least amount of goods (in the territorial structure of Germany's foreign trade, it is only in the 19th and 21st in import). Globally, we can determine that exports of V4 countries to Germany are higher than the import itself, over the entire reviewed period. Germany is the most important exporter (27.3%) and importer (26.5%) for Hungary. The most significant items of Slovak exports to Germany in 2018 were mainly road vehicles, electrical equipment, appliances, base metals and rubber (MZV, 2019).



**Fig. 5.** International Trade between Germany and V4 countries. Source: author's own processing according to Eurostat and MZV SR

The development of the foreign trade curve is growing, which clearly predicts the positive development of foreign trade between the V4 countries and the global logistics leader of Germany. In 2012, the total amount of foreign trade between Germany and the V4 countries was 211 billions €. Until 2018, foreign trade increased by 35%. It is also evident from the graph that exports from the V4 countries to Germany outweigh the import from Germany itself. The Central European region of the Czech Republic, Poland, Hungary and Slovakia together generates 50% more trade with Germany than Germany's largest trading partner - China.

## 2.4 Assessment of dependence between LPI, foreign trade of selected countries

The main objective of the paper was to assess the interdependence between LPI and the foreign trade rate of selected V4 countries with the logistics leader - Germany. In order to achieve this goal, we needed to collect secondary data processed by the World Bank and the Ministry of Foreign Affairs of the Slovak Republic. Based on graphs and tables, we have presented the data in the previous sub-chapters of the paper. In order to deduce the dependence between the examined variables, we used the least squares OLS econometric method, where we determined the foreign trade of the V4 countries and Germany as a dependent variable. The aim was to point out the existence of dependence between import and export of V4 countries and Germany and LPI Logistic Performance Index of Hungary, Poland, Czech Republic and Slovakia. In the following table 6 we can see the results of the OLS model as well as the p-value.

**Table 6.** Model 6: OLS, using observations 1-4, Dependent variable: Trade, Heteroskedasticity-robust standard errors, variant HC1

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-4,78681e+08	2,18158e+08	-2,194	0,1595	
LPI	2,15008e+08	6,70019e+07	3,209	0,0849	*

R-squared

0,729792

P-value(F)

0,084923

Source: author's own processing Gretl, 2020

**Table 7.** Input data to OLS model

YEAR	INTERNATIONAL TRADE IN THOUSAND €	Average LPI
2012	63780091,00	3,14
2014	70229352,00	3,49
2016	80342189,00	3,67
2018	91964088,00	3,68

Source: author's own processing Gretl 2020

In order to work adequately with the OLS model, we needed to get data from two variables - LPI and foreign trade. Since the World Bank on a regular two-year basis has published the logistic performance index LPI only since 2012, foreign trade between V4 countries and Germany has been analyzed since this year, even though the import and export of goods between these countries has been widespread for decades. We chose foreign trade (IM + EX) of all countries of the Visegrad Four and Germany as a dependent variable. Based on the 2012, 2014, 2016 and 2018 LPI ratings, we created the average of all four V4 countries' indices and worked with them as the second variable to enter the OLS model. The average values of LPI and the value of foreign trade in thousands of euros can be seen in Table 7.

Model 6 (Table 6) demonstrates p-value, which means that the variable in the model are statistically significant. Since the p-value is 0.0849 \*, we can say that the logistic performance index LPI is at 90% significance level, so we can accept the null hypothesis that when the quality and performance of logistics services (and hence LPI) in individual V4 countries increases, it will also have a positive effect on foreign trade between these countries and logistics leader Germany, which achieves the best results in LPI values among all 160 analyzed countries in the world.

### Results of OLS model

$$\begin{aligned} \text{^TRADE} &= -4,79\text{e}+08 + 2,15\text{e}+08 * \text{LPI} \\ &\quad (2,18\text{e}+08) \quad (6,70\text{e}+07) \\ n &= 4, R\text{-squared} = 0,730 \end{aligned}$$

Source: author's own processing Gretl 2020

The results of the OLS model show that if LPI increases by one unit, foreign trade between V4 countries and Germany will increase by 2.15. Based on the results of the model, we can conclude that the overall import and export of goods between the V4 countries and Germany will be positively influenced by an increase in the value of LPI and hence an increase in the overall level of logistics services. The R-squared value is always between 0 and 100%. In our case, the R-Squared value is 0.730, which means that the 73% model explains the variability of the data. The lower dependence values are mainly attributed to the fact that the period of the selected variables was relatively short and therefore it is not possible to assess the dependencies for longer time series. As long as the individual LPI ratings issued by the World Bank continue to exist at regular intervals, there is room for more detailed analysis and dependency study between variables. In this case, our study can act as the basis for further detailed analysis in the future.

### 3 Conclusion

These days, logistics can be seen as one of the leading spheres affecting the economic growth of countries. In the global economy, through its wide range of services and processes, it is involved in the safe transfer of goods from one country to another, it can affect the competitiveness of countries in terms of quality, and also affects international trade between them. We consider LPI as the key benchmark that countries can use to assess their logistics performance. The main aim of the paper was to analyze and compare the logistic performance index of LPIs within the V4 countries, as well as to assess the interdependence between LPI and the foreign trade rate of selected countries with the logistics leader - Germany.

The Central European region of the Czech Republic, Poland, Hungary and Slovakia together generates 50% more trade with Germany than Germany's largest trading partner - China. Foreign trade between the V4 countries and Germany is growing steadily, with exports from the V4 countries to Germany outweighing imports during the entire reviewed period. When comparing the logistics performance indices, we found that the two best logistics executives for 2018 in the V4 countries can be considered the Czech Republic with an LPI of 3.68 and Poland with an LPI of 3.54. Polish infrastructure is a better rated dimension, while the Czech Republic excels in the very quality of logistics services, the ability to track shipments, and last but not least, despite worse infrastructure, it has a competitive advantage over Poland due to shorter delivery times. (Poland 4 days, Czech Republic 3 days). Slovakia is the weakest rated country among the V4 countries, and it has the smallest share of foreign trade between the V4 countries and Germany.

Using the econometric model OLS, we assessed the relationship of the dependent variable - foreign trade V4 and Germany with the logistic performance index LPI. The OLS model showed us a p - value of 0.0849 \*, confirming that the variables in the model were statistically significant. Thus, the resulting OLS equation tells us that if the LPI increases by one unit, foreign trade will increase by 2.15. Therefore, if the level of logistics services increases and the quality of logistics of individual countries' performance increases, we can also assume an increased export and import of individual countries not only with the logistics leader of Germany but also with other important trading partners of the world. Therefore, we consider the study of logistics in connection with foreign trade to be significant, and we see room for future studies with a deeper examination of the issue. In particular, we consider the smallest amount of available data related to the country's LPIs to be the greatest limitation of the study.

#### Acknowledgement.

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# Automation and Labor Demand in Slovakia: An International Comparison and Industry-Level Analysis<sup>1</sup>

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**Abstract.** To understand the evolution of labor demand in Slovakia in the context of automation and other emerging technologies, and to make an international comparison, we apply the decomposition developed by Acemoglu and Restrepo (2019) to European data. At the center of this framework is the task content of production—measuring the allocation of tasks to factors of production. By creating a displacement effect, automation shifts the task content of production against labor, while the introduction of new tasks in which labor has a comparative advantage increases the labor demand via the reinstatement effect. We show that in Slovakia over the 2000–2017 period, the displacement effect of automation was completely counterbalanced by technologies that create new tasks. Although the net effect was almost zero, there was considerable displacement and reinstatement. While the displacement effect cumulatively reduced labor demand by 24.7% during this period, the reinstatement effect increased labor demand by 24.4% during the same period. Compared to other countries, these are by far the highest values. We also perform an industry-level analysis.

**Keywords:** Automation, New Technologies, Labor Demand, Decomposition

**JEL classification:** J 23, O 33

## 1 Introduction

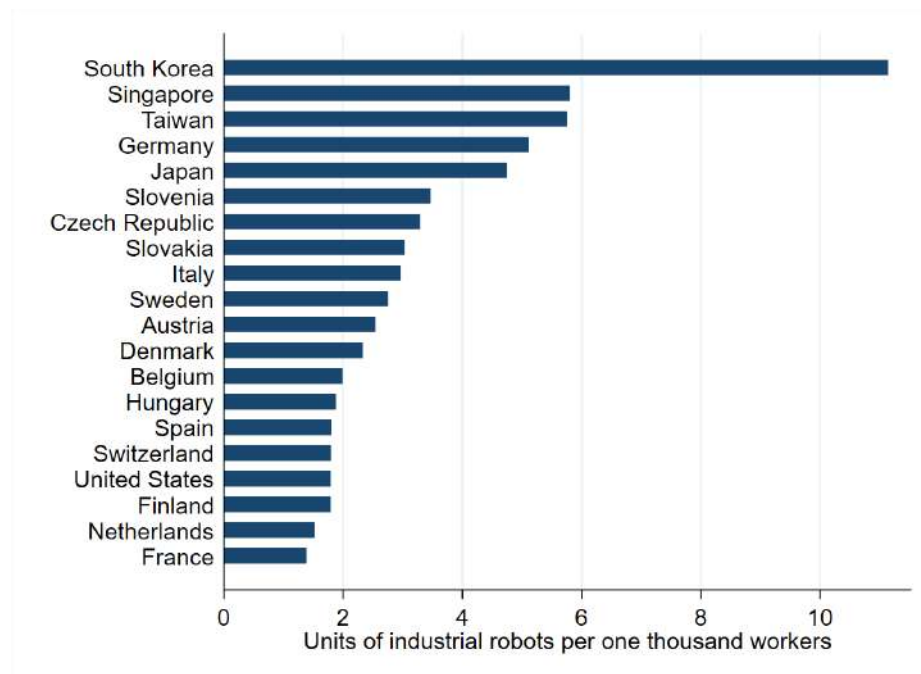
The speed of diffusion of digital and automation technologies—proxied by the operational stock of industrial robots—illustrates why it is important to understand the implications of these technologies. According to data from the IFR database, the total worldwide stock of operational industrial robots increased from roughly 0.5 million in 1993 to almost 2.5 million in 2018. Moreover, in the following years, the growth of

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operational stock will slightly accelerate and is expected to reach an average of around 16% per year until 2021 (Litzenberger et al., 2018). In addition, the IDTechEx Research Report (Ghaffarzadeh, 2018), which includes market forecasts for 46 robot categories from 2018 to 2038, predicts the transformation of many industries and expects the overall market to grow significantly over the next two decades.

In 2018, 15 European countries were among the 20 countries with the highest robot density—the stock of industrial robots per one thousand workers (Figure 1). The remaining countries were South Korea, Singapore, Taiwan, Japan, and the United States. The European countries with the highest robot density were Germany, Slovenia, the Czech Republic, Slovakia, and Italy.



**Fig. 1.** Top 20 countries with the highest robot density in 2018  
Source: Authors' elaboration based on data from the IFR and ILO databases.

## 2 Literature review

Over the last decade, a lot of literature on the impacts of technological change on labor market has been published. In general, it can be divided into two broad categories: i) potential future impacts, and ii) exploration of past trends. Both of them are briefly reviewed, but more space is devoted to research on past trends as this paper falls within this stream of literature.

Two different approaches are used to estimate the share of jobs that may be affected by automation or other emerging technologies in the near future. In general, the

occupation-based approach developed by Frey and Osborne (2017) is associated with estimates ranging from one to two thirds of total employment being in the high-risk category (Bowles, 2014; Pajarinen et al., 2014; Brzeski and Burk, 2015; Pajarinen et al., 2015; Crowley and Doran, 2019; Michlits et al., 2019). Arntz et al. (2016) argue that this approach might lead to an overestimation of job automatability, as occupations labelled as those at a high risk of automation often still contain a substantial share of tasks that are hard to automate. In this way, they argue in favor of the so called task-based approach to potential future impacts. The task-based approach leads to significantly lower estimates, mostly around 10% (Dengler and Matthes, 2018; Pouliakas, 2018; Nedelkoska and Quintini, 2018; Mihaylov and Tijdens, 2019).

Lewney et al. (2019) extend the analysis beyond the technologically feasible substitution of workers by machines and argue that, at the microeconomic level, it is hardly the case that all that is technologically feasible will be economically rational for the firm. Moreover, from the macroeconomic perspective, the scale of investment required to replace workers with machines may just be unrealistic in terms of the share of GDP of such investment. Then there are the effects along the supply chain from the increased demand for these new technologies by firms. It must also be considered how productivity gains affect consumer demand. Because the future investment cost of automation is very uncertain, they model a high-cost case, which implies slower uptake and hence fewer direct job losses, and a low-cost case, in which uptake is faster and direct job losses are larger. The scale of job loss expected in 2030, as a proportion of the jobs projected for 2030 in a baseline scenario with no acceleration in automation, is highest in the EU—10% in the high-cost scenario and 16% in the low-cost scenario. The corresponding numbers for the United States are 9% and 14% respectively.

Other researchers have been exploring the labor market effects of new technologies over the past few decades. Using a panel of industries from 17 countries, Graetz and Michaels (2018) show that between 1993 and 2007, robot densification (positive changes in robot density over time) increased labor productivity, total factor productivity, value added and wages. Although this first empirical analysis of the economic impact of industrial robots reveals no statistically significant effect of industrial robots on total hours worked (overall employment), there is some evidence that they reduced the hours of both low-skilled and middle-skilled workers. Carbonero et al. (2018) use a similar industry-country panel setting and find that between 2005 and 2014, robots led to a drop in global employment of 1.3%. The impact is rather small in developed countries, namely -0.54%, but it is much more pronounced in emerging countries, reaching around 14%—the detrimental effect of robots on employment is concentrated in emerging economies.

Contrary to this sectoral approach, Gregory et al. (2016) provide the first empirical estimate of the economy-wide effect of routine-replacing technological change (RRTC) on labor demand, assessing that RRTC has increased labor demand by up to 11.6 million jobs across Europe between 1999 and 2010, accounting for about half of total employment growth. By performing a decomposition rooted in their theoretical model, they show that sizable substitution effects of RRTC (as workers are replaced by machines in the production of routine tasks) has been overcompensated by product demand and spillover effects.

A similar central idea is behind the approach of Acemoglu and Restrepo (2020). Their model, in which robots and workers compete in the production of different tasks (task-based model), shows that greater penetration of robots into the economy affects employment and wages in two ways—negatively by directly displacing workers from tasks they were previously performing (displacement effect) and positively by increasing the demand for labor in other industries and/or tasks (productivity effect). Their model-based empirical analysis reveals large and robust negative effects of robots on employment and wages across US local labor markets—one more robot per one thousand workers reduces the employment-to-population ratio by about 0.2 percentage points and wages by 0.42%.

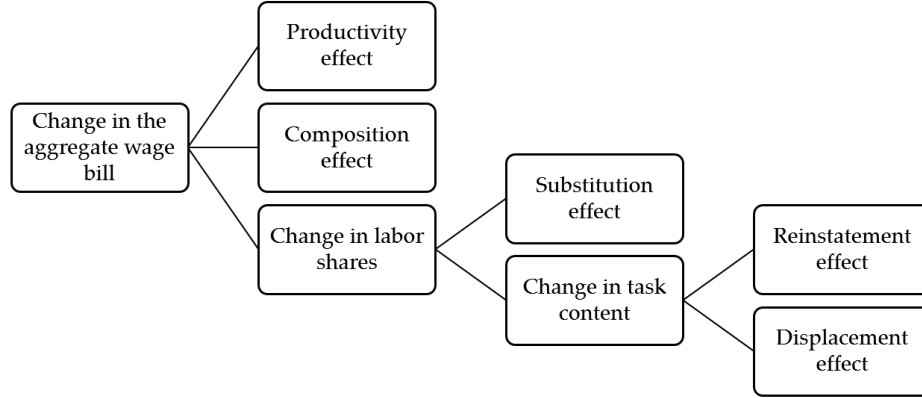
Dauth et al. (2017) and Chiacchio et al. (2018) adopt this local labor market equilibrium approach and use it in the context of the EU labor market. Dauth et al. (2017) focus on Germany and find no evidence that robots have been major job killers so far. Although robots do not cause overall job losses, they do affect the composition of aggregate employment in Germany—every robot destroys roughly two manufacturing jobs. However, over the 1994–2014 period, these job losses were fully offset (or even slightly over-compensated) by additional jobs in the service sector. Assessing the impact of robots on employment and wages in six EU countries (Finland, France, Germany, Italy, Spain and Sweden), Chiacchio et al. (2018) find that one additional robot per one thousand workers reduces the employment rate by 0.16–0.20 percentage points—as in the case of the United States, the displacement effect dominates over the productivity effect. For the impact of industrial robots on wage growth, there are only mixed results.

Building on Acemoglu and Restrepo (2020), Acemoglu and Restrepo (2019) present a framework for understanding the effects of automation and other types of technological changes on labor demand and develop a decomposition of observed changes in the total wage bill in the economy. The displacement and productivity effects of automation are counterbalanced by the reinstatement effect, as technologies create new tasks in which labor has a comparative advantage. Their empirical decomposition shows that the deceleration of US labor demand growth over the last 30 years is a result of a combination of slow productivity growth and adverse shifts in the task contents of production—rapid automation is not being counterbalanced by the creation of new tasks.

### **3 Methodology**

#### **3.1 Wage bill decomposition**

Following Acemoglu and Restrepo (2019), our aim is to decompose changes in the economy-wide wage bill into the contributions of particular determinants: productivity, composition and substitution effects, and changes in the task content of production (Figure 2).



**Fig. 2.** Top 20 countries with the highest robot density in 2018  
 Source: Authors' elaboration based on Acemoglu and Restrepo (2019).

For an economy with multiple industries, aggregate wage bill captures the total amount that employers pay for labor across industries:

$$\text{Wage bill} = \text{Value added} \times \sum_{i \in I} \text{Share of value added in industry}_i \times \text{Labor share in industry}_i,$$

where time in years is indexed with the subscript  $t$  and industries with the subscript  $i$ . Because the total wage bill is the sum of wage bills across industries, the following applies:

$$\ln(W_t L_t) = \ln \left( Y_t \sum_i \chi_{i,t} s_{i,t}^L \right),$$

where  $(W_t L_t)$  is the total wage bill in year  $t$ ,  $Y_t$  is the total value added in year  $t$ ,  $\chi_{i,t}$  is the share of industry  $i$  on the total value added in year  $t$ , and  $s_{i,t}^L$  is the corresponding labor share. The logarithmic form is used to decompose changes in the total wage bill over time.

If the base year is indexed with the subscript  $t_0$ , the percent change in the total wage bill normalized by population,  $N_t$ , between  $t_0$  and  $t$  can be expressed as:

$$\begin{aligned}
\ln\left(\frac{W_t L_t}{N_t}\right) - \ln\left(\frac{W_{t_0} L_{t_0}}{N_{t_0}}\right) &= \ln\left(\frac{Y_t}{N_t}\right) - \ln\left(\frac{Y_{t_0}}{N_{t_0}}\right) \left[ \text{Productivity effect}_{t_0,t} \right] \\
&+ \ln\left(\sum_i x_{i,t} s_{i,t}^L\right) - \ln\left(\sum_i x_{i,t_0} s_{i,t}^L\right) \left[ \text{Composition effect}_{t_0,t} \right] \\
&+ \ln\left(\sum_i x_{i,t_0} s_{i,t}^L\right) - \ln\left(\sum_i x_{i,t_0} s_{i,t_0}^L\right) \left[ \text{Change in labor shares}_{t_0,t} \right],
\end{aligned}$$

where the first term on the right-hand side represents changes in the total value added per capita, which directly corresponds to the productivity effect. The second term on the right-hand side captures the impact of shifts in industry shares (changes in  $x_{i,t}$  over time) on labor demand holding the labor share within each industry constant. This corresponds to the composition effect. The last term on the right-hand side captures the role of changes in labor shares within industries (changes in  $s_{i,t}^L$  over time) on labor demand holding industry shares constant at their initial value. The change in labor shares corresponds to the combined effect of substitution and changes in task content. For a better understanding of the relations between these terms, we refer to Figure 2 above. It shows their schematic representation.

Acemoglu and Restrepo (2019) show that the substitution effect in industry  $i$  between  $t_0$  and  $t$  can be computed as:

$$\text{Substitution effect}_{i,t_0,t} = (1 - \sigma) (1 - s_{i,t_0}^L) \left( \ln \frac{W_{i,t}}{W_{i,t_0}} - \ln \frac{R_{i,t}}{R_{i,t_0}} - g_{i,t_0,t}^A \right)$$

and the change in task content in industry  $i$  between  $t_0$  and  $t$  as:

$$\text{Change in task content}_{i,t_0,t} = \ln s_{i,t}^L - \ln s_{i,t_0}^L - \text{Substitution effect}_{i,t_0,t},$$

where  $w$  denotes the price of labor (wage),  $R$  denotes the price of capital (rental rate),  $\sigma$  denotes the elasticity of substitution between capital and labor, and  $g^A$  stands for the growth rate of factor-augmenting technologies.

The economy-wide contribution of the substitution effect and the economy-wide change in the task content of production are computed by aggregating across industry-level contributions of the substitution effect or changes in the task content of production. The substitution effect captures the substitution between labor- and capital-intensive tasks within an industry in response to a change in task prices. These can be caused by factor-augmenting technologies making labor or capital more productive at tasks they currently perform. Changes in the task content of production are estimated from residual changes in industry-level labor shares (beyond what can be explained by substitution effects).



Changes in the task content of production can be further decomposed into displacement and reinstatement effects. To do so, following Acemoglu and Restrepo (2019), it is assumed that in five-year windows, an industry engages in either automation or the creation of new tasks but not in both activities. This assumption implies that if the average change in the task content of production in industry  $i$  over the five-year period is negative, it is considered that the industry experiences a displacement effect. If it is positive, a reinstatement effect is assumed to take place in the industry. The total contribution of displacement and reinstatement effects can be computed by aggregating these expressions over industries and over time. Displacement effects are caused by automation that replaces labor, while reinstatement effects are driven by the creation of new tasks in which labor has a comparative advantage.

### 3.2 Data

The paper works with industry level data<sup>2</sup> for 10 European countries and the US economy for the period 2000–2017. Spain is excluded from this analysis due to missing data for eight industries (C20, C21, C26, C27, D, E, R, S), while Sweden and the United Kingdom are excluded due to missing data for 2017. For the remaining European countries, the necessary data are either not available at all, or they are available only from 2008.

The analysis uses data from the EU KLEMS database (2019 release). This database contains data on labor compensation, capital compensation, labor services, capital services and gross value added. For each industry and year, factor prices are calculated as:

$$W_{i,t} = \frac{\text{Labor compensation}_{i,t}}{\text{Labor services}_{i,t}}$$

$$R_{i,t} = \frac{\text{Capital compensation}_{i,t}}{\text{Capital services}_{i,t}}.$$

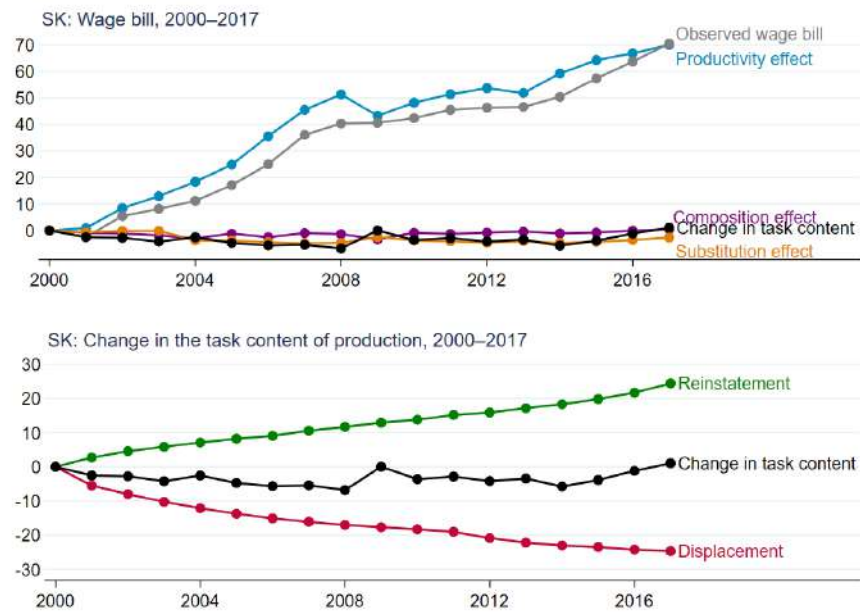
Besides industry-level changes in effective factor prices, the substitution effect depends on the elasticity of substitution  $\sigma$ . Similarly to Acemoglu and Restrepo (2019), in order to estimate the substitution effect in an industry, the estimate of Oberfield and Raval (2014),  $\sigma = 0.8$ , was chosen as the baseline estimate of the elasticity of substitution between capital and labor. To convert observed factor prices into effective ones, it is supposed that  $A_t^L / A_t^K$  grows at a common rate equal to average labor productivity. Therefore, the average labor productivity growth for each country is calculated.

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<sup>2</sup> The analysis is based on data for 28 industries that are part of a market economy (A, B, C10-C12, C13-C15, C16-C18, C19, C20, C21, C22-C23, C24-C25, C26, C27, C28, C29-C30, C31-C33, D, E, F, G, H, I, J58-J60, J61, J62-J63, K, M-N, R, S).

## 4 Empirical results

As Figure 3 and Table 1 show, in Slovakia over the 2000–2017 period, the displacement effect of automation was completely counterbalanced by technologies that create new tasks in which labor has a comparative advantage. Although the net effect was almost zero, there was considerable displacement and reinstatement. While the displacement effect cumulatively reduced labor demand by 24.7% during this period, the reinstatement effect increased labor demand by 24.4% during the same period. Compared to other countries, these are by far the highest values. The corresponding values for the Czech Republic—a country with a comparable sectoral structure of the economy and similar economic performance—are 11.5% for the displacement effect and 14.8% for the reinstatement effect. Figure 4 shows that when compared to most other countries, the differences are even greater. We also observe significant heterogeneity in the cumulative change in the task content of production across countries. In the Czech Republic, France, and Italy (countries above the 45-degree line in Figure 4), the creation of new tasks predominated over automation. The opposite is true for Austria, Belgium, Denmark, Finland, Germany, the Netherlands, and the United States (countries below the 45-degree line in Figure 4). Figure 3 also indicates a strong dominance of the creation of new tasks over automation in Slovakia during the last three years (2015–2017). Therefore, it will be interesting to see whether this trend changes or continues in the coming years. Figure 3 and Table 1 also reveal that in Slovakia, the growth of labor demand was the strongest among all countries, driven almost entirely by strong productivity growth.



**Fig. 3.** Sources of changes in labor demand in Slovakia

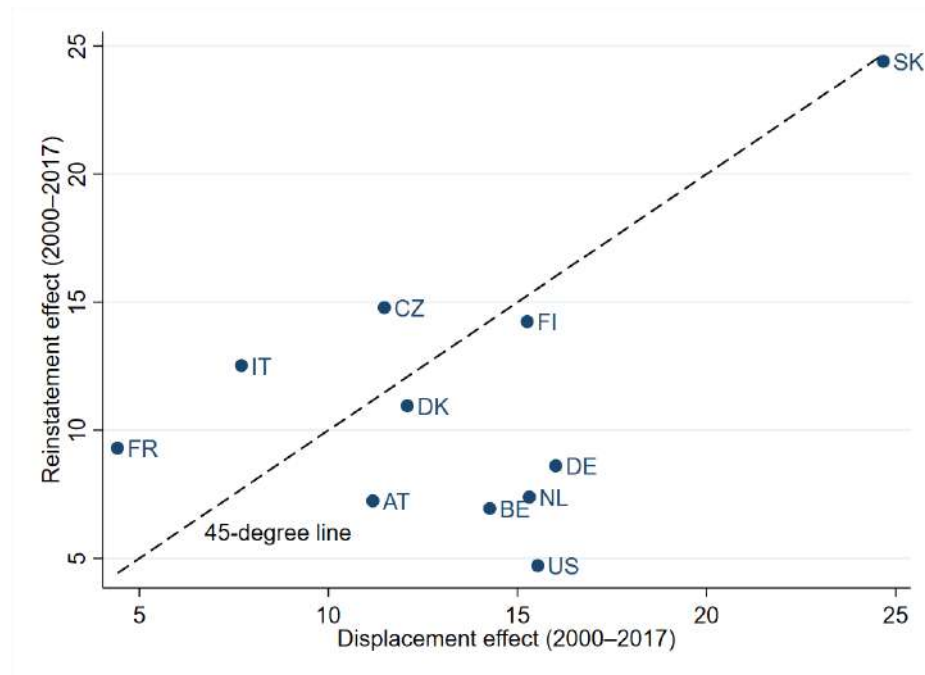
Source: Authors' elaboration based on data from the EU KLEMS and World Bank databases.

**Table 1.** Cumulative change in labor demand and its sources in 10 European countries and the United States, 2000–2017, in %

Country	Observed wage bill	Productivity effect	Composition effect	Substitution effect	Change in task content	Displacement effect	Reinstatement effect
Austria	16.4	16.3	1.7	1.1	-3.2	-11.2	7.2
Belgium	9.9	16.5	0.9	-1.7	-6.5	-14.3	6.9
Czech Republic	46.6	43.0	-1.5	0.8	2.6	-11.5	14.8
Denmark	6.9	7.2	0.9	0.2	-2.2	-12.1	11.0
Finland	20.0	16.0	5.5	-0.2	-1.8	-15.3	14.2
France	19.8	11.5	1.0	2.0	4.9	-4.4	9.3
Germany	12.9	20.0	-0.4	-0.9	-7.1	-16.0	8.6
Italy	4.4	-4.1	0.3	3.4	4.0	-7.7	12.5

Netherlands	8.3	14.5	1.6	-1.1	-7.1	-15.3	7.4
Slovakia	70.6	70.0	0.5	-2.6	1.0	-24.7	24.4
United States	5.2	14.2	-0.3	-0.6	-8.5	-15.5	4.7

Source: Authors' elaboration based on data from the EU KLEMS and World Bank databases.



**Fig. 4.** Displacement and reinstatement effects in 10 European countries and the United States  
Source: Authors' elaboration based on data from the EU KLEMS and World Bank databases.

A significant heterogeneity in the cumulative change in the task content of production can also be observed at the industry level (Table 2). While in some industries automation strongly predominated over the creation of new tasks, in others a strong dominance of the creation of new tasks can be observed. The first group includes, for example, Agriculture, forestry and fishing (A), Mining and quarrying (B), Manufacture of computer, electronic and optical products (C26), Electricity, gas, steam and air conditioning supply (D) and Arts, entertainment and recreation (R). The second group includes, for example, Manufacture of coke and refined petroleum products (C19), Manufacture of basic pharmaceutical products and pharmaceutical preparations (C21), Manufacture of transport equipment (C29\_C30), Telecommunications (J61) and Construction (F).

**Table 2.** Industry-level cumulative change in the task content of production and displacement and reinstatement effects in Slovakia, 2000–2017, in %

Industry (NACE Rev. 2 code)	Change in task content	Displacement effect	Reinstatement effect
A	-33.6	-54.0	12.0
B	-41.1	-49.7	4.6
C10-C12	11.6	-9.5	28.5
C13-C15	-0.8	-17.5	20.3
C16-C18	-1.3	-13.2	11.3
C19	41.1	-70.0	110.7
C20	1.3	-16.9	12.6
C21	49.4	-27.5	81.3
C22_C23	-9.9	-25.7	12.1
C24_C25	7.6	-20.0	27.2
C26	-18.1	-35.8	22.3
C27	-2.5	-13.1	11.7
C28	-6.7	-22.9	11.1
C29_C30	28.1	-7.6	38.1
C31-C33	1.3	-16.6	15.2
D	-32.0	-74.2	35.2
E	-17.1	-32.8	11.2
F	37.6	-13.1	52.8
G	9.8	-11.4	23.7
H	-7.9	-28.4	19.3
I	18.2	-6.6	28.8
J58-J60	-7.1	-31.1	18.9
J61	19.5	-38.5	50.1
J62_J63	-9.6	-28.5	19.8
K	-11.0	-79.2	43.6
M_N	-4.6	-17.4	11.7
R	-74.0	-95.6	13.3
S	5.3	-12.9	16.3

Source: Authors' elaboration based on data from the EU KLEMS and World Bank databases.

## 5 Conclusions

Automation and other new technologies raise questions about their potential labor market impacts and the future of employment. To successfully overcome upcoming challenges and to avoid wrong decisions, an understanding of past trends is necessary.

To understand the evolution of labor demand in Slovakia in the context of automation and other emerging technologies, and to make an international comparison, the decomposition developed by Acemoglu and Restrepo (2019) was applied to European data. The paper demonstrated that in Slovakia over the 2000–2017 period, the displacement effect of automation was completely counterbalanced by technologies that create new tasks in which labor has a comparative advantage. Although the net effect was almost zero, there was considerable displacement and reinstatement. While the displacement effect cumulatively reduced labor demand by 24.7% during this period, the reinstatement effect increased labor demand by 24.4% during the same period. Compared to other countries, these are by far the highest values.

The industry-level analysis in this paper revealed a significant heterogeneity in the cumulative change in the task content of production at the industry level—while in some industries automation strongly predominated over the creation of new tasks, in others a strong dominance of the creation of new tasks was observed.

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## Human capital for business competitiveness

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**Abstract.** The aim of the article is to define human capital and characterize its fundamentals and meaning. It is pointing out how big the impact of human capital is on the prosperity and competitiveness of a business.

A proposal for a user-customizable and comprehensive solution has been developed to support human resource management, focusing on the development and sustainability of human capital in enterprises. The methodology was developed and described in each solution. The conclusion is devoted to the evaluation of the fulfillment of the objectives of the article.

The result of the article is the creation of a methodology and models using ICT for human resources management, focusing on the satisfaction and loyalty of human resources, the development and stability of human capital in enterprises.

**Keywords:** human resources, human capital, information and communications technologies.

**JEL classification:** J24, O15, L86

### 1 Introduction

We live in a time of strong competitive environment in which it is essential to have the best possible position in the market. Quality and loyal employees mainly contribute to achieving this state. People are the basic pillar of every business. They ensure its prosperity, uniqueness, modernity, efficiency, performance or stability. Every employee in the company is unique. People differ in their intellectual abilities, personality traits, education, practice, theoretical and practical skills. For these reasons, each individual can be a benefit or, conversely, a burden in the company. The abilities that an individual can pass on to a company can be described in a figurative sense as human capital, which directly affects the company's results. Businesses often invest the highest costs in people, which are in the form of wages, bonuses, various benefits, education, buildings, their equipment, information and communication technologies (ICT), rolling stock and much more. That is why it is necessary to work systematically on employee loyalty in order to use these costs efficiently and effectively.



## 2 Summary of previous knowledge

Before we focus on the definitions of human capital that have already been described in several publications, let us consider the very phrase human capital. Capital is defined in economics, sociology, business economics or management. It is often associated directly with finance or any revenue-generating object. In the corporate economy, capital is intended directly as a financial source focused on investments. Probably for this reason, human capital is often replaced by the phrase human resources. In the past, human resources and their departments, such as personnel departments, were dedicated to human resources. Today, these sections are referred to as human resource management, which represents a broader scope than just the human resources of employees. In the next part of the work we will point out the relationship between human resources and human capital.

People are often referred to as the highest value business. This is due to the very position of man in the process of establishing, managing or operating a business. At the birth of every business, there must be one or more people who create the original idea, strategy, direction. Subsequently, human resources provide legal processes associated with the establishment of the company or its operation, in the active process human resources manage, plan, control, or work on the implementation of business plans. The quality of human capital determines success in these categories. Natural development creates a hierarchical organizational structure in every company, in which each employee occupies the relevant job position with the corresponding duties and competencies. That is why human resources are often referred to as the basic pillar of the company. No machine or computer can replace many activities and processes performed by human resources. The most significant is human creativity (it is part of human capital), which ensures the competitiveness of the company with its originality or uniqueness. Human capital subsequently influences the further development of the company, its expansion, direction or increasing the portfolio of production and profit. In this, as in many other areas of the human resources can not replace machinery, and information technology.

### 2.1 Human capital

As human capital is non-transferable, it is carried by human resources. Joniaková et al. (2016) characterizes human resources as "employees of the company with their knowledge, skills, abilities and personal characteristics". "The term human resources most often means the production factor in the company, but it can also be a concept that is tied to human resources and therefore the definition depends on the area in question. ( podnikam.sk ) In general, in business, human resources and personnel management (personnel management) are interconnected into processes whose goal is the management and organization of work through people. These processes therefore include the recruitment, management, communication and evaluation of staff. "

Albats , Bogers and Podmetina (2020 ) claims that the concept of human capital is based on economics and limits the nature of human labor as a resource in interinstitutional transactions, which represents individual characteristics such as skills and abilities, knowledge, education, experience and personal characteristics.

When we focus on the concept of human capital, its nature and meaning, we mean corporate assets through which the company can meet its defined goals. These are various knowledge, skills and habits acquired through the previous mental activity of a particular individual. Zax (2020) claims that raising human capital, which takes place before the worker and his employer discover the worker's abilities, reduces the inefficiency of promotion. Kidwell et al. (2019 ) claim that corporate human capital is configured with knowledge and specific skills, communication and relationship skills, as well as motivation.

Thanks to human capital, a company can exist and grow, as without quality employees it is not possible to perform quality activities. There are several reasons to invest in people. We are currently in a situation with a low unemployment rate in Slovakia and companies are forced to look for employees abroad as well . However, there are also companies that can deal with the existing situation and draw employees from marginalized groups. As an example we can mention the company Whirlpool spol. s ro., which started employing Roma fellow citizens, and this cooperation brought benefits to both parties involved. We often have a shortage of qualified job seekers. Therefore, when we hire unqualified candidates for the company, we need to invest in them so that they are able to perform the assigned tasks and thus have the motivation and reason to stay in our company.

Human capital has been defined by many authors. In the following section, we will describe some definitions. Lisý et al. (2011) characterizes human capital as a sum of innate and acquired knowledge, abilities, skills and qualifications that people have at their disposal. In their work, Ren and Song (2020) describe human capital as a set of knowledge, skills and abilities used by individuals.

In his work, Dobeš (2001) states the following: “Nobel laureate Gary S. Becker is the best-known author in the field of human capital. In his works, he does not explicitly define human capital, but argues in favor of the importance of using human capital. ” Hudec et al. (2009 ) say, that overall revenue growth in a country or region can not be justified only increase in physical capital. Longer-term growth and prosperity can be ensured through the use of investment in the labor force, and therefore investment in human capital is extremely important in times of economic recession.

Youndt and Snell (2004) argue that human capital simply refers to the knowledge of individual employees and the codified experience stored in databases, routines, patents, manuals, structures, and the like. It is in the interest of every organization to monitor human capital and, if possible, to invest in human capital. In the interest of any

organization is monitoring human capital and at the same time, if possible, investing in human capital.

The OECD defines human capital as: "the sum of knowledge, skills, competences and attributes that are contained in individuals that facilitate the creation of personal, social and economic well-being."

"Because investment in human capital has a long payback cycle of 20 to 30 years, investment in human capital that was not made in Eastern Europe at the end of the 20th century will be lacking in the next two to three decades." (Hospodárske noviny, 2007)

We also know the division of human capital into general and specific human capital. The OECD defines them as follows. General human capital is defined by general knowledge and skills, regardless of role or society, usually accumulated during work experience and training. General human capital can be relocated to any industry. Specific human capital is usually obtained through education, training, work experience specific to the company. It is difficult to transfer specific capital to other sectors.

Human capital has several components and properties. In the following section, we will briefly describe them.

**1. Human capital is to some extent complementary to technology**

Every person can use his human capital only if there are means by which he can use it.

**2. Human capital is not transferable**

Human capital cannot be transferred and is physically bound to its bearer, that is, to a particular person. The mobility of human capital is limited by the physical mobility of the individual.

**3. Human capital is difficult to store**

It is not possible to separate human capital from its bearer, ie man. The period of use of human capital is thus limited by the life of the individual. From the point of view of the economy, this means the need for constant reproduction of human capital due to its direct dependence.

**4. Human capital is not universally interchangeable**

This feature means that human capital cannot be confused with other goods.

**5. The return on investment in human capital is long-term**

This feature of human capital results from its direct connection to a particular person. The process of procuring human capital for an individual is time consuming. The cycle lasts from a comparable time, from the time of investing in human capital to the possible observable results.

**6. Human capital is difficult to measure.**

This property results in part from the long cycle of creation and application of human capital. The main reason is mainly the connection of human capital to a specific person. Despite existing methodologies, it is difficult to accurately measure people's mental abilities.

### **3 Research design**

The first step in drafting the article will focus on analyzing human capital. Our goal will be to obtain enough relevant information from several sources, which we will complete in the first part.

In the theoretical part we get data from relevant sources, books, professional journals or electronic documents. In our article, we will give priority to those areas of human resource management that have a decisive impact on the development and sustainability of human capital.

The second area will be the measurement of employee satisfaction, in which we will create a proposal for general data for questionnaire surveys of the measurement of employee satisfaction and present several forms of their processing. We will use statistical methods of analysis in developing the theoretical part.

We will focus on employee training. In abbreviated form, we describe the audit of education, which is the optimal solution not only for educational activities, but also for their planning and control.

### **4 Results and discussion**

#### **4.1 Educating human resources**

In the conditions of companies, the development of human capital is most significantly influenced by the education of human resources. Education must be systematic and, if it is to be motivating, it must not be redundant.

Every company, regardless of its size and focus, must invest in the training of its employees. Many training courses are compulsory and required by law, others are needed to increase qualifications, expertise or gain market uniqueness. In order for training activities to be effective, they need to begin with an analysis of the needs of the organization, in which owners, top managers and competent employees justify and rather the areas of training needed to ensure compliance with the company's strategy. The next step is the analysis of the current state of human capital, ie a review of current knowledge of employees. Then it is possible to proceed to the planning of educational activities and all processes related to education (selection of an educational organization, planning of premises, release of employees for educational activities, material and technical equipment for education, etc.). Only then is it possible to proceed to the actual implementation of educational activities. The education audit methodology, which uses ICT for planning and optimization, is actively involved in all these processes. The audit of education will thus increase the efficiency of the education process, save and optimize the costs of education, as well as control the effectiveness

of the costs of education. It will also ensure the automated creation of an education plan. We carry out the education audit in five stages.

1. collection of input information
2. planning of educational activities
3. implementation of education
4. evaluation of the education audit
5. reaudit - repeated audit of education

As we usually carry out education every year, we can use this methodology to save a large amount of money by optimizing groups in training facilities, optimizing lecturers, and optimizing schedules. We also save money by not repeating training for the same employees. To better explain the connection between education and human capital, we will give another view. We not only ensure the development of educational skills of human resources, but we also motivate them to access effective training (as each employee completes a specific area of training only once, not repeatedly). We also increase the satisfaction of human resources, because they do not waste their time sitting inefficiently on the same recurrent training, but they can devote it to meaningful activities.

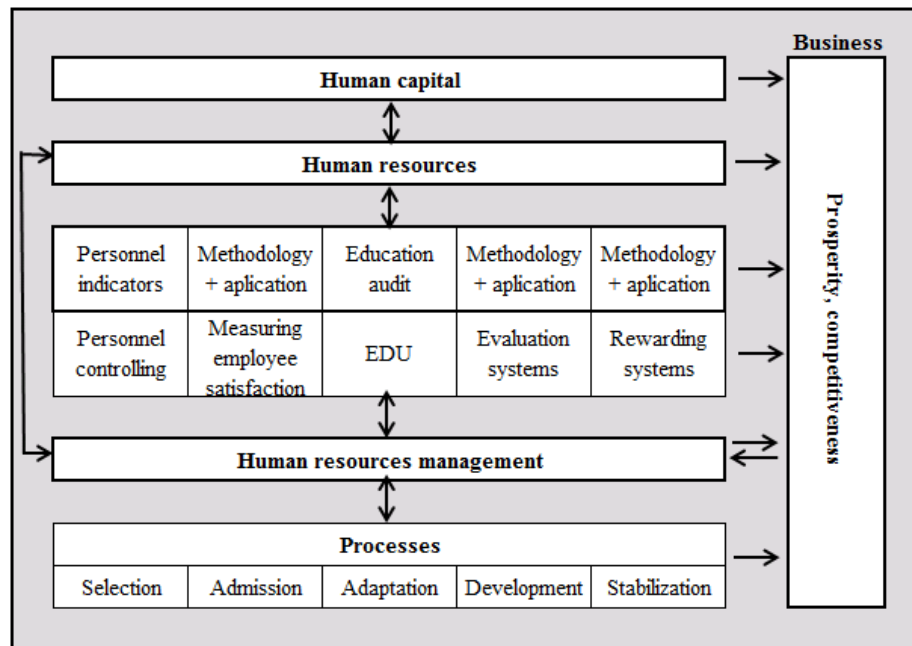
In the article, we also focused on those areas of human resource management that were closely related to this issue. After theoretical analyzes and consultations, we created a universal solution model that is variably applicable to various types and sizes of companies. In the following table, we present the procedures of our solutions in a clear diagram. The basis of a successful company is the functional management of human resources. Already in the introduction, it includes selection, admission and adaptation processes in which we create a quality base of human resources of the company. As human capital is crucial for the prosperity and competitiveness of a company, we focus on human resources management in addition to these processes, but also on the development and stabilization process. Development processes with a focus on human capital development are most prominent in the field of education. Therefore, we dedicate part of the article to effective employee training. Stabilization processes determine the loyalty of employees and their possible fluctuations. Satisfied employees are usually characterized by high loyalty to the company.

Drábek et al. (2016) in their research say, that in today's dynamic times of intensifying globalisation, when many countries are hit by the financial crisis, a company should monitor new trends in their business environment. Managers make daily permanent decisions to develop an effective strategy that will help them to succeed in a highly competitive environment. It is more and more true that in order to succeed, companies should provide and keep quality human resources. It is generally understood that times when tangible assets were the most important assets of a business are long gone. Therefore, many businesses now focus on the knowledge and skills of their employees and the company as a whole, and these often become a source of their competitive advantage. Companies now invest in human resources and significant financial resources and seek appropriate opportunities for streamlining the development of their employees' potential. Human capital plays a crucial role in increasing the

productivity and output of an organisation. It is involved in the creation of the market value of the company and also represents the most valuable source of company.

The main benefit is the part devoted to five areas of human resource management, in which we have developed a comprehensive universal system in a modular concept. Therefore, we will focus our recommendations for further theoretical research or business practice in these areas.

**Picture 1.** Human resources management options



*Source: own processing*

## 4.2 Benefits for theory and business practice

Investments in human capital are not negligible; on the contrary, they are often among the highest in companies. It is therefore necessary to look for the right level and effectiveness of investments in human capital so that it is sufficient to ensure employee satisfaction. Therefore, we recommend strict adherence to planning and controlling in human resources management. Only then can we monitor all financial flows and all processes that have been focused on the development, stability and satisfaction of human resources. We recommend paying great attention to the preparation and implementation of selection, recruitment and adaptation processes, as every wrong decision causes companies irreparable losses. Furthermore, we recommend systematically addressing all development processes and using the education audit methodology for education. With it, companies will ensure the cost-effectiveness of educational activities, as well as sufficient satisfaction of

human resources and their subsequent loyalty. It is necessary to focus on achieving a peaceful working atmosphere using motivational elements in human resource management.

Doucek and Nedomová (2011) states Wow that ICT and employees who use them in enterprises, have a higher potential for innovation than people their ICT in their work do not use.

In the next section, we summarize the recommendations for our superstructure model over human resource management. We recommend companies that have not yet used personnel controlling , or have used it to a limited extent, to implement our proposed personnel indicators into their controlling systems. This will give companies an immediate overview of the situation in human resources and thus be able to respond flexibly to critical situations. Also, many of the presented personnel indicators contribute to the satisfaction of human resources. This does not distract their attention and they can devote themselves fully to their work and its improvement.

Richnák and Porubanová (2018) claim that the turbulent development of international business environment force enterprises to increase efficiency of activities, minimise expenses, increase profit and satisfy the demands of customers to get quality product or service immediately.

We recommend all companies, regardless of size and focus, to measure employee satisfaction at least once a year by an external organization and in an anonymous form. Those undertakings obtain an overview of the internal climate of the relationship between superiors and subordinates, the needs of employees and of all the factors that determine their satisfaction. We recommend using the methodology described by us, within which they can develop action plans to eliminate negative findings after processing the collected information. Furthermore, this solution allows them to compare trends in the development of the internal climate in the company with previous periods and thus assess the effectiveness of corrective actions within the action plans. Calabrò et al . (2020) states in their work that when a family member is on the company's board of directors, the board focuses more on people and therefore plays an important strategic leadership role in valuing human capital, which encourages greater innovation .

Xu and Liu (2020) states, that the intellectual capital (IC) is generally seen as an important driving force in improving the competitiveness of companies and of the value of the knowledge economy. Every company that does not want to be doomed must invest in the training of its employees. The organization must also provide education by law (eg health and safety and fire protection training ), but in order to increase prosperity and ensure the competitiveness of companies, it is necessary to provide training to employees. We must not forget personal development and personal educational activities, because they are the ones that develop human capital. We recommend using the methodology of the audit of education in the planning process and in the subsequent implementation of educational activities we recommend using the proposed model of the audit of education. By saving and efficiently spending on education, the company contributes to increasing its prosperity.

Inspection of the performance of work must be ensured at regular intervals of sufficient quality. It must not be performed formally, but on the contrary, it must

meet all the factors of quality evaluation of work performance and also the personal characteristics of employees. We therefore recommend using the methodology of the evaluation system depending on the level and maturity of individual companies, either in a simplified form of a separate evaluation interview with the relevant documentation, or in a comprehensive evaluation system connected to the entire information system, remuneration systems and planning systems. We recommend that companies implement evaluation forms and procedures designed by us into corporate governance standards and guidelines .

Remuneration of employees is a regular activity that must be provided by every company. The statement that a higher salary is directly proportional to employee satisfaction does not apply. On the other hand, an unfair valuation can lead to demotivation and the subsequent departure of human resources from the company. Therefore, we designed a remuneration system solution connected directly with the evaluation system so that we could positively motivate every employee. Thanks to the evaluation system, we can objectively evaluate the real contribution of each employee in a given period in the context of the fulfillment or non-fulfillment of the entire plan of the company with regard to the performance of its employees. An employee who is aware of the non-fulfillment of pre-agreed tasks will not have a negative perception of the reduction of the financial remuneration if this situation is explained and justified in detail during the evaluation process. We recommend re-evaluating remuneration systems in each company in comparison with our proposed model. We recommend using the links between planning processes, controlling, evaluation and subsequent remuneration of human resources. Only with a comprehensive solution to the above-mentioned issue of human resources management do we have a guaranteed premise of building advanced human capital, which we urgently need to ensure the prosperity and competitiveness of companies.

## **5 Conclusion**

At the beginning of the article, we focused on the theoretical part devoted to human capital. We have defined human resources and human capital and determined the relationships between them. We focused on the characterization of the nature of human capital, we analyzed its components, properties, monitoring indicators and also trends in its management.

In separate parts, we focused on controlling human capital, especially personnel controlling, within which we designed personnel indicators. We also dealt with the creation of a methodology and an independent solution for measuring employee satisfaction, which we also described in detail with the sample topics of the questionnaire survey and a description of their evaluation. We also marginally analyzed the area of human resources education, as this is what contributes mainly to the development of human capital.

Methodology and applications using ICT, we have created such original solutions that can be useful for any business at home and in abroad. All the goals we set in



the introduction have been met and the article is characterized by the complexity and adaptability of all the proposed solutions. We also integrated previous research and proposals from the author's diploma thesis into the work, thus pointing out the importance and sustainability of these solutions. We believe that our solutions will be appreciated by managers, HR staff and all companies who care about the satisfaction, development and sustainability of human resources and human capital.

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# Internationalization and global usage of Chinese yuan renminbi

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**Abstract.** China is the second largest economy and the largest exporter in the world. Despite those facts, global usage of renminbi was until recently relatively low. Internationalization of Chinese yuan renminbi started in 2009 and it is still not entirely completed. The main task of this paper is to evaluate various programmes, which were created in order to establish renminbi as a global currency. We also discuss issues related to currency convertibility, especially liberalisation on capital accounts. We examine process of renminbi inclusion to currency basket for calculation of Special Drawing Rights. We also explore historical and current usage of Chinese yuan renminbi on international level and investigate possibility that Chinese yuan renminbi will become global currency and vital alternative to Euro and American dollar.

**Keywords:** China, Chinese Yuan Renminbi, Monetary Policy, Currency Convertibility, Currency Internationalisation, SDR Currency Basket, Global Currency, Central Bank Independence

**JEL classification:** E 58, F 31, F 32, F 33

## 1 Introduction

After 40 years of economic reforms, China has become second largest economy and the largest exporter in the world [1], with strong manufacturing sector.

The Chinese financial sector is also well-developed. Stock exchanges in Hong Kong, Shanghai and Shenzhen are (by market capitalization) among eight largest in the world. [2] The four globally largest commercial banks are from China. Additionally, China has solid insurance and wealth management sectors.

However, parts of Chinese financial sector are still weak. A Chinese domestic bond market is relatively minor, which is a problem for small and medium sized companies,

because they must rely on the loans from commercial banks. China also needs interest rate marketization and establishment of financial derivatives market.

Despite recent improvements, China is still considered to be a developing country. We can witness huge wealth differences between Chinese cities and rural areas. Compared to Europe or USA, Chinese GDP per capita (current USD) is significantly lower (China – 10,261 USD vs. Germany – 46,258 USD). [3]

Middle income trap is counted as one of the largest threats for Chinese economic. China must make radical changes to preserve its economic growth. Authorities need to adjust domestic economy with swift to service and domestic consumption-oriented economy.

China already started to build qualitative better international political and economic relations. They created ambitious global infrastructure project called Belt and Road Initiative, in which participates more than 70 countries. BRI is consisting of new road, railway, and maritime routes between Asia, Africa, and Europe.[4] China also created new development bank – Asian Infrastructure Investment Bank, which operates mostly in Asia and Africa.

Chinese rising influence over the region (and the world) is tightly linked to a process of renminbi internationalization. Until 2009, renminbi was on international level basically non-existent. Since then, China took measures, which helped to boost global usage of renminbi.

Despite those changes, renminbi is still not fully convertible on capital accounts, which is the largest obstacle for renminbi as global currency. In this article, we examine a process of internationalisation of renminbi. We evaluate individual steps that China took in order to globalise renminbi.

## 2 Literature review

Process of renminbi's internationalization is mostly based on political decisions of Chinese authorities. Besides that, Chinese institutions are not as transparent as their western counterparties. Due to those facts, only a limited amount of quantitative research has been done on discussed topic.

Eswar Prasad [5] considers strong financial markets, flexible exchange rates, open capital account and independent financial oversight vital for renminbi's internationalization.

According to Yu Gao, [6] China should promote usage of renminbi when trading with their neighbours in East Asia. This could weaken position of American dollar in the region and therefore help to internationalize renminbi.

Cohen [7] sees dilemma with renminbi's internationalisation as strictly political. The problem with full convertibility lies in a Chinese economic system, which is mixture of capitalism and socialism. It seems that Chinese government is not comfortable enough with the prospect of lost control over their currency and capital flows between onshore China and the rest of the world.

As Ho [8] points out, renminbi is the first currency included in SDR currency basket which is from non-democratic country. It is uncertain if renminbi would be trustworthy

enough for greater internationalization. It is possible that renminbi will end up as a regional currency.

Next step for renminbi is quite clear – full convertibility on capital accounts. [9] Nowadays, renminbi is fully or partially convertible on 35 from 40 capital accounts, which leads to limited flow of capital to onshore China. [10]

Hosegawa [11] challenges the idea that renminbi will become a global currency. China should firstly create strong regional currency in Asia. Because of its limited convertibility, it is improbable that renminbi will become global currency anyway. Strong Asian regional currency could work as counterweight to American dollar. If China wants to internationalise Chinese yuan renminbi, they will have to maintain three basic premises:

- 1) Avoid any political or war conflict (domestic or international)
- 2) Preserve high GDP growth (higher than EA or USA)
- 3) Political or economic crisis in USA could worsen investors trust to American dollar, which could be positive for renminbi.

Pardo, Knoerich and Li [12] studies importance of renminbi centres for internationalization of currency. They focus on London and Frankfurt, which are two major renminbi hubs in Europe. According to their research, Germany supports renminbi internationalization due to its positive effects on their own real economy. United Kingdom needs to promote internationalization of Chinese yuan renminbi in order to remain one of the most important financial centres in the world. It seems that renminbi internationalization could have positive effects for Europe.

### **3 Methodology**

Main aim of this article is to evaluate the process of renminbi internationalization and international usage of Chinese yuan renminbi on various types of markets. We have chronologically classified various types of programmes created by Chinese authorities in order to promote international usage of renminbi.

Due to limited data sources provided by Chinese institutions, we have relied on data provided by international institutions such as Bank for International Settlements, SWIFT or International Monetary Fund. We have created time series data about volumes of SWIFT transactions by compilation of monthly data provided by RMB Tracker.

We have processed data about global usage of renminbi on various types of markets. We have collected data since 2012, because renminbi became relevant on international markets after that year. Before 2012, global usage of renminbi was practically non-existent.

### **4 Process of internationalization of renminbi**

In 2002, China provided possibility for foreign institutional investors to invest on stock exchanges located in onshore China (Shanghai and Shenzhen) by creation of Qualified Foreign Institutional Investor (QFII) programme. Trades were denominated in

investors home currency. Capital accounts of renminbi were not liberalized, but QFII allowed the first inflow of foreign capital to Chinese onshore financial markets.

Dim Sum Bond market provided for foreign investors possibility to buy bonds denominated in renminbi. For the first three years since creation (2007), only China and Hong Kong based companies could issue the renminbi bonds. After 2010, restrictions were lifted, and now even foreign companies could issue them. Dim Sum Bond market accelerated international use of renminbi without necessity of convertibility liberalization on capital accounts.

Bilateral currency swaps are signed and used by China since 2009. China has already signed renminbi swap agreements with more than 60 countries. Those swap lines have been established with various types of countries (from the poorest to the most developed). Swap lines help to promote international usage of renminbi and reduce the risk of exchange rate fluctuations.

In 2011, China launched the Renminbi Qualified Foreign Institutional Investor (RQFII) programme, which provides possibility for Hong Kong based companies to invest on the Chinese onshore securities market. RQFII differs from QFII by the fact that all trades must be denominated in renminbi. Volume limit, which was set for both QFII and RQFII, was lifted in 2019.

Since 2012, China promoted offshore renminbi hubs. Those serve as a conduit for transactions between onshore and offshore companies. Hong Kong is still the most important renminbi hub. However, many other renminbi hubs all over the world have emerged in the last decade (e.g. Germany, UK, USA, or Australia).

Shanghai-Hong Kong Stock Connect programme was formed in 2014. Stock Connect is investment channel, which work as a by-pass for limited capital accounts flows between world and onshore China. Investors on both sides can trade shares on other market by local brokers and clearing houses.

Impossible trilemma (Mundell-Fleming trilemma) says that it is impossible to have fixed exchange changes, independent monetary policy, and free flow of capital. China is not willing to give up independent monetary policy or nearly fixed exchange rates of renminbi. For this reason, they need to control flow of capital. However, strict control of capital flow is contradictory to the process of renminbi's internationalization. China needs a strong and fully liberalized financial segment. Without fully evolved financial sector is nearly impossible to establish renminbi as global currency.

#### **4.1 Chinese yuan renminbi as a part of SDR basket**

Since 2009, China has been lobbying for bigger role of its currency in international monetary system. Main argument was that current international monetary system has strong Euro-Atlantic orientation. China heavily lobbied for implementation of renminbi into SDR currency basket. According to the rules of IMF, every currency implemented into basket for calculation of the value of SDR needs to fulfil two basic rules:

- a) Export criterion. China was in 2010 third largest exporter in the world (after USA and EA). This criterium was fulfilled by China without any doubt.

b) Convertibility criterion. According to IMF, China did not fulfil it, because renminbi was not fully liberalised on capital accounts and at that time, there even did not exist any supplementary programmes. [13]

IMF did not agree to implement renminbi into currency basket in 2010. However, after further convertibility liberalisation and policy changes, IMF decided that renminbi will become part of the basket since October 1, 2016. [13]

In the Table 1, we can see changes in SDR's basket composition. Share of USD stayed on the same level. European currencies were weakened. Behind this decision we can see declining influence of Europe on the global stage. With 10,92% share, Chinese renminbi became third strongest currency in the basket.

**Table 1.** Special Drawing Rights basket composition. Data (IMF, 2020) [13]

Currency	Code	Proportion 2010 (%)	Proportion 2015 (%)
American dollar	USD	41,9	41,73
Euro	EUR	37,4	30,93
Chinese yuan renminbi	RMB	0,0	10,92
Japanese yen	JPY	9,4	8,33
British Pound	GBP	11,3	8,09

#### 4.2 Chinese internationalisation after 2016

Process of internationalisation of renminbi has slowed after 2016. Global usage of renminbi has stagnated. There are several reasons for this development.

Chinese financial market was hit by market crash in 2015. One third of Shanghai stock exchange market capitalization was lost within the one month. [14] Chinese authorities were frightened, mostly because of their limited power over situation on liberalised financial market. Due to those events, further renminbi internationalization was postponed.

In 2018, USA started trade war with China, which resulted in tariffs and trade barriers. Trade war directly slowed Chinese economic growth. International confidence over Chinese renminbi has plummeted due to accusations of currency manipulation.

China also experienced domestic problems. Mass protests in Hong Kong (2019) caused major economic consequences. Hong Kong slipped into recession. [15] International prestige and trust in Chinese government has dropped.

In 2020, world was hit by COVID-19 pandemic. Due to this situation, usage of renminbi slightly dropped. In the times of uncertainty, institutional investors prefer to hold more safer currencies (Euro or American dollar).

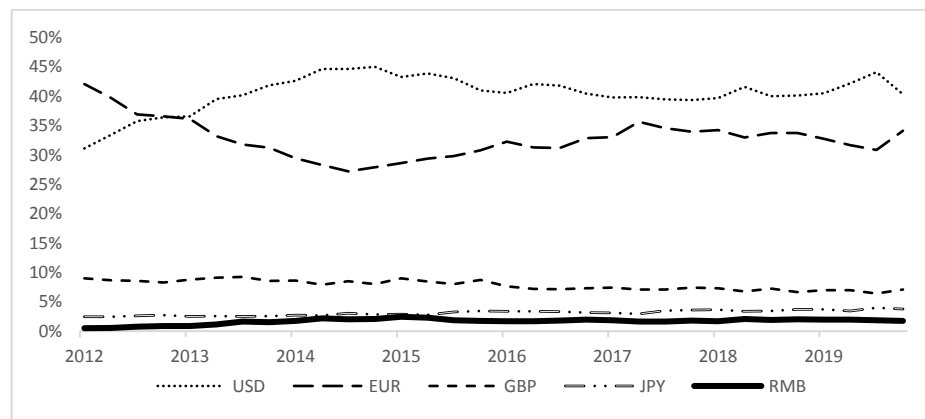
Despite all those facts, renminbi is still ranked as 5<sup>th</sup> most used global payment currency in the world. [16] After turmoil in recent years, it is debatable, if Chinese government is willing to sacrifice renminbi exchange rate stability and controlled inflow and outflow of onshore capital over fully liberalised convertibility on capital accounts.

## 5 Global usage of Chinese yuan renminbi

In this chapter, we will explore usage of Chinese yuan renminbi's on the international level. Due to limited data sources from China, we have used data provided by international organisations such as SWIFT, IMF, or BIS.

### 5.1 Global usage of renminbi according to SWIFT

According data provided by SWIFT, most of the global payments in the world are settled in American dollar and Euro. Their joint share is more than 74%, which makes them two leading global currencies. It is understandable, because USA and Euro Area are two most economically developed regions in the world. Shares of other currencies are significantly smaller. It seems that usage of Euro and American dollar is connected. Lower use of Euro leads to higher use of American dollar and vice versa. Usage of British pound and Japanese yen is relatively stable.

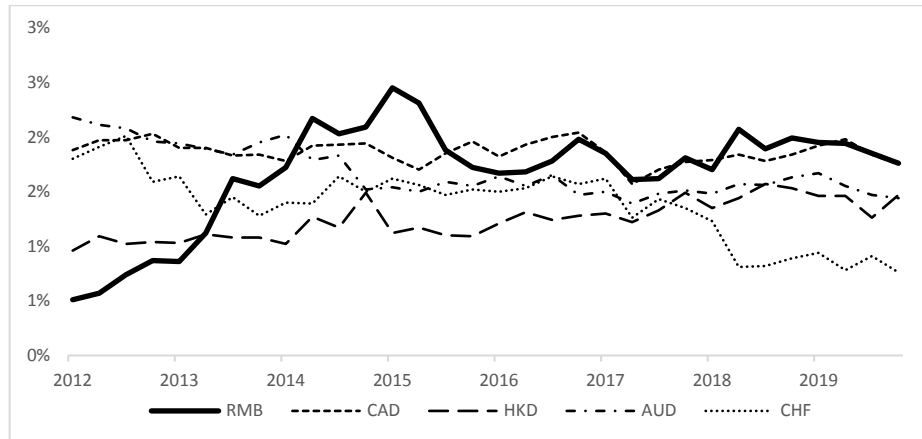


**Fig. 1.** Global payments by currencies. Customer initiated and institutional payments. Messages exchanged on SWIFT. Based on value. Data (SWIFT Renminbi tracker, 2020) [17]

Before 2010, global usage of Chinese yuan renminbi was practically non-existent. Due to effort of Chinese authorities and various programmes, which promoted international usage of renminbi, global presence of Chinese currency in the last 7 years significantly rised. In 2012, share of renminbi was approximately 0,5%. Three years later, its share climbed to 2,45%.

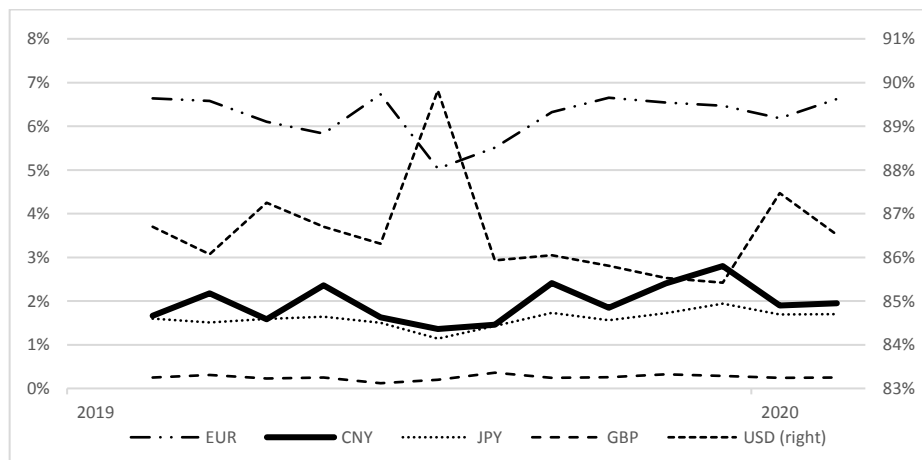
After Chinese market crash in 2015, global usage of renminbi slightly felt. Since then, its international use has stagnated. As a payment currency, renminbi has a similar share as Canadian dollar, Hong Kong dollar or Australian dollar. Difference in share between renminbi and top 4 currencies (EUR, USD, GBP, and JPY) is still significant. We can see that usage of Chinese yuan renminbi is after 2015 relatively stable, which is in the context of Chinese ambitions not sufficient.





**Fig. 2.** Global payments by currencies. (4 most used currencies – USD, EUR, JPY, GBP – are excluded). Customer initiated and institutional payments. Messages exchanged on SWIFT. Based on value. Data (SWIFT Renminbi Tracker, 2020) [17]

When we consider only trade on finance market, share of renminbi is approximately 2%, which makes renminbi the third most used currency, just after Euro and American dollar. Whole segment is absolutely dominated by USD. Its share is 86%.

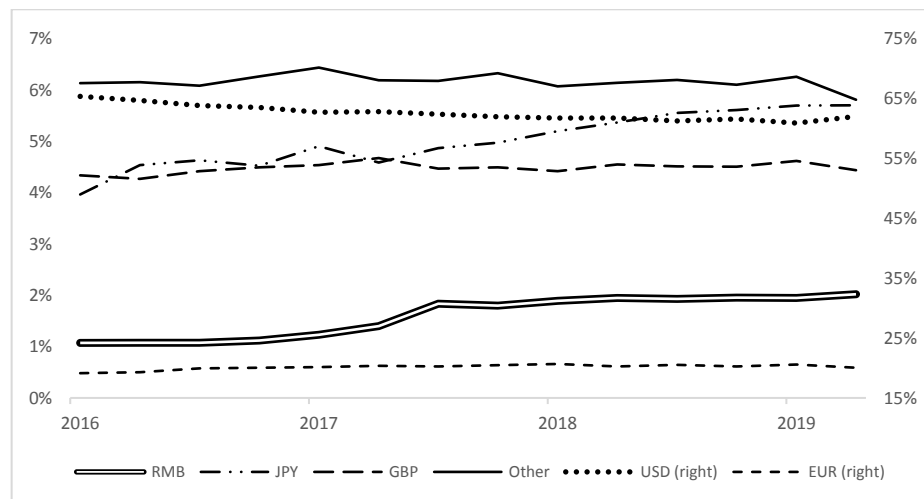


**Fig. 5.** Shares of international currencies in trade finance market. Live and delivered. Messages exchanged on SWIFT. Based on value. Data (SWIFT Renminbi tracker, 2020) [17]

## 5.2 Renminbi as official foreign exchange reserve

Renminbi is 5<sup>th</sup> most used foreign exchange reserve in the world. Its importance is generally rising. Currently, more than 2% of allocated reserves in the world are denominated in renminbi. Nevertheless, more than 81% of foreign exchange reserves

are denominated in American dollar and Euro. Share of Japanese yen is increasing. Currently, more than 5,7% of foreign exchange reserves are held in JPY. Share of British pound has stagnated around 4,5%. Position of renminbi could be considered as generally strong. Established currencies as Australian dollar, Canadian dollar or Swiss franc have lower shares than internationally relatively newly established Chinese renminbi.



**Fig. 3.** World Currency Composition of Official Foreign Exchange Reserves. Only allocated share of allocated reserves. Data (IMF, 2020) [18]

### 5.3 Renminbi and OTC derivatives market

Before 2004, renminbi usage on OTC derivatives market was low. In 2019, renminbi was 8<sup>th</sup> most used currency on OTC market for foreign exchange instruments. Renminbi shares rose from 2% to 4% in the last three years. When we talk about OTC interest rate derivatives, renminbi usage is slightly lower. Renminbi is placed on 9<sup>th</sup> place. Renminbi is gaining importance on OTC derivatives market, but it's too soon to say that Chinese currency is crucial for derivatives market. Even regional currencies as New Zealand dollar or Swedish krone are used more than renminbi.

**Table 2.** Turnover of OTC foreign exchange instruments, by currency. Data (BIS Triennial OTC derivatives statistics) [19]

Currency	2004		2007		2010		2013		2016		2019	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
USD	1702	88	2845	86	3371	85	4662	87	4437	88	5824	88
EUR	724	37	1231	37	1551	39	1790	33	1590	31	2129	32
JPY	403	21	573	17	754	19	1235	23	1096	22	1108	17
GBP	319	16	494	15	512	13	633	12	649	13	844	13
AUD	116	6	220	7	301	8	463	9	349	7	447	7

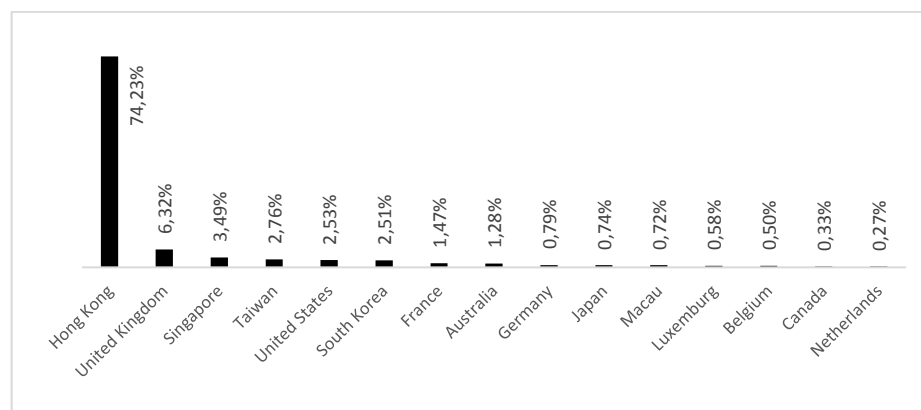
CAD	81	4	143	4	210	5	244	5	260	5	332	5
CHF	117	6	227	7	250	6	276	5	243	5	327	5
RMB	2	0	15	0	34	1	120	2	202	4	285	4
HKD	34	2	90	3	94	2	77	1	88	2	233	4

**Table 2.** Turnover of OTC interest rate derivatives, by currency. Data (BIS Triennial OTC derivatives statistics) [19]

Currency	2004		2007		2010		2013		2016		2019	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
USD	347	34	532	32	654	32	639	28	1357	51	3274	50
EUR	461	45	656	39	834	41	1133	49	641	24	1587	24
GBP	90	9	172	10	213	10	187	8	237	9	538	8
AUD	12	1	19	1	37	2	76	3	108	4	401	6
JPY	46	5	137	8	124	6	69	3	83	3	213	3
CAD	8	1	15	1	48	2	30	1	39	1	90	1
SEK	13	1	33	2	20	1	36	2	19	1	61	1
NZD	2	0	7	0	4	0	5	0	26	1	56	1
RMB	0	0	0	0	2	0	14	1	10	0	33	1
NOK	8	1	8	0	15	1	9	0	15	1	31	0
KRW	0	0	5	0	16	1	12	1	13	0	27	0
CHF	10	1	19	1	20	1	14	1	14	1	26	0

#### 5.4 Offshore renminbi

Despite creation of international renminbi hubs all over the world, Hong Kong is still the most important one. Hong Kong has a share of 74.23%. Second important is United Kingdom (London) with share of 6.32%. Offshore renminbi hubs are concentrated in Asia and Europe. Role of north America is relatively small.



**Fig. 4.** Top 15 offshore RMB economies by weight. Data (SWIFT Renminbi Tracker, 2020) [17]

## 6 Conclusions

Since 2010, China accelerated process of renminbi's internationalization. Global usage of renminbi as payment currency has increased in five years by 500%. Chinese yuan renminbi became one of the most used currency in the world, even though Chinese authorities still did not fully liberalised renminbi on all capital accounts. On political level, China gained success with implementation of renminbi into IMF's currency basket used for calculation of value of SDR. Renminbi is the most used currency of non-democratic country in the world. Renminbi has strong regional presence in the Asia and partially in Africa, due to supporting role of projects such as Belt and Road Initiative or AIIB.

Global usage of renminbi has stagnated since 2015. We have come with few explanations for this development. Firstly, China is still authoritarian communist country with strictly centralised government. Supervisory and regulatory institutions are subordinated to Chinese government and not fully independent. Political decision to fully liberalise usage of Chinese renminbi has still not been made. International investors are afraid of ad hoc decisions made by Chinese government, which can potentially have severe consequences. In conclusion, renminbi's trustworthiness is still relatively low.

We can also observe political tensions in Hong Kong. Protests against proposed Fugitive Offenders amendment bill sparked into one of the biggest political turmoil in modern China. Due to those protests, Hong Kong economy slipped into recession.

Secondly, China was hit with events, which caused several economic damages. In 2015, Chinese stock exchanges experienced market crash, which caused three devaluations of Chinese yuan renminbi. This was the first devaluation of renminbi in a period after starting process of internationalization. Among investors, devaluation significantly amplified distrust in Chinese yuan renminbi.

Trade war between USA and China, which was initialized by President Trump has also significant impact on Chinese economy and consequently on Chinese yuan renminbi. Let us not forget recent COVID-19 pandemic. It is possible that because of uncertainty on international level, investors and institutions switch to more established currencies like EUR or USD.

According to Hasegawa, China needs to keep stability to promote usage of renminbi. Currently, it seems that domestic and international problems keep investors from broader usage of renminbi.

Future broader usage of Chinese yuan renminbi is linked to reforms, which China must fulfil. More transparent and independent regulatory institutions and further convertibility liberalisation are also important.

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## Chosen Challenges of the EU Migration Policy

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**Abstract.** In this paper, we address selected challenges that the European Union's migration policy currently faces. In the first part, we address some of the challenges that have shaped current migration policy, such as the creation of the Schengen area and the subsequent development of European migration policy, as well as the European migration crisis of 2015 and the subsequent creation of the European Migration Agenda. . In the second part, we analyze selected current challenges. The disunity of the Member States is a major obstacle to the deeper development of migration cooperation in the European Union. While the Union wants migration policy based on proportionality and solidarity, some Member States completely reject these principles. Relations with Turkey have been intensifying for several years, with the country using migrants as leverage against the European Union. The COVID-19 pandemic is the most current problem, which also affects migration in the European Union. These are the fundamental challenges that we are analyzing and concluding by looking at why migration will continue to be an important part of the functioning of the European Union.

**Keywords:** migration, European union, COVID-19, Migration crisis

**JEL classification:** F20, F22, F53

### 1 Introduction

*“Migration is a process in which individuals and groups of people leave their homes for various reasons. The current mobility of people is higher than ever before in modern history and continues to increase sharply, becoming one of the determining global issues of 21st century. Almost all of the approximately 200 world states are countries of origin, transit or destination for the migrants.”* [1] This is how migration is described by the International Organization for Migration. Among the countries most affected by migration, many Member States of the European Union are also represented. Since the creation of its predecessors, it has had to deal with how to manage the transfers of individuals between member countries as effectively as possible in order to be able to create a truly efficient single market. With rising living standards, these countries have become the target of migrants from third countries, and so another challenge has arisen for the Union - to create a system that can effectively decide who is admitted to the

Community. And with the advancement of illegal migration, the protection of external borders also had to be addressed so that a common space could continue to function within.

Migration is a topic that constantly brings new challenges for the Union. In this paper, we have decided to address some of them and analyze selected current issues related to EU migration policy.

In the first part of the paper, we look at some of the most important challenges that have shaped European migration policy. Specifically, the creation of the Schengen area and the subsequent further development of EU migration policy. In the subchapter, we also deal with FRONTEX, which plays a key role in protecting the EU's external borders and the Schengen area. It also looks at the 2015 migration crisis, which was the largest migration in Europe since 1992, and the EU's subsequent response, the European Migration Agenda. This document was key to the further development of a common migration policy.

The second part of the paper deals with selected current challenges of migration policy. We have decided to include among them the disunity of the Member States in the field of migration, relations with Turkey and also the COVID-19 pandemic. We address the reasons why Member States reject some common practices, such as the redistribution of migrants on the basis of clearly defined criteria. In the section on Turkey, we examine EU-Turkey migration relations since the outbreak of the migration crisis in 2015. These are currently quite tense, mainly for political reasons, and if Turkey breaches the agreement, it could mean a second wave of migration there are about 3.5 million migrants. Such a second wave would be dangerous, especially because of the COVID-19 pandemic, which we address in the last part as a challenge. Due to the spread of the virus, changes had to take place in both the common migration policy within the EU and at the external borders.

## **2 EU Migration Policy**

Migration was one of the problems that the European Communities had to deal with before the European Union was founded in 1993. Until the 1970s, these countries were more of a source of emigrants, but as their standard of living gradually increased, the trend reversed and they became destinations. In particular, the inhabitants of their former colonies and nearby African countries came to them. Migrants from North and Sub-Saharan Africa in particular migrated to France, to Spain from Morocco, Algeria, but also from Latin America, to Italy from Morocco, Egypt and Somalia, and migrants from India, Pakistan, Ireland, Bangladesh and the Caribbean came to the United Kingdom, while belonging to the Commonwealth. An interesting case was West Germany, which in the past was not a large colonial power, but was the target of many emigrants from communist countries, especially from East Germany, Poland and Romania. In addition, it launched a program to gain cheap labor in the 1960s, and so many Italians migrated to West Germany, who had long been the largest minority, but were later overtaken by the Turks in this ranking [2].



## 2.1 Schengen Agreement and Schengen Convention

In addition to migration from third countries, of course, there was also internal migration, where citizens of individual Member States often traveled for work. Since the signing of the Treaties of Rome in 1957, individuals have enjoyed free movement between the countries of the European Economic Community, but have still undergone checks on passports or national identity cards. Some countries wanted to move free movement even further and abolish these controls, which other Member States, especially the United Kingdom, did not like very much. Such free movement was already in place in the Benelux countries, and in 1985, France and West Germany joined Belgium, the Netherlands and Luxembourg. They signed the agreement at Schengen Castle in Luxembourg, which symbolically stands where the borders of these states and the Benelux meet. The agreement was not signed within the European Communities, as some states opposed the proposal and also because those who were prepared to introduce this regime did not want to wait for others.

The Schengen Agreement began the process of harmonizing visa policies and allowed the people of the signatory countries to move freely between them, even outside border crossings. It also abolished passport controls at border crossings. In 1990, it was supplemented by the Schengen Convention, which proposed the complete abolition of passport controls and a common visa policy, creating a common Schengen area. The Convention entered into force in 1995 and was gradually joined by other European Union countries. Schengen currently has 26 members, of which 22 are EU Member States, along with Norway, Iceland, Switzerland and Liechtenstein. The non-Schengen EU Member States are Ireland, which applies the derogation, Croatia, Romania, Bulgaria and Cyprus. These countries are candidates for accession to Schengen, which has been mandatory for EU Member States since 1999 [3].

Although the Schengen area guarantees free movement, there have already been cases where states have reintroduced border controls. This was mainly for security reasons. An example is the migration crisis, when in 2016 several countries introduced border controls or a COVID-19 pandemic.

## 2.2 Further development of the EU Migration Policy

Shortly after the signing of the Schengen Agreement, another important document was signed, this time within the European Communities. In 1987, the Single European Act was adopted, in which the Member States committed themselves to completing the single market, which included the free movement of persons, by 1992. The Single European Act also laid the foundations for the EU's Common Foreign and Security Policy. Treaty has become one of the fundamental pillars of the European Union.

An important document in the field of migration was also the Dublin Convention, which sets out a common framework for deciding which country decides to grant asylum.

The introduction of free movement in the Member States has raised the elderly from an influx of illegal immigrants, and so the opening of internal borders has been linked to the strengthening of common security. It has therefore become one of the pillars of the EU, and new agencies have begun to emerge to ensure the protection of the EU's

external borders and citizens, mostly through the coordination of national components, as Member States refuse to entrust the defense of their borders entirely to the EU.

Agencies created at this time include, for example, FRONTEX, Europol or CEPOL.

## **FRONTEX**

Frontex, or the full European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union, is an agency set up in 2004 to protect the EU's external borders. The migration crisis of 2015 and 2016 has forced European countries to think better about protecting the external borders of the Schengen area. Therefore, during this period, all key European managing authorities agreed on the need to extend its powers [4]. The original organization was unable to assist Member States in protecting the external borders as it had insufficient staff and equipment. There was also a lack of authority to manage joint coastal protection. The new staff has doubled, the Agency can purchase equipment itself and Member States are obliged to provide this equipment, if registered in their territory, immediately if necessary [5]. The Agency's main role is therefore to protect the external borders of the Schengen area. The European Border and Coast Guard was also set up for this in 2019. It is intended to assist and coordinate the protection of the external borders on land and at sea. It is not a purely military agency, as it largely involves not only the army and navy, but also the police forces of the member states [6].

### **2.3 Migration Crisis in 2015**

In 2015, more than 1.8 million migrants from the Middle East came to Europe, causing the largest migration crisis in Europe in history. Its main causes are mostly the civil war in Syria, which began in 2011, the so-called Arabian spring. Migrants from Syria were gradually joined by migrants from Iraq, Afghanistan and Eritrea, who also tried to escape the deteriorating situation in their home state. The second factor may be the "simplification" of the trip to Europe. While before the outbreak of the crisis, the road through Libya and Italy was used, over time a new, so-called Balkan road. This in turn allowed more migrants to move to the country to which they were headed. Germany's open immigration policy then provided a further impetus to migration to the EU, along with Greece, Macedonia, Serbia and Croatia, which facilitated the transport of migrants through their territories if they did not want to seek asylum in those countries. The whole situation has resulted in an increase in the number of illegal crossings of state borders and a boom in smuggling.

The European Union's response was to create a European migration agenda. Its main objectives were to save lives at sea, to combat smugglers, to relocate migrants, to form partnerships with third countries to prevent migration directly within them, and to help frontline states. The document contains extensive lists of measures and recommendations to be implemented by both the Union and the Member States in order to overcome the crisis effectively, with an emphasis on security but also solidarity with those coming. this document laid the foundations for deeper cooperation between countries in the field of migration and also for more effective protection of common borders [7].

### **3 Contemporary Challenges of the EU Migration Policy**

#### **3.1 Disunity of the member states**

The European Union has long shown how an international organization can work if states can work together effectively. Addressing the issue of migration is one of the issues on which the Member States cannot agree in such a way as to satisfy the whole community. The main points of discussion are the possibilities of states, the degree of solidarity and also the responsibility for migrants. Despite the existence of both the Schengen and Dublin regimes, which regulate the functioning and protection of internal and external borders, as well as the treatment of migrants, states still consider the protection of their territory as a priority in times of crisis, so migration is still tackled more at regional level. Due to the fact that this topic is variously sensitively perceived in individual countries, there is also a great deal of politicization.

In an ideal world, the European Union's migration policy should lead to a fair allocation of migrants based on a combination of the real capacities of the Member States of EU solidarity. An attempt at such a system was the European Commission's proposal to place a precise number of migrants in each country, based on population size, total GDP, the average number of asylum applications over the last four years and the unemployment rate. States were to receive € 6,000 for each migrant admitted to cover relocation costs. However, this fair-looking idea ran into a lack of solidarity [8].

While the western and northern EU countries, which have many years of experience with migrants, agreed with this proposal, opposition came mainly from the V4 countries or Italy, countries where populist parties were more likely to help. One of the strongest opponents of a unified migration policy based on solidarity is the Hungarian Prime Minister Viktor Orbán, who gains political points in his country precisely through anti-European and anti-immigrant rhetoric. Already after the outbreak of the crisis in 2015, Hungary refused to comply with the Dublin regime and to accept migrants from Germany and other countries who had applied for asylum initially in Hungary, considering it to be non-functional [9].

#### **3.2 Relations with Turkey**

Turkey has always been one of the main routes for migrants to Europe and later to the European Union, as it borders Greece. At the same time, since 1999, it has been trying to get into the European Union on its own. This was also the result of his migration policy, which he pursued in cooperation with the EU. And despite the deteriorating political relationship between Turkey and the EU since the election of Erdogan as prime minister and later president, migration cooperation has worked well.

With the gradual Islamization of society under Erdogan, Turkey's chances of joining the EU dropped to freezing, but the migration crisis of 2015 gave the country a strong negotiating position. As most migrants came to the EU via Turkey and a further around 3.5 million remained in Turkey, the country concluded an agreement on migrants with the Union in 2016 [10].

According to the agreement, all migrants who came to Greece from Turkey were to be returned, for each Syrian returned from Greece to Turkey, one Syrian was to be

transferred from Turkey to the EU, Turkey was to take all necessary measures to stop the creation of new routes to the EU, by sea and by land. Turkey's prize for detaining migrants was to be visa liberalization for Turkish citizens in the EU, EUR 6 billion to create conditions for migrants in Turkey and to improve the customs union between Turkey and the EU. Pre-accession negotiations between Turkey and the Union were also expected to be revived [11].

The measures taken have proved effective and by 2018 the daily number of new migrants in the Greek islands had decreased by 97% [12]. By denying migrants access to the EU, Turkey has succeeded in building infrastructure that has been able to intercept people coming to the EU illegally and return them to Turkey, or provide eligible migrants with decent living conditions pending a decision on their application.

However, Turkey is not happy with the way the EU is fulfilling its role, which escalated until the opening of the border with Greece to Syrian migrants in March 2020, which only increased tensions between the two countries. It was Turkey's response to the deaths of its 33 troops in the Syrian city of Idlib, with Erdogan blaming the EU's lack of support. The response was a meeting between French President Macron, German Chancellor Angela Merkel, British Prime Minister Boris Johnson and Erdogan in order not to escalate tensions caused by migrants [13]. However, even after this meeting, the situation has not significantly improved and is not helped by the fact that Turkey is claiming natural gas deposits located in the Mediterranean and in Greek waters and is still using migrants as a weapon against the EU [14].

### **3.3 COVID-19**

If Turkey were to breach its part of the agreement and allow the millions of migrants from the Middle East currently in the country to enter Europe, this could have very negative consequences during the COVID-19 pandemic. At present, these migrants live in relatively poor hygiene conditions, with up to 71% not having access to health care and basic hygiene needs [15]. Given that Turkey is one of the countries most affected by the COVID-19 virus and has already registered almost a quarter of those infected in total [16], it is likely that there are many potential carriers of the virus even among migrants. As most of them are young people or children, they may not even show signs of the disease. In addition, free movement within Schengen is currently restricted due to the coronavirus, as some countries have banned travel to the most affected areas or require quarantine upon arrival. Migrants from Libya who come to the EU via the Mediterranean are also a challenge. As Italy is one of the most affected countries, the country refused to admit more migrants, despite the fact that the disease was confirmed in only 28 of them [17]. Because the countries did not want to allow migrant ships into their ports because of the coronavirus, they had to spend weeks in ships near them [18].

The European Union responded to the outbreak of the pandemic by issuing two documents regulating migration policy. The first was the Guidelines for Border Management Measures to Protect Health and Ensure the Availability of Goods and Essential Services, which concerned in particular measures related to internal migration or the entry into Schengen, but did not address asylum seekers. This document introduced stricter border controls when entering Schengen and also recommended

medical examinations for people suspected of having the disease. It has given Member States the option of refusing to admit such people to the country, but this must not be on the basis of discriminatory conditions. Within the internal borders, it allowed states to introduce temporary border controls [19]

The second important document addressing COVID-19 was the Commission Communication entitled COVID-19: Guidance on the implementation of relevant EU provisions in the area of asylum and return procedures and resettlement. In this document, it issued recommendations and guidelines for the asylum procedure as well as for the procedure under the Dublin Convention. In practice, this involved the greatest possible protection for both parties to the proceedings and the introduction of measures such as the use of protective equipment, electronic communication (when submitting applications, interviews, announcements of results, etc.). It also introduced the health protocols that had to be followed in the asylum process, which included testing incoming people, creating quarantine conditions for potentially infected people, and providing health care. The document also addresses other processes in migration policy, such as resettlement or return [20].

It will only be possible to assess later how effective these measures are and how they are complied with, as not all countries have the means to implement them effectively.

## 4 Conclusion

Migration in the European Union has come a long way and has overcome several challenges. The issue of migration has been very important since the inception of the first European Communities. It was first solved by the Benelux countries by introducing the free movement of persons on their territory. Later, they wanted to inspire the countries of the European Communities with the *animi*, but as there was no general agreement, the Schengen Agreement was signed in the 1980s, which created a common space from West Germany, France and the Benelux countries. Gradually, other countries were added, and the success of this format is highlighted by the fact that joining Schengen has become a condition for EU membership.

Another important challenge in shaping EU migration policy was the 2015 migration crisis, which brought an unprecedented number of migrants to Europe, which the Member States were not prepared for. The EU therefore had to respond and create a new framework for the functioning of migration policy, called the Agenda for Migration Policy, which was to make cooperation between the Member States and the Union in this area more effective.

However, the migration crisis has also revealed some new challenges that are still relevant today. One of them is the reluctance of Member States to agree on a common approach to combat migration. As national security still belongs under the exclusive competence of nation states, some states have decided to fight migration in their own way and see migrants as a threat to their own security. They therefore rejected the principle of proportionality and solidarity through which the EU wanted to redistribute migrants. These are mainly the V4 countries, especially Hungary.

Another challenge are the relations with Turkey, which has been trying to become a member of the EU since 1999, but the declining level of democracy in the country under Erdogan is a major problem for the Member States. As most migrants to the EU flowed through Turkey, it used this card to negotiate with the EU to expand cooperation with the country. However, the events of 2020 show that Turkey uses migrants against the EU as a weapon rather than a reason for cooperation, as it is aware that the EU would find it difficult to cope with the influx of 3.5 million migrants on Turkey's territory. That is why EU-Turkey relations continue to be a major challenge.

The last current challenge we are working on is the COVID-19 epidemic, which has had a significant impact on migration not only in the EU but also in the world. The EU has put in place a number of measures to address this challenge, but their effectiveness will not be seen until later.

In the future, it can be expected that further new challenges will arise in connection with migration. As migrants are cheap labor, it is in the interest of many Member States to receive them. Migration is also considered to be one of the possible solutions to the decline in the population curve in the EU, as the EU expects a significant decline in population in the future. Thus, both Member States and citizens may have different views on migration, the fact is that without it, the future of the Union is difficult to imagine.

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