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INTRODUCTION

The jubilee **10th edition of the International Scientific Conference IFRS: Global Rules & Local Use – Beyond the numbers** was organised in a hybrid format in the **Anglo-American University in Prague premises** in cooperation with Metropolitan University Prague on October 6th and 7th, 2022.

As much as the face-to-face form of the conference meetings is preferred as it both fosters interactions, discussions and bring opportunities for networking, the on-line component allows a wider audience to attend. At the same time, it mitigates the risks related to the pandemic. The hybrid format of the conference is getting closer to normal face-to-face negotiation, however, the virtual communication technique was still in place

This allowed the conference almost normal reactions and also discussions. Nevertheless, the pandemic crisis required special safety measures at the conference. There were more than 100 visitors and participants from different countries during the conference days.

The final proceedings include contributions authored by conference participants which were presented during the conference days. The submissions have gone through a desk review by the editorial team first and subsequently by an international double-blind peer review process organized with international external reviewers and have been subsequently accepted by the conference editorial team.

The programme was organized in two days as follows:

Day I Thursday, October 6th

Opening ceremony

Jan Vašenda, Irena Jindřichovská, Jiří Schwarz (AAU President), Michal Klíma (MUP Rector)

Keynote Speakers I – Chair: Irena Jindřichovská

- Prof. David Alexander – Nobes classification 1983, 40 years on
- Prof. Erginbay Ugurlu (co-author Irena Jindřichovská) – Inflation in the Czech Republic and Turkey
- İlker Sakinc – The effects of COVID-19 on Islamic and Traditional indices
- Prof. Nadia Albu – Explaining inertia and change in the accounting field in CEE: the case of audit in Romania
- Eva Jančíková – Current Trends in Cash management and cash pooling

Keynote Speakers I - Discussion

Thursday sections:

• Reporting and IFRS I	Chair: Irena Jindrichovská
• COVID-19	Chair: Jan Vašenda
• CSR/Integrated and Non-Financial Reporting	Chair: Enikő Lőrinczová
• Interdisciplinary	Chair: David Muir

Day II Friday, October 7th

Keynote Speakers II – Chair: David Muir

- Aleš Králík – European Single Access Point (ESAP)
- Alice Šrámková – IFRS as an inspiration to the interpretations of the National Accounting Board
- Ondřej Fikrlé – Historical perspectives on IFRS in different countries
- Prof. Eleftherios Thalassinou – CBDC (Central Bank Digital Currency) vs Cryptocurrencies
- Prof. Bernadette Andreoso – Fin Tech and Green Digital Finance: an answer to China's coal-reliant economy?
- Zdeněk Strnad – A Brief History of Insolvencies in the Times of Covid
- Anna Białek-Jaworska, Renata Karkowska – The determinants of tax base erosion:

Keynote Speakers II – Discussion

Friday sections:

• Quantitative Studies	Chair: Alžběta Zíková
• Management and Economic Policy	Chair: Helena Fialová
• Reporting and IFRS II	Chair: Dana Kubíčková
• CSR/Integrated and Non-Financial Reporting	Chair: Ladislava Knihová

Official Ending and closing remarks

Irena Jindřichovská, Jan Vašenda

Reporting and IFRS

RESEARCH AND DEVELOPMENT IN ACCOUNTING UNITS REPORTING ACCORDING TO IFRS IN THE SLOVAK REPUBLIC

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Abstract: *Different accounting of expenses for research and development can have a different impact on the presentation of the results of the companies' activities, also concerning the results of management and the property value. Slovak legislation allows to capitalize costs that were spent on research and development on account 012 – Capitalized development costs, when they meet the conditions for assessing their results as long-term intangible assets. According to international accounting standards IAS 38, the result of research is not recognized as an asset aide directly to the costs of the current period and is deducted from the economic result for the current accounting period. Development is handled depending on the nature of the development results. When reporting according to IFRS, the accounting of research and development costs has a significant impact on the economic result of the current period. The aim of the contribution is a quantitative analysis of the reporting of research and development carried out by business accounting units in the Slovak Republic, which report their accounting/financial information according to IFRS for the years 2015 to 2020 and at the same time apply the super deduction of income tax for research and development.*

Keywords: *research, development, super deduction, reporting, IFRS*

1. INTRODUCTION

Currently, society and the economy are in a very difficult period, where a number of negative factors are combined, e.g. climate problems, the Covid 19 pandemic, the war conflict in Ukraine, the energy and gas crisis and the associated widespread rapid growth of inflation and the deterioration of a number of macroeconomic and microeconomic factors that affect everyone. Therefore, it is very important to focus the maximum human potential on finding intelligent solutions that would at least partially improve the situation. Patents, new technologies, new production processes are the result of research and development activities representing important assets with the promise of future benefits for the company. Research and development are purposefully directed towards innovation, as they are the basic pillar of successful development, competitiveness and consequently profitability of companies in industrial sectors, and this is the goal of financial support for research, development and innovation from public sources in the form of various investment incentives, subsidies and e.g. in the Slovak automotive industry (Bajžíková et al., 2017). From an accounting point of view, we are interested in how to value them and how to display and report them in accounting in order to increase the awareness of interested parties who make their decisions based on this information. Nowadays, they are often associated with smart technologies, which are able to use intelligent solutions and increase the competitiveness of businesses in individual countries, as well as the entire EU (Staníčková & Melecký, 2014, Turečková, 2014). Due to the direction of information and technological progress, governments also try, in addition to direct research support in the form of subsidies, to motivate the business sector to increase the implementation of research and development in their spheres of activity in the form of tax breaks. This category of support also includes the possibility of applying a super deduction for company costs spent on research and development when determining the income tax base, which results in a reduction of the direct tax liability of the relevant business entity performing research and development.

2. THEORY BACKGROUND

The super deduction for research and development is an indirect form of support for R&D and was introduced into Slovak legislation relatively late, only in 2015. The super deduction for research and development can be used by natural and legal persons, regardless of whether they are an accounting unit or keep tax records. Compared to neighbouring countries, for example, the super deduction has been in operation in the Czech Republic since 2005 and in Hungary since 2004. The rate of the super deduction for research and development in Slovakia has developed quite dynamically since its introduction. From the original rate of 25% (valid in 2015–2017), it gradually rose up to 100% (valid in 2018), 150% (valid in 2019) and also reached its highest level of 200% (valid in 2020 and 2021). Thanks to the basic super deduction rate of 200% in two years, Slovakia had a competitive advantage within the V4 countries in that it was more interesting for larger investors to invest in the building of new R&D and technological centers of companies in Slovakia. By reducing the super tax deduction rate again to 100% from 2022, Slovakia loses this competitive advantage. In addition, Poland, on the contrary, is increasing the rate of the super deduction for research and development from 100% to 200% from 2022, making it the most attractive country for investors in terms of tax support for research and development in the region (EY Global, 2021).

Research and development (R&D) is a major component of intangible assets and intellectual capital. Investments in research and development are economic investments that play an important role in improving products and creating value for the company and its shareholders. They are considered a valuable source of economic growth (Gelb, 2002; Turečková & Nevima, 2019) and increasing market share (Bočková, 2015). However, investors have difficulty in effectively assessing R&D efforts (Lev & Zarowin, 1999). These activities raise the problem of their accounting recognition, which is not always obvious due to the complexity of evaluating cash flows and the high level of uncertainty associated with this type of investment. The need for voluntary disclosure of this type of assets then becomes crucial for a better market valuation of the company and attracting potential investors. Voluntary disclosure of intellectual capital, especially its research and development activities, is therefore a rich and fruitful area of research. However, studies looking at this type of disclosure are scarce and inconclusive (McCracken et al., 2018; Nekhili et al., 2012, 2016). Accounting for intangible assets such as research and development (R&D) remains an unresolved issue and a major mismatch between International Financial Reporting Standards (IFRS) and US Generally Accepted Accounting Principles (US GAAP) (Lev, 2019). According to US GAAP, costs incurred during research and development activities are reflected in costs immediately and are reported in the income statement under the item research and development costs. Research and development costs are necessary for the long-term prosperity of the company, therefore company management tries to classify various other costs that do not belong to research and development costs. In order to avoid misreporting of research and development costs, IFRS and US GAAP try to carefully distinguish the costs that belong to research and development from those that are part of other costs. Therefore, in order to correctly interpret the rules of US GAAP and IFRS regarding the capitalization of research and development, it is necessary to know exactly what the value of this intangible asset consists of. According to IFRS, criteria of uniqueness of intangible assets and criteria of future economic benefits should be used. It is not possible to determine this future value based on purchase prices, because intangible assets always only have a derived future value that must be estimated. IFRS offers a solution, it prohibits the capitalization of all research, but allows the capitalization of development under the condition that certain requirements are met. R&D and associated costs are dealt with by the international standard IAS 38 or IAS 9. According to international standard IAS 38 (The European Parliament and the Council of the European Union, 2022), only development belongs

to long-term intangible assets and research is not an asset because it does not meet the condition of the probability of future economic benefits, and therefore these costs must be removed from the balance sheet and recognized as costs in the period in which arose, which lowers the economic result. Where, in addition to R&D terms, the terms research phase and development phase are defined. Expenditure into the research and development under certain conditions is capitalized and recognized as an asset on the balance sheet and classified as “internally developed intangibles” that are unidentifiable (Saxunová, 2019). It is important to realize that what occurs is the subsequent expenditure on an in-process research or development project acquired separately or in a business combination and this development expenditure, if it satisfies the development phase, its value is added to the carrying amount of the acquired in-process R&D project and thereby intangible asset is created (Suarez et al., 2020). If it is not possible to distinguish the research phase from the development phase of an internal project in the process of creating an intangible asset, the enterprise considers the expenditure on that project as if incurred only in the research phase and the expenditure into R&D is incurred when it is incurred. Thus, the IAS 38 standard distinguishes between the already mentioned research phase and the development phase in order to assess whether an intangible asset (created internally – inside the company) meets the reporting point of view.

Research phase – intangible assets created as a result of research or during the research phase of a project created within the company will not be reported. Expenditure on research or the research phase of an internal project will be expensed in the period in which it is incurred (IAS 38 paragraph 54, 2022).

In simple terms, we can say that according to IAS 38, research expenses are not capitalized. The reason is that, at the research phase, the accounting unit cannot prove or demonstrate that there is an intangible asset that is likely to generate economic benefits in the future. They will therefore be costs in the period in which they were incurred, and the economic result will be reduced (IAS 38, paragraph 55, 2022).

Among the research activities according to IAS 38.56 we can include (IAS 38 paragraph 55, 2022):

- activities aimed at acquiring new knowledge,
- search, evaluation and final selection of applications of research findings or other knowledge,
- search for alternatives to materials, devices, products, processes, systems or services,
- formulation, design, evaluation and final selection of possible alternatives for new or improved materials, devices, products, processes, systems or services.

Development phase – IAS 38.57 states that in order for assets that are the result of development or the development phase to be reported, the accounting entity must demonstrate all of the following requirements (IAS 38 paragraph 57, 2022):

- the technical feasibility of completing the intangible asset so that it will be available for use or sale,
- their intention to complete the intangible asset and use or sell it,
- ability to use or sell intangible assets,
- how the intangible asset will generate probable future economic benefits. Among other things, the entity can demonstrate the existence of a market for the outputs of the intangible asset or the utility of the intangible asset if used internally,
- the availability of adequate technical, financial and other resources to complete development and use or sell intangible assets,
- its ability to reliably measure the expenditure caused by the intangible asset during its development.

Development activities according to IAS 38.57 are, for example (IAS 38 paragraph 57, 2022):

- design, construction and testing of prototypes before production or before use,
- subject of tools, templates, forms and stamps using new technology,
- the subject, implementation and activity of the test operation, the scope of which does not correspond to economically viable commercial production,
- design, execution and testing of the selected alternative for new or improved materials, devices, products, etc.

IAS 38 does not allow to capitalize the costs of brands, names of periodicals, customer lists created by own activity (IAS 38 paragraph 63, 2022). The establishment costs of an intangible asset are considered to be all expenses incurred from the moment when the intangible asset first met the condition for inclusion in the intangible asset. Establishment costs are, for example, material costs, services, labor costs, various fees, depreciation. On the other hand, it is not possible to consider general overhead costs, expenses for employee training, initial losses, etc. as establishment costs. (IAS 38 paragraph 64, 2022).

Financial disclosure is considered an important area of research that attracted a number of accounting professionals in recent decades (Noh et al., 2019). Voluntary disclosure of research and development information is essential for better evaluation of the company's performance and attracting potential investors. It is also interesting to consider the implications of such disclosure on managerial decisions, including the decision to initiate earnings management practices. Disclosure in the field of research and development is voluntary and associated with a richer information environment and corporate transparency. They are considered a corporate governance tool capable of monitoring opportunistic managerial behavior and leading to a reduction in their discretionary power (Jensen & Meckling, 1976). According to an agency theory perspective, this is likely to reduce their propensity to manage earnings in a way that favors their own interests over those of shareholders. Moreover, financial scandals (eg Enron, Worldcom, Xerox, etc.) have undermined trust and raised serious doubts about the process of creating accounting and financial information. These scandals have highlighted the importance of assessing the quality of this type of information. Some empirical studies show that the non-recognition of intellectual capital worsens the information asymmetry between managers and shareholders, resulting in a poor assessment of the company and its future earnings (Ali et al., 2012). The problem of information asymmetry associated with this type of disclosure raises the question of whether it is necessary to disclose information about research and development activities in order to improve the quality of the management result and reduce its manipulation by managers. In addition, the adoption of international financial reporting standards (IFRS) in European countries since January 2005 for the compilation of financial statements of groups of accounting units and specified accounting units, in the Slovak Republic according to Act no. 431/2002 Coll. on accounting with effect from January 1, 2006, aimed to harmonize the financial statements of companies and ensure the usefulness and comparability of financial information in an international context. The conceptual framework of IFRS emphasized the reliability and relevance of financial information. When it comes to R&D disclosures, the researchers found that intangible assets are better valued under IFRS than assets under local standards. In fact, Boulerne and Sahut (2010) and Oliveira et al. (2010), in a French context and in Portugal, respectively, showed that IFRS allow investors to better integrate intangible assets into companies' values and consequently improve the information content of their earnings. This is because IFRS are generally more detailed compared to local accounting standards. Then, it is important to test the moderating effect of IFRS adoption on the relationship between R&D disclosure and earnings management. Earnings management practices were also affected by the global financial crisis. These affected world markets and were characterized by a strong information asymmetry due to the uncertainty associated with

these shortage periods. The crisis then led to a significant decline in earnings quality (Persakis & Iatridis, 2015, 2016), which was confirmed by examining the impact of the financial crisis on the relationship between voluntary R&D disclosure and earnings quality, assuming that companies disclose more during these recessionary periods. information to reduce the information gap and have a better quality of their earnings.

Studies focusing on research and development activities as a component of intellectual capital generally have their theoretical foundations in economic theories such as agency theory and signalling theory (Beattie & Thomson, 2007). Existing literature has shown that voluntary disclosure of intellectual capital increases the value of the firm in the financial market (Abdolmohammadi, 2005; Gerpott et al., 2008; Vafaei et al., 2011; Nekhili et al., 2016). In this regard, empirical studies have shown that the non-recognition of intellectual capital exacerbates the information asymmetry between managers and external shareholders (Aboody & Lev, 2000). This leads to a poor assessment of the firm and its future earnings by market participants (Ali et al., 2012). According to Cormier and Ledoux (2012), the value of a firm cannot be determined without considering its intangible capital, including research and development activities. Research and development expenditure is reported as a cost despite its value creation. As a result, the lack of information about this type of capital would tend to reduce the quality of returns, especially in industries that invest heavily in research and development, e.g. telecommunications. Liang and Yao (2005) showed in a sample of Taiwanese firms in the high-tech industry that traditional financial information does not provide any significant explanatory performance measures of the firm's market value, suggesting the need for voluntary disclosure for better assessment. fixed value. As intellectual capital investments are not recognized as assets, voluntary disclosure is key to achieving higher earnings quality and reducing earnings manipulation. Managers, especially those in high-tech sectors, are interested in disclosing information about their intellectual capital, including research and development activities, to reduce the problem of misrepresentation of their financial information. Maaloul and Zéghal (2015) empirically tested the relationship between intellectual capital disclosure and the information content of accounting returns. Using a sample of 126 US companies in 2009, these authors show that firms in the high-tech industry disclose more information about their intellectual capital. These firms have significant investments in intellectual capital that are not included in their financial statements due to the lack of accounting recognition as assets under current accounting standards. As a result, these companies voluntarily disclose information about their intellectual capital to prevent gaps in financial information and thereby improve the quality of their earnings. To summarize, previous theoretical and empirical studies on voluntary disclosure in general (Karajeh, 2019) and voluntary disclosure of R&D information, in particular, are in favor of its positive impact on earnings management. Schrand and Verrecchia (2004) argue that a weak information environment impairs managerial discretion, leading to earnings management practices. The negative impact of voluntary disclosure on earnings management in Singapore is also demonstrated by Chen et al. (2004). Hunton et al. (2006) show that regular information about firm performance is associated with greater disclosure of earnings management practices. Ji et al. (2017) show that voluntary disclosure of internal control information is negatively associated with earnings management. This information can also be "non-accounting related"; in the European context, it is now possible to talk primarily about voluntary ESG reporting and publication of the assessment of risks associated with sustainability (Houska, 2022) and the impact on the company's business model (Houska & Pakšiová, 2022) together with the new trends of Ethical Codes, i.e. Codes of Ethics (MacGregor Pelikánová et al., 2021a). Last but not least, the development of EU legislation, especially the Taxonomy Regulation and the update of Directive 2013/34/EU in 2014 to the recent draft SFDR and their specific impact on the reporting of companies in the EU (MacGregor Pelikánová et al., 2021b). However, it is often research investments that trigger

the sustainable transition of businesses (Lähteenmäki-Uutela et al., 2021). Therefore, it is important to monitor all available information on the implementation and results of research and development, not only in research organizations, but also in business sectors that handle a higher volume of capital, which they know how to direct to the development and use of new technologies with a sign of sustainability.

3. DATA AND METHODOLOGY

The aim of the contribution is the analysis of R&D reporting in business entities preparing financial statements according to IFRS and applying the super deduction for R&D costs to reduce income tax under the conditions in the Slovak Republic. In the initial selection, we included all companies that applied the super deduction for R&D costs when calculating income tax in the relevant years 2015–2020, when business entities were allowed to apply the super deduction in the Slovak Republic. As part of the selection, we subsequently selected all entities that prepare financial statements according to IFRS in the period from 2015 to 2020, for which their complete individual financial statements are published in the Register of Financial Statements of the Slovak Republic (<https://registeruz.sk/>).

Basic information for the selection of tax subjects from the business environment, which apply the super deduction for research and development costs in the Slovak Republic for the years 2015 to 2020, is drawn from the current lists published on the website of the Financial Administration of the Slovak Republic (2022). The Financial Administration of the Slovak Republic collects and, for the sake of transparency, also publishes data on tax subjects from completed and submitted tax returns, in which tax subjects state the number of projects, the goals of individual projects and the amount of the super deduction that they claimed in the tax period (Income Tax Law, 2022).

All 27 entrepreneurs in the Slovak Republic were included in the examined sample for this contribution, on the basis of a complete selection according to the selected conditions, who apply super deduction in at least one examined year and at the same time compile individual financial statements according to IFRS in the examined period 2015 - 2020. For the examined entrepreneurs in the monitored period, we analyze the amount of the applied super deduction in absolute terms in euros and also relatively as a percentage of the entire group of business entities applying the super deduction for research and development costs in the Slovak Republic in the period under review.

4. RESULTS AND DISCUSSION

In the Slovak Republic, they are obliged to prepare financial statements according to international accounting standards IFRS adopted by the EU according to the EP and Council regulations (2022), which establish IAS/IFRS binding for the consolidated financial statements of a group of companies that prepare consolidated financial statements and categories of accounting units that prepare individual financial statements also according to IFRS. According to § 17a, paragraph 1 of the Accounting Act (2022), financial statements according to IFRS are drawn up by the accounting unit, which is

- a) bank, management company, insurance company except health insurance company, insurance company, Slovak Office of Insurers, pension management company, supplementary pension company, stock exchange and accounting unit established by special regulation

- b) a branch of a foreign bank, a branch of a foreign management company, a branch of an insurance company from another member state, a branch of a foreign insurance company, a branch of a reinsurance company from another member state and a branch of a foreign reinsurance company.

According to § 17a paragraph 2 of the Accounting Act (2022), financial statements according to IFRS are drawn up by an accounting unit that for at least two consecutive accounting periods meets at least two of the conditions listed in Table 1.

Table 1. Reporting according to IFRS based on the fulfillment of at least two conditions

The total amount of property (in EUR)	Net turnover (in EUR)	Average recalculated number of employees
> 170,000,000.00	> 170,000,000.00	> 2000

Source: Accounting Law (2022) § 17a paragraph 2

According to the Accounting Act, the total amount of the property is the amount determined from the balance sheet in the valuation not adjusted for depreciation and for the created reserves and depreciation of the property.

According to § 2 paragraph 15 of the Accounting Act, revenues from the sale of products, goods and services after deduction of discounts are included in the net turnover. The net turnover also includes other revenues after deducting the discounts of the accounting unit, the object of which is the achievement of revenues other than revenues from the sale of products, goods and services.

The average registered number of employees in recalculated numbers is the arithmetic average of the daily registered number of employees for the monitored period, recalculated to full employment. The calculation is made on the basis of the length of working hours of the employees, in rare cases according to the hours actually worked (Slovak statistics, 2020). An accounting unit that is a business company that for at least two consecutive accounting periods meets at least two of the conditions listed in Table 1, reports in individual financial statements according to IFRS.

From the total number of tax entities that claimed the super deduction for research and development expenses in the Slovak Republic in individual years (2015-2020), we identified 27 entities that prepare financial statements according to IFRS.

In the following Table 2, we present the overall list of enterprises together with their SK NACE codes listed for statistical purposes for the categorization of their business activity. The listed SK NACE of the entrepreneur is the main, or the predominant activity of the given entrepreneur. Banks and insurance companies (as well as branches of a foreign bank or insurance company) must report according to IFRS based on their subject of business. From the selected sample of 27 business entities, there are 4 banks (365.bank, a.s.; Československá obchodná banka, a.s.; Slovenská sporiteľňa, a.s.; Všeobecná úverová banka, a.s.) and 1 insurance company (Allianz – Slovenská poisťovňa, a.s.). The majority of tax entities from other SK NACEs in the analyzed sample meet at least 2 size conditions, which are given by the Accounting Act for the obligation to compile individual financial statements according to IFRS. In addition to financial institutions, 7 entities do business in the Slovak Republic as a parent accounting unit, 2 entities also do business as subsidiary accounting units, and these entities also belong to the consolidated entity, for which the parent accounting unit prepares consolidated financial statements according to IFRS.

Table 2. Reporting according to IFRS in the individual financial statements of entities

Tax subjects	SK NACE	Reason for reporting under IFRS
365.bank, a. s.	64190 Other funds	Bank
Adient Slovakia s.r.o.	29320 Production of other engine parts	They meet at least 2 of the conditions
Allianz - Slovenská poisťovňa, a.s.	65120 Non-life insurance	Insurance company
Asseco Central Europe, a. s.	58290 Other software publishers	Consolidated whole
Bekaert Hlohovec, a.s.	24340 Pulling wires behind the well	They meet at least 2 of the conditions, Consolidated whole
Continental Automotive Systems Slovakia s.r.o.	29320 Production of other engine parts	They meet at least 2 of the conditions
Continental Matador Rubber, s.r.o.	22110 Production of rubber tires	They meet at least 2 of the conditions
Československá obchodná banka, a.s.	64190 Other funds	Bank
Embraco Slovakia s.r.o.	28130 Production of other pumps	They meet at least 2 of the conditions
eustream, a.s.	49501 Gas pipeline transport	They meet at least 2 of the conditions
Foxconn Slovakia, spol. s r.o.	26400 Production of consumer electronics	They meet at least 2 of the conditions
Hornonitrianske bane Prievidza, a.s. v skratke HBP, a.s.	05200 Mining of lignite	They meet at least 2 of the conditions, Consolidated whole
Kia Slovakia s. r. o.	29100 Production of motor vehicles	They meet at least 2 of the conditions
O2 Slovakia, s.r.o.	61200 Wireless telecommunications activity	They meet at least 2 of the conditions
Orange Slovensko, a.s.	61200 Wireless telecommunications activity.	They meet at least 2 of the conditions
Plastic Omnium Auto Exteriors, s.r.o.	29320 Production of other engine parts	They meet at least 2 of the conditions
Schaeffler Kysuce, spol. s r.o.	28150 Production of bearings	They meet at least 2 of the conditions
Siemens s.r.o.	33140 Repair of electrical devices	They meet at least 2 of the conditions
Slovalco, a.s.	24420 Aluminum production	They meet at least 2 of the conditions
Slovenská sporiteľňa, a.s.	64190 Other funds	Bank
Slovenské elektrárne, a.s.	35110 Electricity production	They meet at least 2 of the conditions, Consolidated whole
TATRAVAGÓNKA a.s.	30200 Production of railway locomotives	They meet at least 2 of the conditions, Consolidated whole
U. S. Steel Košice, s.r.o.	24100 Production of pig iron	They meet at least 2 of the conditions, Consolidated whole
Vertiv Slovakia, a. s.	27110 Production of electric motors	They meet at least 2 of the conditions
Všeobecná úverová banka, a.s.	64190 Other funds	Bank
ZKW Slovakia s.r.o.	27400 Production of electric lamps	They meet at least 2 of the conditions
Železiarne Podbrezová a.s. skrátené ŽP a.s.	24200 Production of pipes, tubes	They meet at least 2 of the conditions, Consolidated whole

Source: own processing

Table 3 shows the fulfilment of the individual criteria for determining the obligation of companies to prepare individual financial statements in the Slovak Republic according to IFRS for the two years immediately preceding the year when IFRS is applied, while condition 1 represents the criterion of the amount of assets > 170,000,000 euros, condition 2 represents the fulfilment of the criterion net turnover > 170,000,000 euros and condition 3 represents fulfilment of the criterion average recalculated number of employees > 2,000. The years for which the entrepreneur claimed the R&D super deduction are highlighted.

Table 3. Fulfilment of criteria for reporting according to IFRS in individual financial statements

List of tax subjects	2015	2016	2017	2018	2019	2020
Adient Slovakia s.r.o.	No IFRS	No IFRS	No IFRS	No IFRS	2,3; 2,3	2,3; 2,3
Asseco Central Europe, a. s.	-	-	-	-	-	-
Bekaert Hlohovec, a.s.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Continental Automotive Systems Slovakia s.r.o.	2; 2	2; 2	2; 1	1; 1	1; 1	1; 1,2
Continental Matador Rubber, s.r.o.	1,2,3; 2,3	2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
Embraco Slovakia s.r.o.	2,3; 2,3	2,3; 2,3	2,3; 2,3	2,3; 1,3	1,3; 2,3	2,3; 1,2,3
eustream, a.s.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Foxconn Slovakia, spol. s r.o.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Hornonitrianske bane Prievidza, a.s. v skratke HBP, a.s.	3; 3	3; 3	3; 3	3; 3	3; 3	3; 3
Kia Slovakia s. r. o.	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
O2 Slovakia, s.r.o.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Orange Slovensko, a.s.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Plastic Omnium Auto Exteriors, s.r.o.	No IFRS	No IFRS	No IFRS	1,2; 1,2	1,2; 1,2	1,2; 1,2
Schaeffler Kysuce, spol. s r.o.	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
Siemens s.r.o.	2; 2	2; 2	2; 2	2; -	-	-
Slovalco, a.s.	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2
Slovenské elektrárne, a.s.	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
TATRAVAGÓNKA a.s.	1,2,3; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2	1,2; 1,2,3	1,2,3; 1,2,3
U. S. Steel Košice, s.r.o.	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
Vertiv Slovakia, a. s.	-	-	-	2	2	2; 2
ZKW Slovakia s.r.o.	No IFRS	No IFRS	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3
Železiarne Podbrezová a.s. skratene ŽP a.s.	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3	1,2,3; 1,2,3

Explanations: 1- fulfillment of the asset criterion, 2 – fulfillment of the turnover criterion, 3 – fulfillment of the number of employees criterion

Source: own processing

Table 3 shows that almost all investigated tax entities meet the conditions for reporting according to IFRS in the monitored years. Not all monitored accounting units in the years when they claimed the super deduction for R&D applied IFRS for individual financial statements for the entire monitored period. When examining the individual financial statements and notes of the selected sample, we found the following. The company Adient Slovakia s.r.o. proceeds according to IFRS only from 2019 and therefore we monitored the fulfilment of the conditions from 2017. The company Asseco Central Europe, a. with. did not meet any of the conditions for reporting according to IFRS, but since it is the parent accounting unit and belongs to a consolidated entity, it proceeds according to IFRS when compiling individual financial statements voluntarily. Another parent accounting unit is Hornonitrianske bane Prievidza, a.s. in short, HBP, a.s., which met only one condition (3) in the monitored period. Among the subsidiaries we include Continental Automotive Systems Slovakia s.r.o. and Siemens s.r.o.,

which met one or none of the above conditions, but are part of the consolidated entity. Only Vertiv Slovakia, a.s. has listed securities on the New York Stock Exchange. These accounting units compile individual financial statements according to IFRS voluntarily based on their decision according to § 17a paragraph 3 of the Accounting Act (2022) according to the requirements within the consolidated entity or listed securities on the stock exchange.

Table 4 presents the percentage of entities reporting according to IFRS from the total number of tax entities that claimed the super deduction for R&D in the monitored period. As the number of entities applying the super deduction increased every year, so did the number of applying entities reporting according to IFRS. In our opinion, this fact is not surprising, but on the contrary, it was expected. As we can see in Table 4, since 2018 the percentage rate of entities reporting according to IFRS has been decreasing, despite the fact that the total number of entities applying the super deduction has grown. The increasing number of all entities is not in direct proportion to the growth of the share of entities reporting according to IFRS, which can also be justified by the overall low number of entities compiling individual financial statements according to IFRS in the Slovak Republic.

Table 4. Tax entities reporting according to IFRS in the group of companies applying super deduction in the Slovak Republic

Year	Number of tax subjects applying the super deduction	Number of tax entities reporting according to IFRS	% rate of entities reporting according to IFRS
2015	83	4	5%
2016	112	7	6%
2017	163	8	5%
2018	270	12	4%
2019	369	13	4%
2020	405	17	4%

Source: own processing

In the following part of the paper, we will analyse the absolute and relative amount of applied super deductions by individual investigated tax entities in total, in specific years, and also the share of total applied super deductions in the respective years by all business entities.

In the following tables 5 and 6, we present applied super deductions individually by entities reporting in individual financial statements according to IFRS, together with the amount of super deduction in individual years, the percentage of the amount of super deduction to the total amount of super deduction applied in the given years by all entities and the cumulative value for individual entities. Table 5 shows the period 2015–2017, when the super deduction rate was the lowest, i.e. 25% of R&D costs.

Table 5. Applied super deductions by business entities for 2015–2017

List of tax subjects	Total super deduction for 2015 - 2017	2015			2016			2017		
		Y/N	€	%	Y/N	€	%	Y/N	€	%
365.bank, a. s.	-	No	-	0	No	-	0	No	-	0
Allianz - Slovenská poisťovňa, a.s.	-	No	-	0	No	-	0	No	-	0
Asseco Central Europe, a. s.	-	No	-	0	No	-	0	No	-	0
Bekaert Hlohovec, a.s.	31,627.00	No	-	0	No	-	0	Yes	31,627.00	0
Continental Automotive Systems Slovakia s.r.o.	1,700,156.48	No	-	0	Yes	191,422.75	1	Yes	1,508,733.73	4
Continental Matador Rubber, s.r.o.	1,011,827.50	No	-	0	Yes	1,011,827.50	6	No	-	0
Československá obchodná banka, a.s.	491,764.22	Yes	194,872.22	2	Yes	296,892.00	2	No	-	0
Embraco Slovakia s.r.o.	-	No	-	0	No	-	0	No	-	0
eustream, a.s.	-	No	-	0	No	-	0	No	-	0
Foxconn Slovakia, spol. s r.o.	-	No	-	0	No	-	0	No	-	0
Hornonitrianske bane Prievidza, a.s. v skratke HBP, a.s.	18,017.00	Yes	18,017.00	0	No	-	0	No	-	0
Kia Slovakia s. r. o.	-	No	-	0	No	-	0	No	-	0
O2 Slovakia, s.r.o.	118,822.66	No	-	0	Yes	108,221.60	1	Yes	10,601.06	0
Orange Slovensko, a.s.	-	No	-	0	No	-	0	No	-	0
Plastic Omnium Auto Exteriors, s.r.o.	-	No	-	0	No	-	0	No	-	0
Schaeffler Kysuce, spol. s r.o.	-	No	-	0	No	-	0	No	-	0
Siemens s.r.o.	1,215,165.57	No	-	0	No	-	0	Yes	1,215,165.57	3
Slovalco, a.s.	44,986.38	No	-	0	Yes	7,096.09	0	Yes	37,890.29	0
Slovenská sporiteľňa, a.s.	-	No	-	0	No	-	0	No	-	0
Slovenské elektrárne, a.s.	-	No	-	0	No	-	0	No	-	0
TATRAVAGÓNKA a.s.	3,841,147.00	Yes	400,521.00	4	Yes	1,228,827.00	7	Yes	2,211,799.00	6
U. S. Steel Košice, s.r.o.	22,288,173.39	Yes	1,128,855.69	12	Yes	2,687,063.11	16	Yes	18,472,254.59	46
Vertiv Slovakia, a. s.	-	No	-	0	No	-	0	No	-	0
Všeobecná úverová banka, a.s.	364,520.10	No	-	0	No	-	0	Yes	364,520.10	1
ZKW Slovakia s.r.o.	-	No	-	0	No	-	0	No	-	0
Železiarne Podbrezová a.s. skratene ŽP a.s.	-	No	-	0	No	-	0	No	-	0
TOTAL	31,126,207.30	4	1,742,265.91	18	7	5,531,350.05	33	8	23,852,591.34	60

Source: own processing

Table 6 shows the applied super deductions by business entities for the years 2018 to 2020, when the super deduction rate grew from 100% to 200% of R&D costs. In the last column of this table, we present the cumulative value of super deductions applied during the monitored period from 2015 to 2020.

Table 6. Applied super deductions by business entities for the years 2018–2020

List of tax subjects	Total super deduction for 2018-2020	2015			2016			2017			Total super deduction for 2015 -2020
		Y/N	€	%	Y/N	€	%	Y/N	€	%	
365.bank, a. s.	3,379,544.82	No	-	0	No	-	0	Yes	3,379,544.82	0	3,379,544.82
Allianz - Slovenská poisťovňa, a.s.	255,867.88	No	-	0	No	-	0	Yes	255,867.88	0	255,867.88
Asseco Central Europe, a. s.	163,270.13	No	-	0	Yes	163,270.13	0	No	-	0	163,270.13
Bekaert Hlohovec, a.s.	865,877.07	Yes	188,388.64	0	Yes	301,597.66	0	Yes	375,890.77	5	897,504.07
Continental Automotive Systems Slovakia s.r.o.	19,942,426.45	Yes	5,368,468.68	4	Yes	6,475,756.39	6	Yes	8,098,201.38	8	21,642,582.93
Continental Matador Rubber, s.r.o.	27,874,494.63	Yes	5,714,769.36	5	Yes	9,722,311.32	8	Yes	12,437,413.95	2	28,886,322.13
Československá obchodná banka, a.s.	5,230,906.05	Yes	300,322.21	0	Yes	2,355,551.84	2	Yes	2,575,032.00	0	5,722,670.27
Embraco Slovakia s.r.o.	312,266.06	Yes	88,168.28	0	No	-	0	Yes	224,097.78	1	312,266.06
eustream, a.s.	141,335.21	No	-	0	Yes	141,335.21	0	No	-	0	141,335.21
Foxconn Slovakia, spol. s r.o.	1,362,287.02	No	-	0	No	-	0	Yes	1,362,287.02	0	1,362,287.02
Hornonitrianske bane Prievidza, a.s. v skratke HBP, a.s.	-	No	-	0	No	-	0	No	-	0	18,017.00
Kia Slovakia s. r. o.	14,647.56	Yes	14,647.56	0	No	-	0	No	-	0	14,647.56
O2 Slovakia, s.r.o.	2,654,497.76	Yes	685,965.09	1	Yes	896,693.49	1	Yes	1,071,839.18	1	2,773,320.42
Orange Slovensko, a.s.	572,508.29	No	-	0	Yes	198,573.77	0	Yes	373,934.52	7	572,508.29
Plastic Omnium Auto Exteriors, s.r.o.	10,473,070.56	No	-	0	No	-	0	Yes	10,473,070.56	0	12,360,544.43
Schaeffler Kysuce, spol. s r.o.	34,360.88	No	-	0	No	-	0	Yes	34,360.88	1	34,360.88
Siemens s.r.o.	3,961,701.27	Yes	1,266,791.22	1	Yes	2,694,910.05	2	No	-	0	5,176,866.84
Slovalco, a.s.		No	-	0	No	-	0	No	-	0	44,986.38
Slovenská sporiteľňa, a.s.	2,543,621.84	Yes	505,783.79	0	Yes	1,119,968.85	1	Yes	917,869.20	2	2,543,621.84
Slovenské elektrárne, a.s.	2,403,268.48	No	-	0	Nie	-	0	Yes	2,403,268.48	2	2,403,268.48
TATRAVAGÓNKA a.s.	8,435,036.00	Yes	3,684,712.00	3	Yes	1,366,561.00	1	Yes	3,383,763.00	0	12,276,183.00
U. S. Steel Košice, s.r.o.		No	-	0	No	-	0	No	-	0	22,288,173.39
Vertiv Slovakia, a. s.	778,033.14	No	-	0	No	-	0	Yes	778,033.14	2	778,033.14
Všeobecná úverová banka, a.s.	7,435,657.09	No	-	0	No	-	0	Yes	7,435,657.09	5	7,800,177.19
ZKW Slovakia s.r.o.	2,802,118.02	Yes	1,603,830.00	1	Yes	1,198,288.02	1	No	-	0	2,802,118.02
Železiarne Podbrezová a.s. skratene ŽP a.s.	3,180,098.43	Yes	83,339.28	0	Yes	3,096,759.15	3	No	-	0	3,180,098.43
TOTAL	104,816,894.64	12	19,505,186.11	15	13	29,731,576.88	25	17	55,580,131.65	43	x

Source: own processing

During the investigation, we had to exclude Adient Slovakia s.r.o. from the sample of companies reporting according to IFRS. and partially Plastic Omnium Auto Exteriors, s.r.o. The company Adient Slovakia s.r.o. claimed a super deduction in 2017 and 2018, but started reporting according to IFRS only from 2019. The company Plastic Omnium Auto Exteriors, s.r.o. claimed the super deduction for R&D in 2016, 2017 and 2020. Since it only started reporting according to IFRS from 2018, we added only the super deduction for 2020 to Table 6, because the condition for reporting the company according to IFRS was not met in the previous monitored period.

In the first year in which the super deduction could be used, i.e. in 2015, 4 subjects together claimed a super deduction of 1,742,265.91 euros, which was 18% of the total amount of the super deduction in that year. In 2016, there were 7 entities in the amount of 5,531,350.05 euros, which constituted 33% of the total amount. In 2017, 8 entities claimed a super deduction in the amount of 23,852,591.34 euros, which accounted for up to 60% of the total volume of

super deduction applied in 2017. From 2018, the super deduction rate for R&D began to gradually increase, and therefore we would also expect an increasing number of entities that they will apply the super deduction. The number of entities reporting according to IFRS increased in 2018 to 12 with the amount of 19,505,186.11 euros, but in percentage terms only 15% of the total applied super deduction. In 2019, 13 subjects claimed 29,731,576.88 euros (25%). In the last monitored year, there were 17 entities in the amount of 55,580,131.65 euros (43%).

For the entire monitored period, the company Kia Slovakia s.r.o. claimed the least, i.e. the sum of 14,647.56 euros, and only in one single year, 2018. On the other hand, the company Continental Matador Rubber, s.r.o. applied the most, 28,886,322.13 euros, despite the fact that R&D started in 2016, but had a break in 2017 and then continued from 2018 until now. The company that claimed the super deduction every year is TATRAVAGÓNKA a.s.

By means of the more detailed examination of the financial statements of the investigated tax entities, we found that the tax entities do not report and capitalize R&D costs, because they report according to IFRS. When examining the reports and notes of the individual financial statements of individual companies, we have to state that for the majority it is not possible to identify financial information related to the carried out activities in the field of R&D. Mostly, only information is given, such as the valued result of the own production process, i.e. at own expense. However, in the case of intangible or tangible assets created by own production, the time of increase corresponding to the results of R&D has not been identified. The same was true for expenses in the profit and loss statement and the corresponding parts of the notes. Therefore, it is important to emphasize that it is necessary for entrepreneurs to include this information in their financial statements, and it is possible to identify information related to the super deduction of R&D costs in parts of individual financial statements, despite the fact that this is not yet a clear requirement resulting from legislation. For the stated reasons, it is necessary to direct research to other published information about business entities as sources of information about R&D carried out by entrepreneurs.

5. CONCLUSION

Accounting for R&D expenses can have a different impact on the presentation of the company's performance. Slovak legislation allows business entities to use account 012 – Capitalized development costs, on which they can capitalize costs that were spent on R&D as long-term intangible assets. From the point of view of reporting according to IFRS, the issue of R&D is regulated by the IAS 38 standard. This standard says that the result of the research is not recognized as an asset and goes directly to the costs of the current accounting period and is deducted from the economic results for the current accounting period. On the other hand, development is handled depending on the nature of the development result. When reporting according to IFRS, the costs related to R&D have a significant impact on the financial result of the current accounting period.

As part of our research, we focused on business entities that report according to IFRS and at the same time applied the super deduction of income tax for R&D in the monitored period from 2015 to 2020. From the total sample of entities applying the super deduction for R&D, we identified 27 entities during the monitored period. We analysed the amount of super deduction applied in absolute terms in euros, but also relatively as a percentage of the entire group of business entities. In 2015, 4 entities out of 83 (5%) reported according to IFRS, in 2016 7 entities out of 112 (6%) and in 2017 8 entities out of 163 (5%). After the super deduction rate was increased to 100% in 2018, 12 entities out of 270 (4%) reported according to IFRS, in 2019, at the rate of 150%, 13 entities out of 369 (4%), and with the highest super deduction rate of

200%, it was 17 entities out of 405 (4%). The increasing number of all entities applying the super deduction of R&D is not in direct proportion to the growth of the share of entities reporting according to IFRS, which can also be justified by the overall low number of entities compiling individual financial statements according to IFRS in the Slovak Republic. During the investigation, we had to exclude Adient Slovakia s.r.o. from the sample of companies reporting according to IFRS. and partially Plastic Omnium Auto Exteriors, s.r.o. Adient Slovakia s.r.o. claimed a super deduction in 2017 and 2018, but started reporting according to IFRS only from 2019. Plastic Omnium Auto Exteriors, s.r.o. applied the super deduction for R&D in 2016, 2017 and 2020. Since it only started reporting according to IFRS from 2018, only the amount of the super deduction applied for 2020 was important for our research, because in the previous monitored period the condition for reporting the company according to IFRS was not met.

During a detailed examination of the individual financial statements of the investigated tax entities, we came to the conclusion that the tax entities do not report and capitalize R&D costs, as they report according to IFRS. Examining the reports and notes of the individual financial statements of individual companies, we find that for the majority it is not possible to identify financial information related to R&D, such as valuation of the result of one's own production process at one's own costs. Further research needs to be directed at other published information about business entities as sources of information about R&D carried out by entrepreneurs.

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COMPARATIVE ANALYSIS OF THE ACCRUAL-BASED AND CASH-BASED CREDIT RISK MODELS

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Abstract: *This paper is the second in a series of articles related to an interesting research topic that the author has been working on for some years. The final goal of the research is to create a new model that would allow defining the company's pre-bankruptcy status and possible credit risk default. In this paper, the author has focused on the comparative analysis of the cash-based credit risk model and the accrual-based credit risk model. The author applies it to the case of a manufacturing company and compares the effectiveness of probability of default determination by cash-based credit risk model to the accrual-based credit risk model. The author uses mixed research methods, combining quantitative calculations with analysis based on qualitative information. The author elaborates the cash-based credit risk model based on the Timothy Jury's template improved by the author. The accrual-based model chosen for the comparison and analysis is Altman's Z-Score model. The results of the study have shown that the cash-based model is more effective in determining credit risk and default probability. The cash-based model indicated a high-risk default for the manufacturing company in years out of five years, while Altman's Z-Score showed the company to be in the moderate risk grey zone. The author suggests to the financial institutions, financial managers, and investors using cash-based credit risk model or the combination of it with the accrual-based model.*

Keywords: *accrual-based credit risk model, cash-based credit risk model, credit risk, probability of default, credit risk modelling*

1. INTRODUCTION

Nowadays with the increase in the number of requests to obtain personal and business financing (European Central Bank... 2021), credit risk modelling becomes an important part of the daily operations for the estimation of the solvency and liquidity of the borrower. However, the validity and completeness of the analysis obtained from the traditional credit risk modelling based on the financial statements such as income statements and balance sheets can be questioned (Jury 2012). The management for the sake of benefits, for example gaining additional funding, can manipulate the data in the traditional financial statements internally.

For financial institutions, it is essential to determine the exact numerical value of risk exposure when they decide to provide a loan. Besides the importance of decision-making and its possible financial consequences, having clear credit risk estimations is a legal requirement for the financial institutions set by the controlling institutions (European Bank Authority 2021). It is also important for the investors to have a clear analysis of the financial state of their potential investment, especially foreign direct investment. Thus, the economic society faces the problem of the trustworthiness of such an important method of analysis as credit risk modelling, which is usually done based on the traditional financial statements. It is a problem for the business and financial society that currently, relying on the credit risk analysis done through accrual-based credit risk model, the financial institutions risk providing a loan to the companies close to insolvency, because the accrual-based approach does not grant as clear and trustworthy information as cash-based approach (Kiaupaite-Grušniene 2019). The main reason for the author to choose the current topic of research is to fill in the knowledge gap. The knowledge gap lies in the area of cash-based methods in credit risk modelling. Currently, accrual-based

methods prevail and the application of cash-based methods is not studied sufficiently (Jury 2012). Therefore, it is important to emphasize the difference between the two methods and the benefits of the cash-based approach, the cash-based indicators, and ratios.

To increase the reliability of the data outcome from the credit risk modelling, the author of the research suggests applying the credit risk modelling to the cash flow statements, which are more reliable in showing the actual data about the companies' solvency and liquidity (Mills, Yamamura 1998). The author's investigation of cash flow analysis in credit risk shows that the cash flow method provides clearer and more reliable information about the financial state of the analysed company.

The aim of this research is for the author to develop a new cash-based credit risk model and to apply it to a manufacturing company, comparing the effectiveness of the cash-based credit risk model with the results of the accrual-based credit risk model.

2. THEORETICAL BACKGROUND

One of the important researches on the use of operating cash flows for the prediction of financial distress was elaborated by Cornelius Casey and Norman Bartczak (1985). Notwithstanding that their study with the use of multiple discriminant analysis, suggested that operating cash flows themselves does not possess and incremental predictive power over accrual-based ratios, however, the researchers concluded that cash flow has a huge potential in various analyses. This study was a good step forward for further researchers looking for the area of application of cash-based data for the prediction of financial indicators of the firms. Schroeder, Clark and Cathey in their book underlined the importance of operating cash flow generation ability of an enterprise as an indicator of health and degree of risk of investment into an enterprise (Schroeder *et al.* 2014).

2.1 Credit risk models and their types in the context of accrual-based accounting

The list of credit risk models is quite extensive, and it continues to grow, because none of the invented models is perfect, as far as the author of this research concluded performing the qualitative research on this topic.

Fernandes (2005) classifies the three main approaches to credit risk modelling among which the first two can be used for the companies with traded equity or debt:

- 1) Structural models;
- 2) Reduced-form models;
- 3) Credit scoring models. Used for privately held firms.

For structural models, the major theory contributors are Merton who proposed the Merton option pricing model in 1974, and Black and Scholes who extended it together with Merton. Merton investigated the valuation of corporate debt in three states: coupon-bearing debt, callable debt, and the most emphasized zero-coupon debt. (Sundaresan 2013). This model requires information about the company's assets and liabilities, as it presumes that credit risk occurs when the assets fall below the company's debt (Merton 1974). Another extension of the Merton's model suggests a developed reduced-form model based on the discounted cash balance as a primitive variable (Capinski, 2007, pg 500).

Jarrow and Turnbull created the reduced-form model in 1995 (Jarrow, Turnbull 1995), and extended by Duffie and Singleton in 1999 (Duffie, Singleton 1999). The model analyses the interest rates and uses dynamic and multi-factor analysis for the calculation of credit risk. It was very useful for the financial institutions, as it has shown also the performance of credit risk investments under different interest rates and with little information on the company's

financial situation available (Jarrow, Turnbull 1995). In other words, this model possesses quite a broad view and does not look into each company closely (Deventer 2012).

With the growing volume of data and the risks of subjective judgments of analysis, the credit scoring models are the most sought-after models for the assessment of credit risk and credit classification of individuals and small companies. The credit-scoring model is the risk management tool that is constructed based on the historical data, estimating the probability of default of the requestor assigning the score (Kyriazopoulos 2019). There is evidence that through credit scoring the accuracy of credit decision-making is improved (Vidal, Barbon 2019), which positively affects the financial sector overall.

Kyriazopoulos (2019) listed several empirical credit risk evaluation methods used by American banks as the tools for default prediction and creditworthiness assessment:

- Five C method. The method included both qualitative and quantitative measures for estimation of the following factors:
 - “Character” reflecting the credit history of the borrower;
 - “Capacity” shown by the borrower’s debt-to-income ratio;
 - “Capital” is the amount of money that borrower possess;
 - “Conditions” expressing the purpose of the loan, its amount, and interest rates;
 - “Coverage” or collateral, an asset backing the loan.
- The “LAPP” method, estimates liquidity, activity, profit, and potential, with the emphasis on profitability (Abukarsh, Abumwais 2017).
- “Credit-Men” method, which was not explicitly described by the author.

It is important to mention the invention of the Credit Metrics methodology, which implies both quantitative and qualitative techniques. JP Morgan’s Risk Management Research division invented this technique in 1977. The current version of Credit Metrics is based on the Hull-White pricing framework with default valuation and collateral included in calculation account for non-default as well as used-estimated recovery rates (Credit Metrics 2007). The methodology is described more thoroughly in the technical document (Credit Metrics 2007), the most important fact to mention is that migration analysis is one of the fundamental techniques used in Credit Metrics. Although, Credit Metrics is a leader in the field of risk management analytics, for this research the author will not use this methodology, because it involves also qualitative data, which cannot be withdrawn from the cash flow.

The financial ratios methodology in the default prediction based on the univariate statistical approach was fundamental. Further, in 1968 Altman used the multiple discriminant analysis (MDA) statistic techniques to develop his Z-Score model (Altman 1968), which will be discussed more in-depth further in current paper. However, it is important to admit that Altman was the first who attempted to create a prediction model for bankruptcy prediction of the companies (Manousaridis 2017), which of course was followed by criticism and intentions to improve. Ohlson, who claimed that the score possesses an intuitive interpretation, which is not always relevant, that methods of data collection are not perfect, and even more (Ohlson 1980), criticized Altman’s model. Ohlson created logit analysis in an attempt to suggest an alternative to Altman’s discriminant model, stating that logit analysis assigns the firm to the predetermined population, based on large sample theory, and simply finds the probability of default.

2.2 Comparing the cash-based model to the accrual-based credit risk model

Comparing the cash-based method to the accrual-based credit risk models, the major weakness of the accrual-based models is the possibility that the data in the statements were manipulated. A practice of rewarding managers with incentives can increase the risk of financial statements manipulation in the financial statements by managers either manipulating the existing rules or

financial statements or by deciding on the accounting rules that favour them (Hendriksen, Van Breda 1992, 213). In practical application, what is called the “bonus plan hypothesis”, is when the net income is increased in a certain period at the expense of later periods, the managers’ performance bonuses are tied to the size of profit. Another example of accounting rule manipulation is the choice of the depreciation method. Thus, when the earnings for the period are not as high to receive the bonuses, managers can write off everything they can in that less favourable period to increase the probability of the positive net incomes in the upcoming periods by choosing the straight-line depreciation method over the accelerated depreciation. (Ibid.)

Another example is the research of Mirjam Einstein (Einstein 2021). The researcher took for the analysis of the bankrupt companies only the accrual-based data for their unique matrix containing ratios. The matrix was based on system-integrated analysis of Mereste (Alver, Startseva 2016) and developed further combining the system approach with matrix modeling and theory of indexes. The result of such research showed that companies had a healthy financial state, although the companies were bankrupt and liquidated (Einstein 2021). This is a sign that the finance managers and accountants of those companies manipulated accrual-based financial statements of the bankrupt companies before their bankruptcy to hide the solvency, liquidity, and profitability issues. Einstein has done great research. Although the goals of the research were not reached, the model was created, which can indicate the manipulations with accrual-based statements. This sets a red flag and immediately required a detailed investigation of such cases.

2.3 Methodology of research

This research employs mixed methods of research: qualitative methods of research and quantitative methods of research. The qualitative research of numerous research papers, books, and dissertations on the topics of credit risk, financial analysis, and cash flow statement analysis provided the author with a solid theoretical background for this research. Namely, this qualitative research contributed to the understanding of cash flow statement components and purpose, the nature of credit risk and existing credit risk models, as well as their characteristics. There is no perfect credit risk model currently. However, after the thorough analysis of theoretical input gained through qualitative research, the author has chosen one accrual-based model and one cash-based model to compare their usefulness to the financial institutions in the prediction of credit risk default.

For the credit risk analysis of the manufacturing company, the author has chosen purely quantitative credit risk models, without any qualitative parameters, because in this research the author is interested in comparison of the level trustworthiness of the basis of the financial statements of the models (cash basis versus accrual basis). The author has chosen Altman’s Z-Score model for the manufacturing companies (see Formula 1), as the ancestor of accrual-based quantitative models and one of the most popular and widely used in the financial institutions nowadays (Altman 1968; Sajjan 2016):

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 0.999X5 \quad (1)$$

where:

$X1$ = working capital / total assets;

$X2$ = retained earnings / total assets;

$X3$ = earnings before interest and taxes / total assets;

$X4$ = market value of equity / total liabilities;

$X5$ = sales / total assets.

To apply Altman’s Z-Score model, the author will pick the necessary values from the income statement and balance sheet of the company, representing the accrual basis of analysis, and will insert them into ratios from $X1$ to $X5$ in the Formula 1. As an output of the model application,

the author will get the score, which will classify the company into one of three categories: red (high credit risk), green (low credit risk), grey (ordinary credit risk). Important to mention that one should not do this analysis for one year only, only a minimum of five years of analysis can show a more trustworthy result, because sometimes if the company purchases tangible and intangible assets, it can show a decrease in the score on that particular year. As the cash-based credit risk model, the Timothy Jury template was chosen and reworked. A more detailed description of the model and the improvements done by the author is represented in the previous publication (Litvinenko 2022).

Timothy Jury has chosen certain cash flow data indicators to serve the credit risk analysis through his template so, that those indicators are compared for several years. Indicators taken from the statement are listed in Table 1: cash generated from operations as a starting line, deducting generated from net working assets, deducting net CAPEX, deducting taxation paid in the period. These lines result in the line “cash available to satisfy capital providers”. Further, the net interest and net dividends are deducted resulting in the line “cash available for debt service”. The next line in the template is “total net debt in cash”, and the last line is “number of years to repay” which is finalizing the template. (Jury 2012, 208)

Table 1. Indicators of Jury’s template

Action	Line
Starting line	Cash Generated From Operations
(Deduct)	(Invested In) / Generated From Net Working (Current) Assets
(Deduct)	Net Capital Expenditures
(Deduct)	Taxation Paid In The Period
Equals to	Cash Available To Satisfy Capital Providers
(Deduct)	Net Interest
(Deduct)	Net Dividends
Equals to	Cash Available For Debt Service
Starting line, divide by line above	Total Net Debt (-) In Cash
Equals to	Number Of Years To Repay

Source: Jury (2012, 208)

Important to mention the classification criteria. Thus, if the number of years to repay the debt is from 0 up to 6 years, it shows that the company is healthy and mature. When the number of years to repay ranges from 6 to 10 years, the leverage of the company is high and cash flow is fully utilized. Finally, if the number of years to repay is more than 10 years, there is too much debt. Jury states that restructuring and business disposals might be required to reduce debt, which speaks of the high credit risk. (Jury 2012, 205).

Timothy Jury has created a template comparing values for five years and after several mathematical manipulations getting the number of years to repay the debt. The higher the number of years to repay the debt, the closer the company is to the credit default. Table 2 below shows the summary of outputs. The healthy number of years to repay is from 0 to 6 years. (Jury 2012, 205).

Table 2. Summary of the Jury’s credit risk template outputs

Characteristic	Jury’s Template
High credit risk. Marked as a red category.	More than 10 years to repay the debt.
Ordinary credit risk. Marked as a grey category.	From 6 to 10 years to repay the debt.
Low credit risk. Marked as a green category.	From 0 to 6 years to repay the debt.

Source: Jury (2012)

Thus, as visible from Table 2, according to Jury's classification, zero to six years to repay the debt means the strong mature company without problems with solvency and liquidity and strong profitability from its major business activities. Jury's six to ten years to repay the debt, meaning the company acting normally, has the ability to cover the debt, but has small issues with its solvency, liquidity, and profitability. However, such a company still accumulates positive cash from operating activity. Jury's more than 10 years to repay the debt, especially dangerous if classified as "never". This means that the company has a negative value of net cash flow from operations. Such companies have serious problems with solvency, liquidity, and especially with profitability, having the high chances of bankruptcy and a high probability of credit default, the inability to repay the debt provided by the financial institutions. There are several advantages, specified by Jury regarding the use of his template (Ibid. 209):

- The analysis using the template shows the actual cash available for the interest and debt service.
- The template indicates the cause of the problems with cash if any.
- The cash flow values summarized based on several years show the historic effects of the industrial and economic cycles.

The template is a valuable invention for companies and financial professionals because the cash available for the service of debt is not shown in the financial statements, though it contributes a lot to the credit risk analysis of the company.

The author will compare the results of this accrual-based model to the results gained with the breakthrough cash-based model created by Timothy Jury. Timothy Jury has created a template comparing values for five years and after several mathematical manipulations getting the number of years to repay the debt. The higher the number of years to repay the debt, the closer the company is to the credit default. The healthy number of years to repay is from 0 to 6 years, the author will mark it as a green zone, red zone more than 10 years, and grey zone will be from 6 to 10 years (Jury 2012, 205). Table 3 summarizes the features of both credit risk models used in this research.

Table 3. Summary of the usage two credit risk models

Characteristic	Altman's Z-Score for manufacturing firms	Jury's Template
Basis	accrual-based	cash-based
Number of years analyzed	five years	five years
High credit risk. Marked as a red category.	Z-Score less than 1.81	more than 10 years to repay the debt
Ordinary credit risk. Marked as a grey category.	Z-Score from 1.81 to 2.99	from 6 to 10 years to repay the debt
Low credit risk. Marked as a green category.	Z-Score more than 2.99	from 0 to 6 years to repay the debt.

Source: Altman (2018) and Jury (2012)

As it is visible from the Table 3, the models are comparable. The result of the accrual-based and cash-based models application might classify the company:

- both as a solvent;
- both as insolvent;
- show different results.

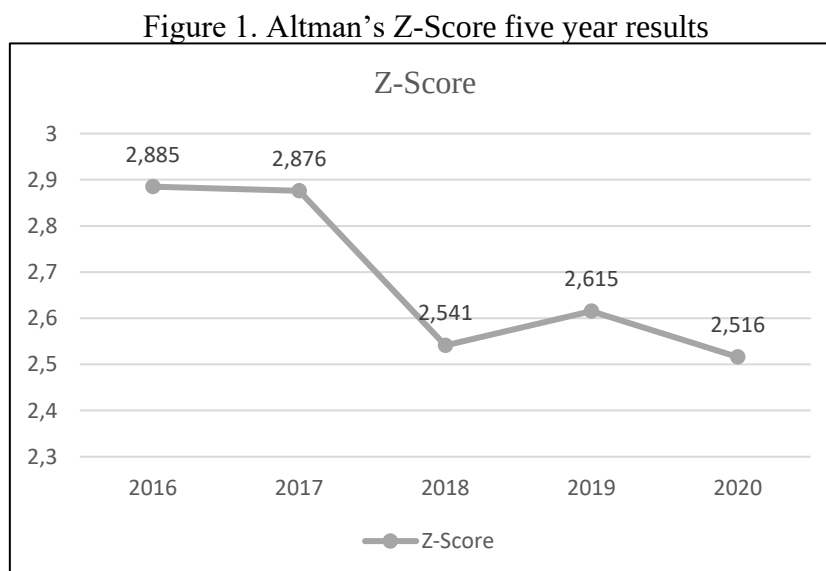
If accrual-based and cash-based credit risk models show different results, this would represent the most interesting option for the investigation. The author will investigate, what could cause different results for the application of these two models.

To illustrate the comparison of accrual-based and cash-based credit risk models on a case study, the author has chosen for analysis of the financial statements of *Linas Agro Group* (Linas Agro Annual Report 2016/2017). The company produces milk, poultry, grain, oilseeds for export in Baltics and Scandinavia, as well as supplying certified seeds, fertilizers, machinery, and plant protection products to the farmers. *Linas Agro Group* is a publicly listed company with its shares traded at Nasdaq Baltic (Nasdaq Baltic 2021). It is important to mention that the financial year of *Linas Agro Group* ends on the 30th of June.

3 COMPARATIVE ANALYSIS OF ACCRUAL-BASED TO CASH-BASED CREDIT RISK MODEL

This section will start with the application of the Z-Score model and analysis of *Linas Agro*'s accrual financial statements (income statement and balance sheet) with the Z-Score model. In addition, the market value of equity data was taken from the open stock exchange listing and annual report. After the analysis of the company data with the accrual-based model, the author proceeds with the analysis of the cash-based model using Jury's template improved and reworked by the author. Altman's Z-score calculations are represented in Appendix 1.

To review the results of the calculations, Figure 1 includes the compilation of the results of the Z-Score model application to visualize the outcomes.



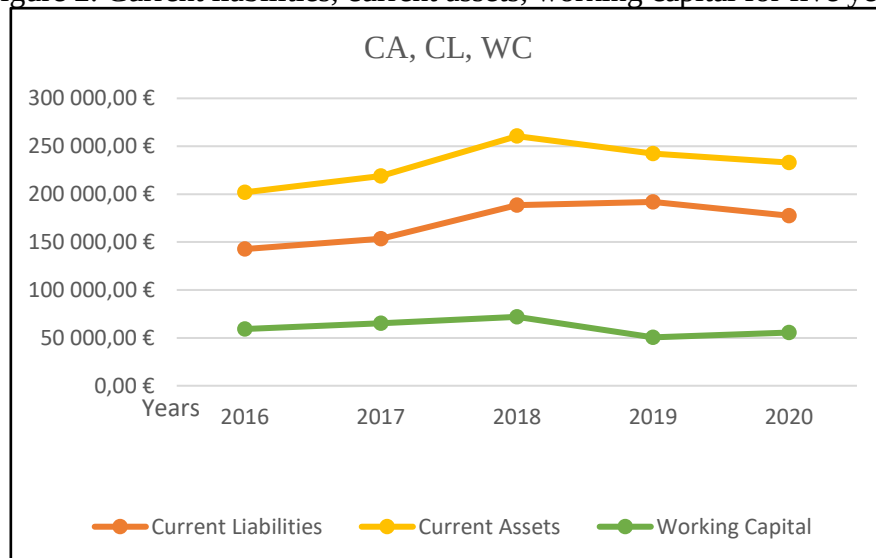
Source: author's calculations based on Appendix 1

As it is visible from the calculations, all Z-Score values are ranging between 1.81 and 2.99 indicating that all years the company is located in the grey zone, closer to the upper part of the grey zone. The smallest Z-Score is 2.516 in the year 2020 and the highest value was gained in the year 2016 in the score of 2.885. The trend of decrease of the Z-Score value is visible throughout the years from the upper grey zone to the middle grey zone. One of the lowest values as shown in the year 2018. Several elements had the strongest influence on Z-Score behavior.

Further, the author reviews the X1 variable that consists of working capital (WC) divided by total assets. Since working capital is calculated as current liabilities (CL) less current assets (CA), the author has decided to extract and depict these three components into the graph

for analysis. Moreover, the current liabilities component is the part of total debt, which will be considered more in detail in the second part of this chapter during the application of the cash-based credit risk model. Figure 2 assists in this analysis.

Figure 2. Current liabilities, current assets, working capital for five years



Source: author's calculations based on *Linas Agro* Financial Statements

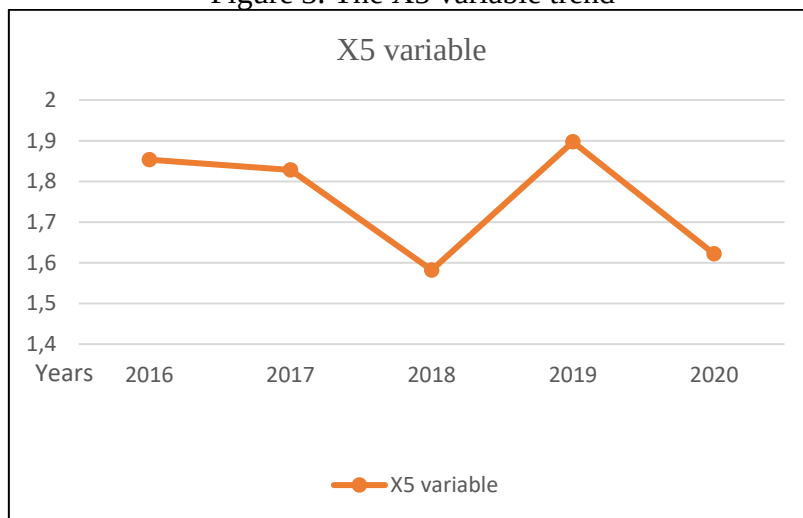
Explaining the low value of working capital in the year 2018, Figure 2 shows that the level of current liabilities has significantly grown in the year 2018 striving to the maximum value for five years which was reached in the year 2019. It is important to review Figure 2 more in detail, as it gives some hints on the origin of certain Z-Score values. Current liabilities continuously grow from the year 2016 to 2019, and only in 2020, they started to decrease. According to the managerial report for the year 2016, the borrowing increased as short-term loans to finance trade activity (*Linas Agro Interim Report 2016/2017*). The total amount of loan portfolio grew in the year 2018, due to increased stocks and debtors (*Linas Agro Interim Report 2017/2018*). The managerial report explains the decrease in current liabilities in the year 2019 as the result of the decrease in financial loans portfolio due to diminished amount of stocks and accounts receivable (*Linas Agro Interim Report 2018/2019*). An existing empirical research confirms that “the importance of the working capital, stating that cash-flow data have incremental information content over accrual earnings data and that cash-flow data are superior to changes in working capital information” (Bowen *et al.* 1987).

As it is visible from Figure 2, current assets have also been growing aligned with current liabilities until the year 2018, but it is important to mention that in the year 2019 they have shown the reverse result starting to fall and continuing the decrease in the year 2020. As it is evident from the balance sheet of *Linas Agro Group* the dramatic increase in the current assets in the year 2018 is caused by the increase in inventories and trade receivables. The decline in current assets in the year 2019 is caused by the decrease in inventories and cash. (*Linas Agro Group Annual report 2018/2019*)

If to consider the working capital line, there is a slight growth from the year 2016 till the year 2018 and a sudden fall in the year 2019. Thus, working capital has shown a deep simultaneous fall with current assets in 2019 while liabilities were still growing. However, current liabilities started to decrease in the year 2020 resulting in the working capital's slight growth in the same year. Thus one of the elements that influenced Z-Score fall in 2020 was a current liability from the X1 variable.

The author finds it important to review the X5 variable. This variable is calculated as sales divided by total assets. This element is one of the most significant components of Altman's model, because it is the only one which value exceeds 1, and the change of this value influences the final Z-Score the most. Figure 3 shows that the dramatic falls in sales of *Linus Agro Group* have happened in the years 2018 and 2020.

Figure 3. The X5 variable trend

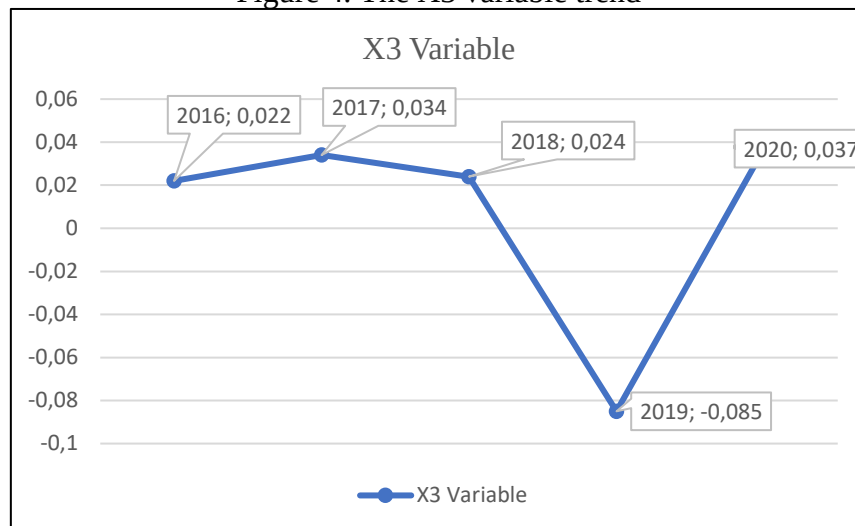


Source: author's calculations based on Appendix 1

To explain the fluctuation of the X5 variable the author analyses sales data of *Linus Agro*, because sales are one of the elements that affect X5 movements, and managerial reports provide sufficient information about sales changes. According to a managerial report, in the year 2018 sales have dropped down compared to the year 2017 due to low grain prices globally and imposed duties on certain products in import markets (*Linus Agro Interim Report 2017/2019*). The total sales volume has also dropped due to the decrease of the harvested area and severe weather conditions (*Ibid.*). As it is visible from Figure 3 the X5 element increases in the year 2019, which is caused by the increase in sales. The managerial report supports this statement, explaining that because of the large product portfolio *Linus Agro* increased its sales volumes (*Linus Agro Interim Report 2018/2019*). However, in the year 2020 Figure 3 shows another drop of X5, which is explained by the sales volume decrease of *Linus Agro Group* by 12% (*Linus Agro Interim Report 2019/2020*).

Another important element for analysis is X3, although it has the lowest weight in Z-Score accrual-based model, it influences the general picture. This element consists of earnings before interest and taxes (EBIT) withdrawn from the income statement, divided by total assets from the balance sheet. Figure 4 assists in the analysis of this variable.

Figure 4. The X3 variable trend



Source: author's calculations based on Appendix 1

Figure 4 shows fluctuations in the years 2018, 2019, 2020. In the year 2018 EBIT has declined slightly compared to the previous year due to the decrease of the value of biological assets and the lower value of the future crop harvest in the group-controlled agricultural companies (Linas Agro Interim Report 2017/2018). As it is visible from Figure 4, the X3 variable has a negative value for the year 2019 due to the drop of EBIT to a negative amount (Linas Agro Interim Report 2018/2019), and it was the only variable from all Z-Score calculations, which shown negative result. However, Figure 2 shows that in the year 2019 the company had the highest amount of current liabilities. It is visible from the income statement that EBIT is negative and visible from the calculation of X3 for the year 2019 that the value is negative. This correlation of facts means that the company has a negative EBIT had to take the additional loans to cover the expenses and losses. The managerial report states that *Linas Agro* decreased the face value of their debts, but has Group's financial expenses increased, meaning that the interest on loans has increased (Linas Agro Interim Report 2018/2019). In the year 2020, EBIT has grown again (Linas Agro Interim Report 2019/2002), and X3 in Figure 4 reflects it. It is important to note that the variables X1, X2 and X4 consist of the elements from the balance sheet, while the variable X3 and X5 contain the elements not only from the balance sheet but also from the income statement (EBIT). The rest of the variables X2 and X4 have not been changing drastically throughout the years of the research. Although X4 had a trend for a decrease from the year 2016 till the year 2020, which speaks of the slow and insignificant decrease of the market capitalization of the company.

Figure 1 shows that Altman's Z-Score credit risk model places *Linas Agro Group* in the upper grey zone, which means that according to this model, the company has no problems with solvency and liquidity. Because accrual-based credit risk models are widely used by financial institutions, this allows the company continuously increase its debt based on accrual-based credit risk model calculations. Since the analysis is based on the cash-flow principle, the relevant values were taken from cash flow statements from the year 2016 until the year 2020. Data on total debts were taken from balance sheets. Table 4 below shows the template of Jury (2012), which was reworked and improved; it includes the analysis for the 5 years. Calculation details are available in Appendix 1.

Table 4. Cash-based analysis based on Jury's template

Elements, in thousands of EUR	2016	2017	2018	2019	2020
Cash generated from operations	17,372	20,603	20,606	4,985	19,770
Changes in working capital:	-	-	-	-	-
Increase(-) /decrease in biological assets	3,096	1,061	2,894	-968	3,508
Decrease/ increase(-) in inventories, incl. right of return asset	-15,098	1,511	-22,191	4,180	8,224
Decrease (increase) in prepayments	2,147	-553	-1,598	5,281	1,555
Decrease in trade and other accounts receivable	4,057	-13366	-15790	3,201	5,614
Increase (-) in restricted cash	-449	199	-710	600	211
Increase in trade and other accounts payable	13,020	-2,444	-1401	3,500	164
Invested in (-) / Generated from Net Working Assets	6,773	-13,592	-38,796	15,794	19,276
Net Capex	-11,911	-15,707	-18,356	-11,440	-5,118
Cash Taxes	-1,251	-1,037	-1,824	-471	-165
Cash available to satisfy capital providers	-6,389	-9,733	-58,976	8,868	33,763
Net interest	-1,896	-2,004	-2,074	-2,309	-2,337
Net dividends	-1,217	-1,228	-1,216	-2,939	-7
Cash available for debt service	-9,502	-12,965	-62,266	3,620	31,419
Total net debt (-) in cash	-98,492	-112,497	-153,968	-150,165	-149,895
Number of years to repay the debt	never	never	never	41.48	4.77

Source: calculations based on the reworked template; Appendix 1

The main element, which allows making a conclusion about the company's ability to repay the debt, is the number of years to repay debt, which is shown in the last line of Table 4. Table 2 provides the description and categorization of the outputs gained from the Jury's template.

It is visible that according to the cash-based credit risk model calculations in Table 4, the number of years to repay for the years 2016–2018 is calculated as “never”. In the year 2019, the number of years to repay got to 41.48, and in 2020, it finally dropped to 4.77, the interpretations of the results are provided further in the paper.

More explicit analysis of the results and the evidence of managerial manipulations investigated through the cash-based credit risk model is provided in the previous publication of the author (Litvinenko 2022). It is important to mention that there is such a phenomenon as the debt to equity hypothesis when managers can shift the income from the future periods to the present because this decreases the debt-to-equity ratio (Hendriksen, Van Breda 1992). Further, the author proceeds with the comparative analysis of the results of the two credit risk models: accrual-based Altman Z-Score and cash-based Timothy Jury modified by the author. As it is visible from Table 5, the results gained from the accrual-based Altman Z-Score model are completely different from the cash-based Jury's credit risk model.

Table 5. Comparative analysis of accrual-based and cash-based credit risk models

Indicators	2016	2017	2018	2019	2020
Accrual-based credit risk model result	2.89	2.88	2.54	2.62	2.52
Altman Z-Score color classification	grey	grey	grey	grey	grey
Cash-based credit risk model result	never	never	never	41.48	4.77
Jury's template color classification	red	red	red	red to grey	green

Source: author's calculations based on Appendices 1 and 2

It is evident from Table 5 that during all the research years from 2016 until 2020, the company was in the upper grey zone according to Altman's Z-Score model. The company had more or less similar values of Z-Score reaching neither green nor red zone. This model did not show any important changes in the financial strategy and situation of the company, which allowed *Linas Agro* to increase the total debt to the maximum level for the five years of research. Some studies confirm that the Z-Score model performs well (Altman *et al.*, 2017). However, the cash-based credit risk model shows a completely different picture. It shows the dramatic fluctuations and changes in the company's financial situation and strategy. In the years 2016 till 2018 *Linas Agro Group* was in the red zone with the high probability of default and inability to repay the debt ("never"), according to the cash-based credit risk model. The company had enough profit but not enough cash to satisfy the debt providers to cover the debts. The only opportunity for the company to repay the debt was to increase the total debts repeatedly. Of course, the negative values of cash flow from operations can be disregarded, as well as the number of years to repay the debt classified as "never" if the company would have managed to perform the payouts with its funds, such as:

- Increase equity through the attraction of external investors;
- Increase its capital;
- Sell out the inventory and non-current assets;
- Increase sales;
- Increase profitability of company's operations;
- Decrease manufacturing costs.

Nevertheless, the financial strategy of the company was to continue increasing the total debts and continuing to pay out dividends to its stakeholders from the years 2016-2019. As stated by Hendriksen and Van Breda (1992), the dividend decision must take into consideration many factors such as capital growth and expansion objectives of the firm, external funding policies, and most importantly the availability of cash (Hendriksen, Van Breda 1992, 271). The strategy of *Linas Agro* goes against the researcher's findings.

Linas Agro started a transformation in the organizational structure in the year 2019 what allowed the company to reach the "red to grey" level with the mark of 41.48 years to repay the debt. The transformation included reducing operating costs, closure of the dormant company in Latvia, closure of Denmark company *Linas Agro*, implementing other programs increasing the efficiency of internal processes, and reducing operational costs (*Linas Agro* Interim Report 2018/2019).

In the year 2020, significant changes in the company's strategy and management have happened. A new financial director replaced in 2020 the financial director, who was running the company until the year 2019 (*Linas Agro* Annual Report 2019/2020). In addition, the auditor was changed in the year 2020 for KPMG, replacing the Ernst & Young auditing until 2019. Moreover, the company has changed its organizational structure and formed a sub-group of companies from new and acquired land management companies (*Ibid.*).

In the year 2020, the company had changed its strategy (*Linas Agro* Interim Report 2019/2020) what allowed to

- decrease the amount of total debt, as calculated by the author in Appendix 3 and supported by the managerial report;
- get the positive value of the cash generated from the net working assets, as calculated in Appendix 2 and confirmed by managerial report;
- get the positive result of net cash from operating activities as visible from the cash flow statement (*Linas Agro* Annual Report 2019/2020);
- reach the green zone according to the cash-based credit risk model with the significant of 4.77 (years to repay the debt), as calculated by the author in Appendix 2.

This speaks of the fact that in the company the management team restructuring has happened and the correct financial strategy was pursued. It is important to mention that the new auditor KPMG that audited the financial statements of *Linas Agro Group* for the financial year 2019/2020 has identified the significant increase in credit risk or credit-impaired (defaulted) exposures (*Linas Agro* Annual Report 2019/2020) which was a residual result of previous years' company policy. The author believes, there is a good tendency because the problems, which *Linas Agro* had during preceding years, could not have been changed at once in the year 2020 but significant steps were taken towards the improvement of the financial situation of the company, although there is no guarantee that the company will continue to follow the new financial policy. As a result of the calculations, there is a visible necessity to calculate the probability of default not only according to the accrual-based credit risk model, which is widely used nowadays in financial institutions but also to investigate the opportunity to use the cash-based credit risk models. Comparison of the results between these two models is highly appreciated to find the best suitable model for each particular case.

4 CONCLUSION

The present study and the model built are based on the IFRSs accounting principles and the analysis of the financial statements of the last five years of the company listed on the stock exchange. The result of the research has provided the economic society with clear evidence of the necessity to create the theoretical knowledge base of the credit risk models built according to the cash flow basis principles and their combinations with the actively used accrual-based models.

As a result of the research, the author of this paper answered the research questions set in the beginning:

1. What are the potential strengths of the credit risk model based on the cash flow principle?

As it revealed by the implementation of the cash-based credit risk model, its strengths are:

- The visibility of the actual financial situation of the company, its ability to cover the debt, and specification of the source from which the debt was covered.
- The cash flow statement is more difficult to manipulate the data compared to accrual-based statements, especially in the section of cash flows from operating activities.
- It shows more clearly whether the company is close to bankruptcy and specifies the probability of default.

2. What are the weaknesses of the accrual-based credit risk model?

Weaknesses of the accrual-based credit risk model were revealed during implementation and comparison with the cash-based model. Weaknesses are as follows:

- This model showed no significant changes in the company's financial situation for all research periods.
- The model has shown the company in the grey zone for all five years, classified as creditworthy.
- The model allowed the company to continue increasing its debt and getting deeper into the debt trap striving for bankruptcy. If *Linas Agro* would not take a restructuring in 2019–2020, it would most likely be bankrupt.

3. What are the benefits of the combined use of both cash-based and accrual-based credit risk modelling methods in analyzing companies? The benefits are:

- A clearer vision of the company's financial situation.
- Better prediction of the probability of bankruptcy, credit risk and default.
- More balanced and justified decisions for financial institutions when issuing loans.

As it was observed, the traditional Altman's Z-Score model works well only if the financial managers did not manipulate the accrual-based statements of the companies analyzed. If the financial managers possess the skills to manipulate the accrual-based financial statements, then they are able to hide the actual results in a way that the accrual-based credit risk models cannot recognize and assign the moderate result to the company. Currently, financial managers did not acquire the skills to manipulate the statement of cash flows. Therefore the cash-based credit risk model shows the actual financial situation of the company and helps to uncover the manipulations on accrual-based financial statements when the results are compared between the cash-based credit risk model and the accrual-based Altman's Z-Score model. As it becomes evident from this research, it is important for the financial analysis and audit to reveal the actual financial situation of the companies to estimate the probability of default and predict bankruptcy. It is important to admit, that the only financial structure which indicated the company's actual financial situation and reacted properly, was the stock exchange. The fluctuation of *Linas Agro Group* share prices was the evidence (Nasdaq Baltic 2021). Traders perform the analysis of the company's solvency, liquidity, and profitability, as well as forecasting using not only accrual-based tools but relying on cash-based tools a lot (Ramnath *et al.*, 2006). However, sometimes traders are overly optimistic. The studies revealed that even when a company filed for bankruptcy the increase in share price can happen when the large traders create bull market conditions due to the optimistic spirit of investors (Panigrahi, 2019, 66). The threat of insolvency of the company felt by stockholders causes equity and credit markets to react by a decrease in shares price and the loss of value of the certificates of indebtedness (Hendriksen, Van Breda, 1992, 172). This in its turn increases the costs of additional borrowing for the company, complicates the growth, and attempts to overcome financial difficulties.

Currently, the author of this paper is in the process of creating a new model based on financial principles, which adds to the accounting principles some elements of forecasting based on the multiple linear regression method, elements of probability, deviation and correlation.

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APPENDICES

Appendix 1. Authors calculations of Z-Score credit risk model for 5 years

30.06.2016	Calculation, thousands of EUR	Result
X1	59,229 / 332,473	0.178
X2	88,310 / 332,473	0.266
X3	7198 / 332,473	0.022
X4	106,490 / 170,512	0.625
X5	615,959 / 332,473	1.853
Z	$(1.2 \times 0.178) + (1.4 \times 0.266) + (3.3 \times 0.022) + (0.6 \times 0.625) + (0.999 \times 1.853)$	2.885
30.06.2017	Calculation, thousands of EUR	Result
X1	65,312 / 352,849	0.185
X2	95,177 / 352,849	0.267
X3	12,054 / 352,849	0.034
X4	104,900 / 183,632	0.571
X5	644,952 / 352,849	1.828
Z	$(1.2 \times 0.185) + (1.4 \times 1.267) + (3.3 \times 0.034) + (0.6 \times 0.571) + (0.999 \times 1.828)$	2.876
30.06.2018	Calculation, thousands of EUR	Result
X1	71,899 / 400,937	0.179
X2	102,951 / 400,937	0.257
X3	9597 / 400,937	0.024
X4	114,437 / 223,863	0.511
X5	634,423 / 400 937	1.582
Z	$(1.2 \times 0.179) + (1.4 \times 0.257) + (3.3 \times 0.024) + (0.6 \times 0.511) + (0.999 \times 1.582)$	2.541
30.06.2019	Calculation, thousands of EUR	Result
X1	50,505 / 391,398	0.129
X2	89,955 / 391,398	0.23
X3	-3336 / 391,398	-0.085
X4	100,132 / 221,328	0.452
X5	742,542 / 391,398	1.897
Z	$(1.2 \times 0.129) + (1.4 \times 0.23) + (3.3 \times -0.085) + (0.6 \times 0.452) + (0.999 \times 1.897)$	2.615
30.06.2020	Calculation, thousands of EUR	Result
X1	55,642 / 405,421	0.137
X2	105,122 / 405,421	0.259
X3	14,827 / 405,421	0.037
X4	93,775 / 224,219	0.412
X5	657,700 / 405,421	1.622
Z	$(1.2 \times 0.137) + (1.4 \times 0.259) + (3.3 \times 0.037) + (0.6 \times 0.412) + (0.999 \times 1.622)$	2.516

Appendix 2. Author's calculations of cash-based credit risk model

In thousands of EUR	2020	2019	2018	2017	2016
Cash generated from operations	19,770	4,985	20,606	20,603	17,372
Changes in working capital	–	–	–	–	–
(Increase) decrease in biological assets	3,508	-968	2,894	1,061	3,096
Decrease (increase) in inventories, incl. right of return asset	8,224	4,180	-22,191	1,511	-15,098
Decrease (increase) in prepayments	1,555	5,281	-1,598	-553	2,147
Decrease in trade and other accounts receivable	5,614	3,201	-15,790	-13,366	4,057
(Increase) in restricted cash	211	600	-710	199	-449
Increase in trade and other accounts payable	164	3,500	-1,401	-2,444	13,020
(Invested in)/ Generated from Net Working Assets	19,276	15,794	-38,796	-13,592	6,773
Net Capex	-5,118	-11,440	-18,356	-15,707	-11,911
Cash Taxes	-165	-471	-1824	-1,037	-1,251
Cash available to satisfy capital providers	33,763	8,868	-58,976	-9,733	-6,389
Net interest	817 - 3,148 = -2,337	635 - 2,944 = -2,309	503 - 2577 = -2074	868 - 2,872 = -2004	273 - 2,169 = -1,896
Net dividends	1 - 8 = -7	4 - (17+2,926) = -2,939	14+1,202 = -1,216	26+1202 = -1,228	15+1,202 = -1,217
Cash available for debt service	31,419	3,620	-62,266	-12,965	-9,502
Total net debt (-) in cash	-149,895	-150,165	-153,968	-112,497	-98,492
Number of years to repay	4.77	41.48	NEVER	NEVER	NEVER

Notes:

1. Cash Generated from Operations 2020 = 38,881 + 165 - 19,276 = 19,770
2. Cash Generated from Operations 2019 = 20,308 + 471 - 15,794 = 4,985
3. Cash Generated from Operations 2018 = -20,014 + 1,824 + 38,796 = 20,606
4. Cash Generated from Operations 2017 = 5,974 + 1,037 + 13,592 = 20,603
5. Cash Generated from Operations 2016 = 22,894 + 1251 - 6,773 = 17,372

Appendix 3. Authors' total debt calculations

Year 2020: Total Net Debt (-) in Cash. Changes	Changes
Net debt at beginning of the year	150,165
Increase in cash in the year	1,902
Decrease in short-term borrowing	20,810
Current portion of long-term borrowing	281
Decrease in long-term borrowing	1,101
Finance lease obligation (non-current)	-17,040
Current portion of finance lease obligations	-4,117
Deferred income tax liability	-761
Change in net debt	270
Total net (debt)/cash	149,895

Year 2020. Total Net Debt (-) in Cash	Beginning	Ending	Difference
Cash	7,637	9,539	1,902
Short-term borrowing	113,539	92,729	20,810
Current portion of long-term borrowing	13,411	13,130	281
Long-term borrowing	19,793	18,692	1,101
Finance lease obligation (non-current)	2,455	19,495	17,040
Current portion of finance lease obligations	875	4,992	4,117
Deferred income tax liability	92	853	761
Total (debt)/cash	146,743	124,551	22,192
Difference	3,422	25,344	21,922
Total net (debt) / cash	150,165	149,895	270

Year 2019: Total Net Debt (-) in Cash. Changes	Changes
Net debt at beginning of the year	153,965
Increase in cash in the year	-2,858
Decrease in short-term borrowing	4,570
Current portion of long-term borrowing	-6,576
Decrease in long-term borrowing	7,387
Finance lease obligation (non-current)	-1,283
Current portion of finance lease obligations	-316
Deferred income tax liability	18
Change in net debt	3,800
Total net (debt)/cash	150,165

Appendix 3 (continued 1)

Year 2019: Total Net Debt (-) in Cash	Beginning	Ending	Difference
Cash	10,495	7,637	2,858
Short-term borrowing	118,109	113,539	4,570
Current portion of long-term borrowing	6,835	13,411	6,576
Long-term borrowing	27,180	19,793	7,387
Finance lease obligation (non-current)	1,172	2,455	1,283
Current portion of finance lease obligations	559	875	316
Deferred income tax liability	110	92	18
Total (debt)/cash	145,399	146,743	1344
Difference	8,566	3,422	5,144
Total net (debt) / cash	153,965	150,165	3,800

Year 2018. Total Net Debt (-) in Cash. Changes	Changes
Net debt at beginning of the year	112,497
Increase in cash in the year	1,598
Decrease in short-term borrowing	-40,615
Current portion of long-term borrowing	4,226
Decrease in long-term borrowing	-6,779
Finance lease obligation (non-current)	-96
Current portion of finance lease obligations	0
Deferred income tax liability	-739
Change in net debt	-41,468
Total net (debt)/cash	153,968

Year 2018. Total Net Debt (-) in Cash	Beginning	Ending	Difference
Cash	8,897	10,495	1,598
Short-term borrowing	77,494	118,109	40,615
Current portion of long-term borrowing	11,061	6,835	4,226
Long-term borrowing	20,401	27,180	6,779
Finance lease obligation (non-current)	1,076	1,172	96
Current portion of finance lease obligations	559	559	0
Deferred income tax liability	1,906	110	1,796
Total (debt)/cash	98,971	145,399	22,192
Difference	13,256	8,566	21,922
Total net (debt) / cash	112,497	153,965	41,468

Appendix 3 (continued 2)

Year 2017: Total Net Debt (-) in Cash. Changes	Changes
Net debt at beginning of the year	98,492
Increase in cash in the year	1,996
Decrease in short-term borrowing	-19,402
Current portion of long-term borrowing	8,882
Decrease in long-term borrowing	-3,660
Finance lease obligation (non-current)	152
Current portion of finance lease obligations	374
Deferred income tax liability	-351
Change in net debt	-14,005
Total net (debt)/cash	112,497

Year 2017: Total Net Debt (-) in Cash	Beginning	Ending	Difference
Cash	6,901	8,897	1,996
Short-term borrowing	58,092	77,494	19,402
Current portion of long-term borrowing	19,943	11,061	8,882
Long-term borrowing	16,741	20,401	3,660
Finance lease obligation (non-current)	1,228	1,076	152
Current portion of finance lease obligations	933	559	374
Deferred income tax liability	1,555	1,906	351
Total (debt)/cash	76,388	98,971	22,583
Difference	22,104	13,256	8,848
Total net (debt) / cash	98,492	112,497	14,005

Year 2016: Total Net Debt (-) in Cash. Changes	Changes
Net debt at beginning of the year	104,047
Increase in cash in the year	221
Decrease in short-term borrowing	6,164
Current portion of long-term borrowing	-6,630
Decrease in long-term borrowing	5,988
Finance lease obligation (non-current)	561
Current portion of finance lease obligations	-130
Deferred income tax liability	-398
Change in net debt	5,555
Total net (debt)/cash	98,492

2016 Year: Total Net Debt (-) in Cash	Beginning	Ending	Difference
Cash	6,680	6,901	221
Short-term borrowing	64,256	58,092	6,164
Current portion of long-term borrowing	13,313	19,943	6,630
Long-term borrowing	22,729	16,741	5,988
Finance lease obligation (non-current)	1,789	1,228	561
Current portion of finance lease obligations	803	933	-130
Deferred income tax liability	1,157	1,555	-398
Total (debt)/cash	88,774	76,388	12,386
Difference	15,273	22,014	6,741
Total net (debt) / cash	104,047	98,492	5,555

ANALYSIS OF THE PRESERVATION OF THE DOUBLE-ENTRY BOOKKEEPING PRINCIPLE IN THE REPORTING OF DATA IN THE FINANCIAL STATEMENTS OF THE SLOVAK REPUBLIC

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Abstract: *The double-entry bookkeeping principle is the basic accounting system worldwide. Although double-entry accounting has been around for centuries, the evolution of this system is still being developed and refined. The basic principle of double-entry accounting is based on the fact that each financial transaction is recorded in two different accounts to ensure the relationship of the balance sheet equation $Assets = Equity + Liabilities$. In addition to the evolution of the double-entry bookkeeping system, in recent years we have also experienced an increase in digitalization in all processes in the private or business sphere. Accounting is adapting to this trend by introducing electronic processing and storage of documents. The aim of this paper is to describe the development of double-entry bookkeeping in Slovak republic, to highlight its basic principles, point out and the process of electronification in Slovak republic and to analyse the preservation of the balance principle in the reporting of data in the financial statements on a selected sample of accounting entities in the Slovak Republic.*

Keywords: *double-entry bookkeeping, accounts, financial statements, electronic accounting record, Register of financial statements*

1. INTRODUCTION

Double-entry bookkeeping has been an automatic part of the accounting profession for centuries. Accounting has evolved over time from simple spreadsheet forms of accounting records to sophisticated double-entry accounting records with a logically arranged chart of accounts for each account. The first references to the double-entry technique date back to 13th century Italy, used by Italian merchants or in the banking sector. Since then, two basic accounting systems have been established, namely single-entry and double-entry accounting, which are also used in the Slovak Republic. Double-entry bookkeeping is considered the primary accounting system. Although it has been in use for several centuries and the system of recording and controlling accounting transactions has steadily progressed from paper records to electronic records, we find that not all accounting entities follow the basic balance sheet principle when we obtain information from the financial statements published on the available web portal. The aim of this paper is to describe the development of double-entry bookkeeping as a standard method used to record accounting transactions according to the IAS/IFRS guidelines implemented in Slovak law, to highlight its basic principles, point out and the process of electronification in Slovak republic and to analyse the errors that occur in the reporting of data in the financial statements on a selected sample of accounting entities in the Slovak Republic.

2. METHODOLOGY AND DATA

The object of research is double-entry bookkeeping system, its development, principles and new trends which makes bookkeeping more efficient and less mistaken. We obtained the

resources for the purposes of this article from articles devoted to the genesis of double-entry bookkeeping, digitization of accounting and new trends in accounting (Gonçalves, et al., 2022). The biggest source of information for this article was amendment no. 465/2021 Coll. of the Act on Accounting, which supplemented and specified the provisions in connection with digital accounting. Other important source of information was database of financial statements for selected sample of limited companies. We obtained data for the analysis of the financial statements of selected companies from the web portal www.registeruz.sk.

When writing this article, we used the selection method to select concrete provisions related to double-entry bookkeeping and digital accounting. Selection method was used as well for sample of accounting entities which balance equation was not equal. We used analysed method for closer identification of possible errors occurred in the financial statements of selected sample.

3. EVOLUTION OF DOUBLE-ENTRY BOOKKEEPING

The earliest known form of recording transactions was in the form of simple entries or a tabular bookkeeping system based on a cash ledger and simple ledgers in which each transaction was recorded in only one account. Tabular bookkeeping can be traced back to Roman times when records were kept on wax tablets or "*tabulae cerae*". Among the account books, an *adversaria* (day book) was used to record all the debts, purchases, credits, and obligations of trade. Financial data were then posted from the day book to a "*tabulae rationum*" (tabular ledger). Each account in the *tabulae rationum* was divided into two pages facing each other, one for debit entries and one for credit. But there was no entry made into a second account. All the entries made were single entry in form (Martinelli, 1974, 174–184). According to Zerbi (1952), tabular accounting was the forerunner of detailed single entry bookkeeping, which evolved into double entry bookkeeping.

Alan Sangster (2016) in his paper brings a new perspective on the transition from single to double-entry bookkeeping. He termed this intermediate step between single entries and double entries as "**dual entry**" bookkeeping. Dual entry involved equal entries being made on the opposite sides of two personal accounts but without any indication in either account of the location of the account containing the contra entry. So the difference between dual entry and double entry lies in how the contra entry is recorded. In double entry, each entry in an account must include the location of the account in which the contra entry has been made. No such information is provided in dual entry. This represents the last stage at which bookkeeping was undertaken purely to preserve a historical record of something considered important by the bookkeeper. Once the location of the contra entry was added, it became **double-entry**, and the entries now showed not only the result of what had occurred, but also where else these details had been recorded. This format facilitated external and internal auditing of the correctness of both entries. Table 1 summarizes the differences among the single entry, dual entry and double entry forms.

Table 1. The three stages of modern bookkeeping

	Single entry	Dual entry	Double entry
Entries made in	1 account	2 accounts	2 accounts
Each entry names the other account	-	✓	✓
Each entry includes the page number where the contra entry can be found	-	x	✓

Source: Sangster (2016)

4. DOUBLE-ENTRY BOOKKEEPING NOWADAY

Double entry is the fundamental concept underlying present-day bookkeeping and accounting.

4.1 Double-entry bookkeeping principles

Double-entry accounting used in Slovakia is based on the principles used according IAS/IFRS standards, that every financial transaction has equal and opposite effects in at least two different accounts. It is used to satisfy the equation **Assets = Liabilities + Equity**, in which each entry is recorded to maintain the relationship.

Under the **double-entry** system every transaction is recorded in at least **two accounts**. One account will receive a debit entry, meaning the amount will be entered on the *left* side of that account. Another account will receive a credit entry, meaning the amount will be entered on the *right* side of that account.

Since a debit in one account will be offset by a credit in another account, the sum of all debits must therefore be exactly equal to the sum of all credits. The double-entry system of bookkeeping or accounting makes it easier to prepare accurate financial statements directly from the books of account and detect errors.

Balance sheet accounts

Assets are debit accounts and the increases in assets are recorded on the debit side of the account. Asset accounts have opening balance and final balance on the debit side, so on the side where the increases are recorded. The decreases in asset accounts are recorded on the credit side, the opposite side of the increases.

The accounting principle for asset accounts is as follows on T-account below:

Debit	Asset account	Credit
<i>Opening balance (OB)</i>		
Increases an asset +		Decreases an asset -
<i>Final balance of account (FB)</i>		

Liabilities and Equity accounts

Increases in liabilities and equity are recorded on the credit side of the account and these accounts are called as credit accounts. Credit accounts have normal balances on the credit side. The decreases in credit accounts are recorded on the debit side.

T-account of Liabilities and Equity accounts is shown below:

Debit	Liabilities, Equity account	Credit
		<i>Opening balance (OB)</i>
Decreases a Liabilities and Equity -		Increases a Liabilities and Equity -
		<i>Final balance of account (FB)</i>

Asset, liability, and most owner/stockholder equity accounts are referred to as “**permanent accounts**” (or “real accounts”). Permanent accounts are not closed at the end of the accounting year; their balances are automatically carried forward to the next accounting year.

Income statement accounts

Revenues accounts normally have credit balances that are increased with a credit entry, a debit decreases the balance in case of sales returns or discount.

Debit	Revenue account	Credit
Decreases a Revenue -		Increases a Revenue -
	<i>Final balance of account (FB)</i>	

Expenses normally have their account balances on the debit side (left side). A debit increases the balance in an expense account; a credit decreases the balance. Since expenses are usually increasing, think "debit" when expenses are incurred. (We credit expenses only to reduce them, adjust them, or to close the expense accounts.)

Debit	Expense account	Credit
Increases an expense +		Decreases an expense -
<i>Final balance of account (FB)</i>		

“**Temporary accounts**” (or “nominal accounts”) include all of the revenue accounts and expense accounts. Generally speaking, the balances in temporary accounts increase throughout the accounting year and are "zeroed out" and closed at the end of the accounting year. Balances in the revenue and expense accounts are zeroed out by closing their balances to the Income statement account.

Because the balances in the temporary accounts are transferred out of their respective accounts at the end of the accounting year, each temporary account will have a **zero balance when the next accounting year begins**. This means that the new accounting year starts with no revenue amounts, no expense amounts.

To keep a company's financial data organized, accountants developed a system that sorts transactions into records called accounts. When a company's accounting system is set up, the accounts most likely to be affected by the company's transactions are identified and listed out. This list is referred to as the company's chart of accounts. Depending on the size of a company and the complexity of its business operations, the chart of accounts may list as few as thirty accounts or as many as thousands. A company has the flexibility of tailoring its chart of accounts to best meet its needs.

Within the chart of accounts in the Slovak republic the balance sheet accounts are listed first, followed by the income statement accounts as follows:

- Assets,
- Liabilities,
- Equity,

- Expenses,
- Revenues or Income.

At the end of the chart of accounts we have in Slovakia one more group of accounts to open all mentioned accounts above on the beginning of the accounting period and close at the end of accounting period, as well as accounts for internal use. This group of accounts called closing accounts and off balance sheet accounts.

4.2 Double-entry bookkeeping nowadays in Slovak Republic

All companies (accounting units in accounting terminology) are obliged to account in the **double-entry bookkeeping** system, except for those which are allowed to do so by Act No. 431/2002 Coll. Accounting Act, as amended (hereinafter referred to as the Accounting Act). According to Section 9(2) of the Accounting Act, only the following entities **may use the single entry system** of accounting:

- a) a natural person who is engaged in business and complies with [Section 1(1)(a)(3)],
- b) a civil association, its organisational units, if they act on their own behalf, organisational units of the Matica Slovenska, which have legal personality, associations of legal persons, communities of owners of flats and non-residential premises, non-investment funds, hunting organisations and non-profit organisations providing generally beneficial services; if they are not in business and if their income did not reach EUR 200 000 in the previous accounting period, if they are not a subject of public administration,
- c) churches and religious societies, their bodies and religious institutions which have legal personality; if they are not engaged in business.

All other companies must keep double-entry accounts according to the relevant legal accounting norms.

Following the last major amendment to the Accounting Act with effect from 1.1.2022, when we talk about the evolution of accounting, we must also mention an essential part of our constantly evolving daily processes in the accounting profession, which is the digitisation of the accounting system. This amendment clarifies and supplements the provisions regarding electronic accounting records, their processing, keeping and archiving of accounting electronically. There are still two systems of accounting - double-entry bookkeeping and simple bookkeeping, but the way documents are processed and stored is in regulation expanding from existing paper to electronic form.

A **paper accounting record** is considered to be an accounting record made on paper or made using software and printed on paper, which is sent and received as a document (by post), or made for the internal purposes of the accounting entity as a documentary document.

An **electronic accounting record** means an accounting record:

1. which is prepared, received or made available in electronic format, whereby the electronic format is determined by the preparer of the accounting record himself or determined on the basis of an agreement with the recipient of the accounting record,
2. in the form of a scanned document, while it may form an attachment to an electronic mail,
3. prepared in electronic format for the internal purposes of the accounting unit (as internal accounting documents).

Changing the form of an accounting record from a paper form to an electronic one, or from an electronic form to a paper form, this is the so-called **transformation of an accounting record**. Transformation from the paper form to electronic form and opposite is possible if the content of the accounting record is preserved intact and that the accounting record is provable.

Many accounting entities have welcomed the possibility of electronic processing and storage of documents as it brings them a number of advantages. Accounting entities no longer have to keep physical documents, they no longer have to worry about them not being destroyed,

lost, faded or damaged. Digitisation of accounting enables faster search of documents by supplier, amount, date of issue or other selection attributes. The advantage of digital accounting is also the effective control of duplicates, help to make accounting processes more efficient, less mistakes and in the end save money.

5. REGISTER OF FINANCIAL STATEMENTS

The impact of the digitisation of accounting records has placed even greater emphasis on the reporting and presentation of financial statement data, which is important to the various users of financial statement information. The Government of the Slovak Republic has therefore extended the list of entities required to file financial statements electronically from 1 January 2022 in the public part of the **Register of Financial Statements**. The Register started to perform its tasks from January 1, 2014 and obligatorily publishes the accounting documents pursuant to section 23(2) of the Accounting Act, drawn up on 31 December 2013 and thereafter. The Register is a public administration information system, the administrator of which is the Ministry of Finance of the Slovak Republic.

The Register of Financial Statements was established with the aim of improving and simplifying the business environment and reducing the administrative complexity of business. The Register is divided into a public part and a non-public part.

The **non-public** part of the Register of Financial Statements consists from 1.1.2022 only of documents for (MFSR, 2022):

- a) foreign organizational units of legal entities and
- b) natural persons – entrepreneurs, if they are an accounting entity.

The **public part** of the Register consists of documents of all other entities. From 1.1.2022 the public part of the Register of Financial Statements has been **extended** to include other legal forms of legal entities, thus all legal entities that are obliged to deposit documents in the Register will be included in the public part of the Register. These are mainly:

- land communities,
- non-governmental non-profit organisations such as civic associations, communities of owners of flats and non-residential premises,
- interest associations of legal persons and others.

In order to extend the functionalities of the register, all accounting documents after 1 January 2022 will be stored in the register for the accounting period of 2021 or for previous accounting periods **only in electronic form**.

When storing accounting documents in the register in electronic form, it is possible to store accounting documents:

- as an attachment made in electronic form, or
- to complete a form for the entity to store the financial statements in structured form. The creation of the form will significantly reduce the error rate of accounting documents and increase the comfort of storing them.

If a form for a structured form of financial statements or other accounting document is created, it will no longer be possible to store the accounting document even as an attachment to the submission. In this case, it will not be possible to save the financial statements as part of the annual report either. This will particularly affect non-governmental non-profit organisations which are obliged to file a tax statement and to compile financial statements. Until the end of 2021, they had the possibility to deposit their financial statements and other accounting documents in paper form. However, from 1 January 2022, they had to file their 2021 financial statements electronically as well. The financial statements are deposited in the Register of Financial Statements via the electronic filing office of the Financial Administration of the

Slovak Republic. The Financial Administration of the Slovak Republic has already prepared a structured form of the financial statements for non-profit entities on its portal within the electronic forms, so it is their legal obligation to fill in this form for the financial statements only electronically via the electronic form. This change is related to the fact that when financial statements were saved in paper form, there was a large error rate in their processing as well as saving incorrect templates of financial statements.

6. ANALYSIS OF SELECTED ENTITIES WHOSE BALANCE SHEET EQUATION DOES NOT EQUAL

The financial statements of accounting entities that are neither in bankruptcy nor in liquidation were the subject of the balance sheet equation equality test. The legal form we chose was the most commonly used legal form, which is the limited liability company. From the selected database of entities, we then investigated for how many of these entities the equation : assets = equity + liabilities is broken. Out of a total of 77184 limited liability companies, we found that balance sheet equality was not met in 47 entities, of which in 33 entities the inequality was only due to the effect of rounding, where the difference was less than 2 euros. The remaining 14 entities had a significant difference in the balance sheet total. We then analysed the financial statements of these entities in more detail to identify the most common errors and deficiencies that may occur in the financial statements. Those results are presented in the table below and the factors giving rise to the inequalities are described below the table.

Table 2. Limited companies with a non-equal balance sheet amount in the 2020 financial statements

No.	Name of the accounting entity	Date of origin	TOTAL ASSETS	TOTAL EQUITY AND LIABILITIES	Difference in balance sheet total	Type of accounting entity
1	STYLEX, s.r.o.	6.4.2005	15783	14419	1364	small
2	LESOPROJEKT, s.r.o.	13.9.2007	26804	25021	1783	big
3	TRAFO Softworks, s.r.o.	20.4.2013	31823	15860	15963	small
4	DFL, s.r.o.	10.1.2017	48246	736	47510	small/micro
5	KONTRAKT GP, spol. s r.o.	6.4.2012	29956	25823	4133	small
6	Chyt' ho, s.r.o.	17.2.2016	2339	1059	1280	small
7	KALEBRA, s.r.o.	21.2.2019	45002	43380	1622	small
8	PROJEKTING-BB, s.r.o.	7.12.2012	42424	34627	7797	big
9	Omnia Slovakia, s.r.o.	30.11.2007	368466	189618	178848	small
10	UNISOL SLOVAKIA s.r.o.	19.9.2012	23041	-111	23152	small
11	ADLERR, s.r.o.	12.12.2006	79086	34492	44594	small
12	HYDINA KUBUS s.r.o.	19.4.2005	1590961	1611876	82951	small
13	Mabtech s.r.o.	13.1.2012	26322	24218	2104	small
14	ORION TIP, s.r.o.	6.8.2016	5491239	4794617	696622	big

Source: own processing from the www.registeruz.sk

Analyse of the entities:

1. Our analysis of the **STYLEX, s.r.o.** found that the total amount of equity and liabilities did not match the individual items shown on the liability side. In addition, a peculiarity of the balance sheet of this financial statement is also that it has complete identical items of assets, equity and liabilities for both 2020 and 2019, i.e. no expenses, income or other changes have taken place, which is quite unrealistic in practice as the company has a bank account, so that minimal bank fees are a common expense for existing entities. It shows no line item in the profit and loss statement and shows a zero profit and loss for both 2020 and 2019, which is also not a common occurrence for entities.

2. In our analysis of the **LESOPROJEKT, s.r.o.**, we found that it did not show any share capital or legal reserve and the sum of the individual items of equity and liabilities did not add up to the total. After adding up the individual items, the amount of EUR 26 804 shown in assets would equal the amount of equity and liabilities, but the entity shows a different total amount in the balance sheet, an incorrect total, and incorrectly shows negative liabilities from current operations. At the same time, in the profit and loss account, the entity shows a significant loss of EUR 23225, yet on the liabilities side of the balance sheet it shows a profit of EUR 28588.

3. By analysing the financial statements of **TRAFO Softworks, s.r.o.**, we found that the accounting entity had forgotten to add the profit for the current accounting period shown on line 100 in the amount of EUR 15 965 to equity, which is why it had such a significant difference in the balance sheet equation.

4. Our analysis of the financial statements of the entity **DFL, s.r.o.** revealed that the entity has entered two individual financial statements for the year 2020 in the Register of Financial Statements. One as a micro-entity, where the total assets amounted to EUR 736 made up of cash, and on the liabilities side the same amount of EUR 736 represented only the amount of the profit for the current accounting period reported on line 100, but there are no amounts of share capital, legal reserve fund, etc. The second set of financial statements for the year 2020 is inserted by the accounting entity as a small entity, giving completely different figures for the various items of assets and liabilities. The total amount of assets is EUR 48246, and the amount of equity and liabilities is also equal to the amount of assets of EUR 48246, so the balance sheet equation is maintained, but the question is how an entity can have completely different balances for the same accounting period. On the basis of the statistical data, we have just identified a discrepancy in the statements.

5. When analysing the financial statements of the **KONTRAKT GP, spol. s r.o.**, we found that in 2020 investments were made for the purchase of tangible fixed assets, which are still shown in the acquisition account in the balance sheet, but at the same time depreciation of EUR 4 374 is shown, but no assets are shown in the balance sheet to which depreciation should be linked. On the liabilities side of equity, the entity does not show any share capital or legal reserve, even though it made a profit in previous accounting periods. Also, the retained earnings of previous periods shown at EUR 4 476 on line 98 do not correspond to the previous period's accounts after adding the profit for 2019, so it is difficult to see on what basis this amount was put there, which may be the reason for such a large difference in the balance sheet equation.

6. Based on our analysis of the **Chyt' ho, s.r.o.** entity's financial statements, we found that the entity incorrectly summed the amount of each item reported on the liability side and also incorrectly reported the amount of liabilities with a minus. Equality of the balance sheet equation would have been achieved by simply checking the sum of the items on the liabilities

side. However, when comparing the balance sheet and the income statement, we found a different amount of profit and loss for the 2020 financial year. According to the profit and loss account, a loss of EUR 71 is shown on line 61, which does not correspond to the result shown on the liabilities side of the balance sheet on line 100, amounting to EUR 405. These two lines should be identical, but they are not, so the accounts do not give a true and fair view and the balance sheet total cannot add up either.

7. By analysing the financial statements of the **KALEBRA, s.r.o.**, we found that the accounting entity forgot to add the result of the current accounting period – the profit for the current accounting period shown on line 100 in the amount of EUR 606 as well as the retained earnings of previous years in the amount of EUR 1016 to the equity, which is why it incurred a difference in the balance sheet equation in the amount of EUR 1622.

8. By analysing the financial statements of the **PROJEKTING-BB, s.r.o.**, we found that the accounting entity forgot to add the loss for the current accounting period shown on line 100 in the amount of EUR 11219 and the retained earnings of previous years in the amount of EUR 19016 to the equity, which is why it incurred a difference in the balance sheet equation in the amount of EUR 7797. Among other things, our analysis of the financial statements revealed other deficiencies, such as the fact that, although it made a loss of EUR 17034 for the previous accounting period, the retained earnings of previous years, together with the legal reserve, were increased by a total of EUR 838, while the balance sheet does not show the adjustment of the loss for the previous period. At the same time, the economic outturn shown in the profit and loss statement for the current period on line 61, amounting to EUR 7142, does not correspond to the amount of the economic loss for the current period, a loss of EUR 11219. Similarly, the profit and loss amounts for the previous period are also different, so that it is likely that the balance sheet total will not be the same in subsequent accounting periods unless the misstated individual items are corrected. At the same time, on the asset side, it shows non-current assets in a negative amount, which does not make sense.

9. By analysing the financial statements of the **Omnia Slovakia, s.r.o.**, we found that the accounting entity had forgotten to add the profit for the current accounting period shown on line 100 in the amount of EUR 51608 and other funds in the amount of EUR 127240 to equity. Together, these two amounts make up the difference in the balance sheet equation of EUR 178 848.

10. Based on our analysis of the **UNISOL SLOVAKIA s.r.o.** entity's financial statements, we found that the entity incorrectly summed the amount of each item reported on the liability side and also incorrectly reported the amount of liabilities with a minus sign. Equality of the balance sheet equation would have been achieved by simply checking the sum of the items on the liabilities side. However, when comparing the balance sheet and the profit and loss account, we found a significantly different amount of profit and loss for the 2020 accounting period and similarly for the previous accounting period. According to the profit and loss account, line 61 shows a profit for the year 2020 of EUR 234, which does not correspond to the result shown on the liabilities side of the balance sheet on line 100 of EUR 18804. These two lines should be identical, but they are not, so the accounts do not give a true and fair view and the balance sheet total cannot add up either.

11. There are a number of factors that affect the large difference in the balance sheet equation of **ADLERR, s.r.o.** entity's financial statements. In the introduction, on the asset side, the amount of the adjustment (write-downs) is incorrectly stated because the sum of the adjustments

to the assets comes out to EUR 18 951 and not EUR 7009 as shown on line 1. At the same time, the entity has not included fixed assets for which it reports depreciation and incorrectly reports the amount of receivables with a minus sign, similarly, on the liabilities side, the amount of payables with a minus sign.

12. To identify the difference in the balance sheet total in the 2020 financial statements of **HYDINA KUBUS s.r.o.**, it would be useful to look at the current accounts as the totals of the line items add up, even the audit report does not indicate significant misstatements, but from a comparison of both the 2020 and 2019 financial statements, the balance sheet equation is not maintained.

13. From the analysis of the financial statements of the **Mabtech s.r.o.**, the difference in the balance sheet amount of EUR 2,104 leads us to the incorrectly reported settlement of the profit for the previous accounting period from line 100, since the profit was EUR 2,654, but only EUR 549 more was added to retained earnings of previous years, while the legal reserve fund, which is compulsorily created when a profit is made, was not increased, and we will not know from the financial statements whether the remaining profit was paid out, but the difference of EUR 2104 corresponds to the amount lost from the previous period's profit.

14. As in the previous entity, the mystery in financial statements of the **ORION TIP, s.r.o.**, is what happened to the rather large amount of the profit for the previous accounting period, as the statutory reserve fund was not contributed the required amount and retained earnings of previous years only increased by EUR 41341, leaving an amount of EUR 78696 unsettled on the profit of previous years. However, the difference in the balance sheet total is due to a number of factors, the origin of which can only be ascertained from the current accounting documents, since the amounts of the individual items of assets and equity and liabilities correspond to those in the financial statements.

6. CONCLUSION

As a result of our research, we find that the most recurring errors that cause the balance sheet equation to be unequal are within equity. These include:

- failure to include the profit or loss of the current and previous accounting period in the total amount of equity,
- the failure to include the amount of the legal reserve in total equity, if the entity has established it at all,
- the absence of a previous period's settlement of profit or loss.

In addition, very often an inequality in the balance sheet total arises if the total amount of either assets or equity and liabilities are incorrectly added up, and also by rounding.

Accounting entities currently have a number of control tools at their disposal which make the work of preparing financial statements and of highlighting errors easier. The very forms available when depositing financial statements in the Register of Financial Statements will highlight possible errors before the actual sending of the financial statements, so it is important that accounting entities take care to comply with the very basic principles of double-entry bookkeeping and the reporting of data in the financial statements. This will also ensure better credibility in the accounting profession. Although the government helps to eliminate discrepancies in the balance of the financial statements thanks to digitization of accounting, it is still the responsibility of each accounting entity to check its balance. Our suggestions to regulatory authorities to improve the current situation is to set up control mechanism for

checking balance of financial statements before sending it and archiving on the Register of Financial Statements.

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REFLECTIONS ON INSTITUTIONAL LEGITIMACY IN THE CZECH ACCOUNTING PROFESSION

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Idea: Institutional legitimacy is a suitable theoretical framework for research in the social sciences and is also frequently used in accounting research.

Data and Tools: In this research we perform an analysis of the responses of representatives of the Czech accounting profession to the issues of new requirements on the accounting profession and current issues caused by the recent pandemic. The research is structured according to the three levels of legitimacy theory identified by Suchman, 1995, and DiMaggio and Powel, 2000.

What's new: We assessed the features concerning normative and mimetic isomorphism that are relevant in Czech conditions because of its particular cultural aspects and historical development.

Contribution: The Czech accounting profession, despite having important economic reasons to use the accounting information embedded in financial statements productively for effectively running companies, often concentrates on tax minimization pursuing the requirements of its clients. Nevertheless, an important change in the perception of the accounting profession's role in society has been initiated by COVID-19.

Limitations and further research: Our findings may be distorted because of the small size of our sample and because of the conditions in which the research has been conducted, even though we have tried to use the information constructively and avoid misinterpretations. Further exploration is needed.

Keywords: accounting profession, institutional legitimacy, isomorphism, tax optimization.

1. INTRODUCTION AND MOTIVATION

Institutional legitimacy is a suitable theoretical framework for research in many social **sciences**. It is also frequently used in accounting research. In Czech conditions, the framework is used more in managerial accounting. In this paper, we use the legitimacy theory framework to ascertain the position of accountants in their profession (Deegan, 2014; Schmidt, 2002).

We have used the perspectives of perceived similarities or isomorphisms. Within this perspective, we concentrate on two kinds of isomorphism: "normative isomorphism" stemming from imitations of norms and behaviour within the profession and "mimetic isomorphism" resulting from endeavouring to gain legitimacy in the society or community.

Legitimacy theory distinguishes three forms of isomorphism: so-called **coercive isomorphism, normative isomorphism, and mimetic isomorphism**. In our paper we will concentrate on the two types of isomorphism which are relevant in Czech conditions:

Normative isomorphism relies on customs and standards maintained by the profession, including norms and best practices. The profession needs to conform to the expectations of the broad society. For this reason, professional groups and associations frequently implement their own norms or voluntary measures, work standards and internal ethical codes (Tuttle and Dillard, 2007; Carungu, Di Pietra and Molinari, 2020).

The second relevant type of isomorphism in Czech conditions is *mimetic isomorphism*. This is initiated from within the organizations, which frequently mimic the behaviour of other companies in the same industry, especially those that are considered successful or more dominant. New useful practices can also be imported from abroad from employees in the same sector (Mizruchi and Fein, 1999; Teodoro, 2014; Dumitru, V., Stanciu, Dumitru, M., and Feleaga. 2014).

This paper is structured as follows: Part one is the introduction. Part two introduces previous literature on institutional legitimacy in accounting. Part three presents the methodology used, and part four summarises our findings. Part five concludes and introduces future research directions.

2. PREVIOUS LITERATURE

Many authors devote their attention to institutional legitimacy in the social sciences. In accounting science, in particular among the significant authors belongs Deegan (2014), who prepared an overview of legitimacy theory in social and environmental accounting literature. The author presents organizational legitimacy as a resource that is necessary for the survival of an organization. Tuttle and Dillard (2007) apply the institutional theory framework in the field of academic accounting and suggest that responses to organizations are based on institutional influences instead of competitive forces. The authors suggest that the processes of institutional isomorphism (mimetic, coercive, and normative) shape the organizational field of accounting research. Rodrigues and Craig (2007) highlight influences on the process of harmonization of accounting standards characterizing the process of construction of international accounting standards as a dynamic process of isomorphism and decoupling.

Amoako, Adam, Arthur, and Tackie (2021) concentrate on institutional isomorphism in environmental management accounting. The authors provide a review and synthesis of institutional isomorphism, environmental management accounting and environmental accountability. Sartono, Suhardjanto, Probohudono, and Djuminah (2022) investigated the mandatory disclosure of mimetic and normative isomorphism in real sector cooperatives in Indonesia. The authors found that the said institutions use mimetic and normative isomorphism when explaining mandatory disclosures to their stakeholders.

Authors Peng, Cui, Bai, and Xu (2022) investigated the institutional isomorphism pressures on multinational corporations concentrating on environmental and social performance. Their study reveals the relationship between institutional isomorphism and environmental and social performance in multinational companies and provides a more comprehensive descriptive approach to institutional isomorphic pressures on MNCs. The authors concluded that the relationship between isomorphic pressures and MNCs' environmental and social performance provides a more comprehensive description approach of IIP measurement. Moreover, suggestions for enhancing MNCs' environmental responsibility by strengthening IIP are also provided by policymakers and MNCs. Romanian authors Dumitru, V., Stanciu, Dumitru, M. and Feleaga (2014) explored the perspective of isomorphic pressures in business education. Romanian universities adhered to the Bologna Treaty requirements, which led to better standardization and unification with international educational standards, including enhancement of educational curricula in business education. This paper studies the evolution of the curriculum for the bachelor's degree of the Faculty of Accounting and Management Information Systems in Bucharest over eight years. The paper concludes that positive changes resulted from the application of the concepts of coercive, mimetic, and normative isomorphism when the faculty consulted educational goals with representatives of the professional bodies. This practice is effectively featuring strong normative and mimetic isomorphism.

3. METHODOLOGY

To explore the features of legitimacy theory in the Czech accounting profession, we decided to use a qualitative approach and interview representatives of the accounting profession, including professional accountants, auditors, tax advisors, and controllers (Axelrod, 1976). Selected professionals formed a diverse pool of representatives from the field of accountancy. Furthermore, we have interviewed representatives of the state control bodies and regulators.

Our aim was to encompass the widest possible spectrum of members of the accounting profession as well as reflect the regulatory entities that participate in the preparation and regulation of accounting norms in the Czech environment. The interviews were recorded, allowing their interpretation and placement in context. All respondents were from the Czech Republic. In the following Table 1 presents the characteristics of the interviewees involved.

Table 1. Interviewees

Interviewee	Professional characteristics	Institution (description)
I1	Professional international accounting education manager	International accounting association
I2	Representative of professional accounting organization	Czech accounting association
I3	Regulator of accounting – state administration	Regulator – state administration
I4	Producer of accounting software	Accounting software firm
I5	Auditor	Big Czech audit firm
I6	Accounting consultant	International audit firm – big four
I7	Auditor and tax advisor	Medium-sized Czech audit firm
I8	Tax advisor	Professional organization
I9	Auditor and tax advisor	International audit firm – non-Big Four
I10	Educational specialist – business	Business educational firm Specialized in training in accounting
I11	Head Controller	Advisory firm
I12	Accounting Lecturer	University

Source: own investigation

The interviews took place in two stages. The first round focussing on opportunities brought by new technological innovations and digitalization in accounting, was held in June and July 2020 in Prague. A subsequent set of complementary interviews was executed in December 2020 and January 2021.

In the second phase, we have adjusted the focus of interviews underscoring the preparedness of the accounting profession to cope with obstacles in effective direct interaction with clients and in the firms' management caused by the experience of COVID-19. We have also enquired about the preparedness of accounting education to adapt to the current needs of the practice and the broader adoption of more sophisticated information technology and digitalization.

The questions build on the findings of the surveys focusing on the main areas in which the accounting profession is changing in response to technological opportunities and measures brought by the COVID-19 pandemic experience, which could result in a major impact on the quality of the results of professional accounting work.

4. FINDINGS

In accordance with the above-mentioned aims of this article, we can now present the results of the analysis of the responses of the interviewees from the point of view of normative and mimetic isomorphism, which we have identified in communication with accounting experts.

4.1 Normative isomorphism in interviewees' responses

It can be stated that normative isomorphism is enabled and implemented through professional accounting institutions both at the national and international levels.

In the Czech Republic, these professional institutions are covered by the National Accounting Council (NÚR), *an independent professional institution to support professional competence and professional ethics in the development of accounting professions and in the field of accounting and financing methodology* (NÚR, 2022). Its members are the Chamber of Auditors of the Czech Republic, the Chamber of Tax Advisors of the Czech Republic, the Association of Accountants of the Czech Republic and the Faculty of Finance and Accounting of the University of Economics in Prague. NÚR issues interpretations that represent certain desirable norms and recommendations, but they are not legally enforceable. However, their observance significantly increases the legitimacy of the profession. Organizing seminars are also important for the development of accounting professionals. Each of the individual members of the NÚR, according to their focus, participates in the continuous improvement of the quality of the accounting profession.

In connection with normative isomorphism, it is still appropriate to mention the ACCA (The Association of Chartered Certified Accountants) – an international professional association which, through its activities in the Czech Republic, contributes significantly to advancing the accounting profession to a higher level.

Since the above-mentioned institutions deal with the education of accounting professionals and, thereby, actually implement normative isomorphism, the most selected answers of the respondents, shown in the following table, relate to this aspect. The education of accountants should develop in these directions.

Table 2. Normative isomorphism – selected answers

I1:	<i>“In addition to basic professional knowledge, knowledge related to current and future technologies and trends in the field of finance, (such as big data, data analysis, blockchain, machine learning, artificial intelligence, etc.), is also important for the performance of the accounting profession.”</i> [Professional educator – accounting]
I3:	<i>“... in the performance of the accounting profession are not only important so-called ‘hard skills’. If the accountant is not able to present clearly and intelligibly the numbers and other contexts that affect financial management, then it is wrong. The so-called “soft skills” are also important, i.e., for example, the ability to present results and interpret them.</i> [Regulator – state administration]
I9	<i>“In the performance of their profession, an accountant works 60% of their time with modules such as MS Office, especially Excel, PowerPoint, and other software of similar purpose. I think it would be good to include this knowledge in the study programs that prepare them...”</i> [International audit firm non-Big Four]
I10:	<i>“...In the activities of an accountant, language skills and the ability to talk about current economic topics and their impact on contemporary society also prove to be an important condition for the performance of activities. ...”</i> [Educational specialist – business]
I12:	<i>“At present, greater demands are placed on the ability to assess the impact of accounting transactions on profit and the balance sheet, the ability to clearly interpret financial statements and draw conclusions from them to assess the financial situation, including the prediction of possible future developments.”</i> [Accounting Lecturer]

Source: own investigation

It is no surprise that nowadays, the demand for education in technology is highlighted. Still, it is also good to note the importance of a deep understanding of the narrative ability of financial statements, including the prediction of the possible future, and the ability to understand the results, which also presupposes the mentioned language and presentation skills, i.e., the so-called soft skills.

The above-mentioned institutions are a good guarantee of securing these requirements in the future, and the necessary competencies will, thus, become a matter of course for accounting professionals.

4.2 Mimetic isomorphism in the responses of interviewees

As follows from the above, mimetic isomorphism is actually an imitation of the ways and styles of practices of "model" companies. That is, those that are successful and worth following. Therefore, many other organizations voluntarily implement their established and tested procedures into their internal regulations (albeit with some adaptation).

It is worth noting that, for example, the Association of Accountants of the Czech Republic helps here by organizing competitions for the best accounting firm of the year, etc. Various discussion forums, seminars, and colloquia enable the exchange of experience and the subsequent use of "examples of good practice".

Selected answers reflecting mimetic isomorphism are shown in the following table.

Table 3. Mimetic isomorphism – illustrative answers

I1	<i>Collecting data from various sources, analysing all data, drawing conclusions from data analysis, and providing insights, real-time accounting – no longer need only to be prepared by FS at the yearend, but there is a growing demand for accurate financial reporting throughout the financial year. There is a strong demand for financial professionals to understand and present the organizations they work for. [International Accountancy training ACCA]</i>
I4	<i>"A general view of most of what is happening in the company is important for the accounting profession. Knowledge changes incredibly fast, and personal motivation and willingness to continue learning becomes crucially important." [Accounting software producer]</i>
I10	<i>The accounting profession, in its target function (i.e., to provide information on the financial condition and performance of a company), is an essential part of the management of any company. It provides the basic and irreplaceable information needed for decision-making by managers and owners as well as other stakeholders. The growing complexity of the performance of this function has historically led to the division of labour in the field of corporate accounting: this information, essential for management, is processed by the "staff" of employees. The requirements for their performance within the accounting department may vary. However, to communicate with each other and be actively involved in the whole set of activities, it is necessary to find the "same professional language" so that the demands on education should not differ. [Educational specialist – business, Accounting]</i>
I11:	<i>Overcoming the existing limits of the scope of accounting services in the company in the direction of deepening the information support of managerial decision-making, especially in the area of operational controlling marketing and business management and updating the strategic management of the company's finances. [Head controller]</i>
I13	<i>The recent pandemic pushed the accounting profession to more digitalization and better coordination due to remote work. [International audit firm – Big Four]</i>

Source: own investigation

Clearly, accounting professionals in companies have advanced very quickly in digitization and remote work practices. The main activity of professional accountants is shifting from routine activities that are gradually replaced by automation to the more important position of manager advisor, communicating with owners, investors, and other stakeholders. Furthermore, an important change in the perception of the role of the accounting profession in society has been initiated by some government measures to induce a decrease in the COVID-19 Crisis.

5. DISCUSSION AND CONCLUSION

If we compare the results of our research with the cited professional literature, we can state that we have reached similar conclusions in several respects.

By analysing the statements of the interviewees, we traced the signs of coercive, normative, and mimetic isomorphism. However, in this article, we focused on the latter two (normative and mimetic relevant to Czech conditions). They, therefore, play an important role in enforcing the legitimacy of professional companies in the field of accounting (cf. Susith and Stewart, 2014, p. 169).

Furthermore, we found that the perception of the shift in the quality of accounting services provided and the requirements for the accounting profession as a result of the COVID-19 pandemic by leading experts corresponds to the most important points of previously published results (Papadopoulou S. and M. Papadopoulou, 2020; Bogasiu, 2020). It follows from the cited papers and our research that the accounting profession has considerably changed in recent years. It has moved from routine activities that can now be replaced by automation to the role of the accountant as an important advisor to management who can evaluate the financial state and health of the company based on accounting data and predict future developments in the segment and, in addition, explain the situation clearly to stakeholders, who can help the company overcome the difficulties it has found itself in, for example, because of enforced coronavirus measures.

Several of the answers of our interviewees also hint at a shift in the perception of the importance of accounting in society by the broad business community. Small entrepreneurs especially perceived accounting as a "necessary evil" that forced them to keep evidence of their activities required by law but, otherwise, did not fulfil any significant purpose. For this perceived marginal importance, they were willing to entrust the management of the firm's accounting to almost anyone. However, due to the pressures enforced by the COVID-19 Crisis, they are now placing great emphasis on accounting, as it enables them to unveil a realistic picture of their economic position, from which they will base their plans for future steps (cf. e.g., Isip, 2022, in press).

What resonates the most in both the answers of the respondents in this research and previously published professional papers is the detection of the rapid progress of new technologies in terms of the digitization of accounting. This long overdue change, which was previously intuitively resisted by many involved participants, began its rapid rise due to the coronavirus measures (Isip, 2022, in press; Jabin, 2021 or Shen, Fu, Pan, Yu, & Chen, 2020).

The recently discussed ethical aspects of accounting work and the influence of new measures initiated by European integration should be the subject of further research (MacGregor Pelikánová and MacGregor, 2020; MacGregor Pelikánová et al., 2021).

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FAIR VALUE MODEL EFFICIENCY IN EMERGING VS ESTABLISHED ECONOMIES (IAS 40)

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Abstract: *International accounting standards (IAS) No. 40 (Investment Property) allows companies to choose between the fair value model or the historical cost model for investment property accounting. The objectives which have been clearly stated in the Regulation (EC) 1606/2002, are intended to foster the harmonization of financial information within the capital markets that are given out by the issuers of securities (publicly traded companies). These efforts are in place to lower costs of capital, increase cross-border investments and achieve overall macroeconomic goals. The accounting objective is to increase comparability and transparency between markets, allowing investors to make informed decisions. However, questions and scepticism still remain about the decision usefulness of the two methods (fair value model, cost model) in IAS 40. The following paper will provide an analysis of the decision usefulness of the fair value model in emerging economies, emphasizing themes including i) manipulation of earnings management; ii) inefficiency in estimating fair values; and iii) the efficient markets hypothesis (EMH). Methodology includes the leveraging of empirical research to identify themes and inefficiencies within emerging economies currently operating under the fair value model. Finally, the paper will conclude that the fair value model of accounting for investment properties is less efficient in emerging economies.*

Keywords: *accounting, cost model, emerging economies, fair value model, valuation*

1. INTRODUCTION

International Financial Reporting Standards (IFRS) are developed by the International Accounting Standards Board (IASB) to define best practices for a company's preparation of its financial statements. Per the mission statement of the IFRS Foundation (2022), IFRS Standards are designed to bring transparency, accountability, and efficiency to financial markets around the world through the enhancement of international comparability and quality of financial information. As a result, investors and other market participants can identify opportunities and risks around the world, allowing for the execution of informed economic decisions and optimization of global capital allocation. IFRS Accounting Standards are currently required in more than 140 jurisdictions, and are permitted in many more (IFRS Foundation, 2022).

In April 2001, the International Accounting Standards Board (IASB) initially adopted IAS 40 *Investment Property*, which has since been amended in December 2003 and January 2016. The Standard defines Investment Property as land or a building (including part of a building) or both that is:

1. Held to earn rentals or for capital allocation or both;
2. Not owner-occupied;
3. Not used in the production of goods or services, or for administration; and
4. Not held for sale in the ordinary course of business.

IAS 40 stipulates that investment property as defined above is initially measured at cost. In accordance with IAS 16, the cost of an investment property held under a lease is measured at the lower of the fair value of the property interest and the present value of the minimum lease payments (IFRS Foundation, 2022). Under IAS 40, companies can choose to value their

investment properties using the ‘fair value model’ or the ‘cost model.’ Under the cost model, investment properties will be stated at cost less depreciation (less any impairment losses). Under the fair value model the investment property is re-measured at fair value, which is the amount for which the property could be exchanged between knowledgeable, willing parties in an arm's length transaction. [IAS 40.5] Al-Khadash and Khasawneh (2014) identify the recognition of unrealized gains and losses as a contentious issue in accounting, claiming that fair value accounting is becoming more pervasive despite uncertainty surrounding its impact—which is concerning in emerging economy environments with less-developed institutions. (Al-Khadash and Khasawneh, 2014).

For the purposes of this paper, the criteria outlined by Annushkina et al. (2016) will be used to classify an economy as ‘emerging’ vs ‘established.’ For conceptual clarity, the 14 criteria distinguishing an emerging market (EM) from an established market have been divided into the categories of i) institutional traits; ii) macroeconomic development traits; and iii) local market traits (Annushkina et al., 2016). Based on these criteria—which include factors such as Quality of the Local Institutional Environment, Role of the State in Business, Prospects for Economic Growth, etc—our research will examine two previous studies conducted in recent years, which reference economies classified as ‘emerging:’ Slovenia and Jordan.

Our objective is to use empirical data to conduct a critical analysis of the decision usefulness of the fair value accounting model in emerging economies. For the purposes of this report, we have chosen the developing economies of Slovenia and Jordan to analyze in the context of earnings management and decision usefulness under the fair value accounting model. The efficient markets hypothesis, dependent on the availability of market information, is also a key consideration. Findings will emphasize key indicators of appropriateness of the fair value model and identify inefficiencies in their respective economic climates. Finally, potential implications for emerging economies and forward-looking recommendations yielded by our research will be discussed.

2. PREVIOUS STUDIES

The following section will emphasize empirical analysis through previous studies of the accounting practices in two countries, Slovenia and Jordan, to determine the decision usefulness of the fair value model of accounting for investment properties (IAS 40) under differing levels of capital market development. The first case to be discussed in this context is Slovenia, a small Eastern European country located between Italy, Austria, Hungary, Croatia, and the Adriatic Sea (Duhovnik, 2007). The second case will be Jordan, leveraging data collected from Jordaniain Shareholding Companies listed on Amman Stock Exchange between 2002-2009 (Al-Khadash & Khasawneh, 2014). For purposes of comparison in this paper, the criteria put forth by Annushkina et al. classifies both Slovenia and Jordan as broad emerging market (EM) economies.

2.1 The case of Slovenia

Shortly after declaring its independence from Yugoslavia in 1991, significant legislative changes were enacted in Slovenia between 1991–1994 to facilitate the former socialist country's transition from an economically inefficient, centrally-planned economy to a competitive market economy. Notably, gradual changes in the measurements of assets and liabilities from historical value to fair value are reflected in the Slovenian Accounting Standards (SAS)—similar in substance to the IAS—which were adopted during the privatization process of 1993 (Duhovnik, 2007). Furthermore, as a member of the European Union, Slovenia is

subject to the European Commission's decision to mandate International Financial Reporting Standards (IFRS) for the preparation of consolidated accounts.

A study conducted by Maria Elena Olante and Ugo Lassini (2022) identifies multiple reasons why companies in Europe may prefer the fair value approach, suggesting that legal code and the development of capital markets in particular are decisive factors in the choice between the fair value model and cost model for investment property. Their research analyzes relevant data to draw the conclusion that firms operating in countries where capital markets are more developed are more inclined to select the fair value method. However, according to Duhovnik (2007), IFRS is not appropriately structured to cover accounting solutions for all levels of capital market development, specifically emphasizing problems with fair value accounting in a small market economy such as that of Slovenia. The key issues arise from 1) the lack of an active market & therefore availability of accurately quoted prices—incurring significant implications for the cornerstone of Fama's efficient markets hypothesis; and 2) reliable measurement using valuation techniques such as the discounted cash flow (DCF) model, which is heavily reliant on assumptions.

Šodan (2015) further elaborates on the impact of fair value accounting on earnings management in Eastern European countries by examining an aggregate of six earnings quality dimensions, including: persistence, predictability, smoothness, accruals quality, value relevance, and conservatism. His work aligns with that of Duhovnik, suggesting that a lack of market data prompts Eastern European countries to estimate fair values with valuation techniques more commonly than in developed countries, presenting an opportunity for earnings manipulation and therefore lower quality of reported earnings (Šodan, 2015).

2.2 The case of Jordan

Al-Khadash & Khasawneh (2014) uses the earnings-per-share (EPS) ratio to analyze the effects of unrealized gains and quantify the earnings of these companies that are overstated by the revaluation volatility inherent in fair value accounting. The study concludes that the fair value model is more beneficial in the case of efficient markets, in alignment with Eugene Fama's hypothesis that "market prices fully reflect all available information" (Lo, 2007). The Jordanian Securities Commission, Jordanian Insurance Commission and the Central Bank of Jordan also require their publicly traded companies with consolidated financial statements to report under IFRS, which raises the following concern:

"If capital markets in developing economies have large price fluctuations based on noise rather than relevant information, use of fair values based on these market prices may create abnormal fluctuations in firms' net income and owner's equity. This raises concerns that the relevance and reliability of financial information will both be reduced." (Al-Khadash & Khasawneh, 2014).

3. SYNTHESIZE

The objective of the following synthesis is to analyze the findings of the previous studies under three financial concepts: the Efficient Markets Hypothesis (EMH), decision usefulness, and earnings management. The analysis will identify the impact of fair value accounting for investment properties under IAS 40 in the aforementioned emerging economies, to offer actionable insights as to best accounting practices.

3.1 Efficient markets hypothesis

The Efficient Markets Hypothesis (EMH) is an economic theory derived from concepts attributed to Eugene Fama's 1970 publication, "Efficient Capital Markets: A Review of Theory

and Empirical Work.” Essentially, Fama concludes that stocks always trade at their fair market value as a result of the high number of buyers and sellers present in the market and the corresponding efficiency of price movements. Per the EMH, the strongest form of market efficiency yields an economy in which it is impossible to generate returns that outperform the overall market average, due to the sheer availability of market information (Fama, 1970). Defined by several assumptions—most significantly the belief that all information relevant to stock prices is “universally shared” among all investors—Fama’s theory allows for greater clarity on the distinction between emerging and established markets, and the most appropriate model for use in determining the value of investment properties. In the case of Slovenia, Duhovnik (2007) presents the question of whether an active market—distinguished by readily and regularly available quoted prices of actual market transactions—implies an efficient market. Three levels of market efficiency are suggested by Duhovnik:

1. The weakest form of efficiency, in which prices reflect all information contained in the record of past prices
2. A semi-strong form of efficiency in which prices reflect all publicly available information
3. The strongest form of market efficiency, in which prices reflect not only public information, but all the information acquired by painstaking fundamental analysis of the company and the economy.

The Slovenian stock exchange market, Duhovnik argues, is inefficient even in the weak form as described above, due to the unreliable nature of its financial information and the treatment of quoted prices on the gray market as “fair values.” Such barriers in the provision of accurate, readily available public investment information stem from the lack of market activity, corroborating Duhovnik’s suggestion that a market must be active to be defined as efficient. Therefore, Fama’s efficient market hypothesis may not appropriately be applied to an emerging economy.

According to the framework by Francis et al. (2004) each of the accounting models have the potential to affect the firm in different ways, in the context of the EMH. The fair value model is considered value relevant under the assumption of efficient markets, due to its orientation towards future cash flows based on readily-available market data over historical cost. Furthermore, the fair value model allows for unrealized gains to be recognized, despite a lack of tangible value generated by the actual property, which remains stagnant in a firm’s statements for all intents and purposes. Therefore the cost method is considered to be the most conservative of the two models, as the recognition of value changes only appears when the gain is actually recognized (i.e. the investment property is sold).

Al-Khadash & Khasawneh draw the following conclusion: “The use of fair value in developed countries is based on the assumption that the capital market is efficient, such that prices incorporate new information relatively quickly and accurately, without extreme fluctuations.” (2014). The “considerable” fluctuations evident in the Amman Stock Market between the years 2005-2007 suggest that use of the fair value model in emerging economies is less than ideal, considering a lack of readily available market data such as that of established capital markets under which the fair value model was conceived.

3.2 Decision usefulness

The decision usefulness of the fair value estimates under IAS 40 rely on a real estate market that is “efficient and liquid” (Lo et al., 2013). As mentioned in the previous studies which analyzed the use of the fair value model in Jordan and Slovenia (Al-Khadash & Khasawneh, 2014), (Duhovnik, 2007), the efficiency is reduced in emerging markets, for which financial reporting also tends to have minimal transparency in real estate transactions (Lasalle, 2010). Since the fair value estimation requires “the price that would be received to sell an asset, or

paid to transfer a liability, in an orderly transaction between market participants at the measurement date” and it “reflects market participants' current expectations about the amount, timing and uncertainty of future cash flows” (IFRS, 2022) it is questionable whether emerging markets should use the fair value model to account for their investment property. And if they would, the question is to what extent the managers of these companies would provide reliable information that is relevant to investors and capable of making a difference in their decision making process and also if the information set forth by managers faithfully represents what it actually should represent. For emerging economies, often characterized by a low level of transparency, occasional volatility, and lower efficiency, the fair value model presents a challenge as they “lack many elements of a well-functioning capital market that are needed in order to adopt and implement fair value accounting successfully” (Chen & Chan, 2009).

Additionally, IFRS 13 discusses the Fair Value Measurement, which is relevant to our research. For fair value estimation to add value to managerial decisions, it is assumed that market participants will act according to their best economic interest and they will also make use of due diligence and all other efforts to become knowledgeable of the asset or liability. According to the Corruption Perceptions Index, developing countries experience higher levels of corruption than developed nations, which contributes to the conclusion that market participants in emerging economies may fail to utilize due diligence, and if so, to what extent it will be reliable. Furthermore, whether or not firms in emerging economies will manipulate earnings in favor of their economic interest is also a concern as the fair value model relies on assumptions of due diligence and readily available market information.

3.3 Earnings management

Earnings management plays an important role in determining which accounting model a firm will use. Through manipulation of unrealized gains and losses, companies may reduce the perceived earnings volatility. This “smoothing behavior” is again more apparent in less developed regions, according to Dr Kin Lo, et al., 2013. This also suggests that there is a greater opportunity in emerging markets for firms to bias their estimations of the fair value of their investment properties. Dr Kin Lo, et al. (2013) found 3 criteria suggesting why the decision usefulness of the fair value model in emerging economies might not faithfully represent reality. The underlying economics behind his first assumption is that developing economies bear a lower amount of transparency, carry a poor legal and governance structure and contain higher information asymmetry between market participants. In other words, developing countries suffer from a lack of readily available financial reporting, which raises a question about the reliability of fair values of the investment properties. The second point is that the valuations of the properties largely depend on real estate experts that don't have sufficient information of the market and have to work with its inefficiencies (lower transparency, lower liquidity). The last factor he mentions is about the absence of a property tax system in developing countries, resulting in having less credible information about the fair value information. In summary, earnings management plays a big role in emerging economies that don't posit the same market efficiency and are unable to interpret all readily available information as effectively as some developed countries and that sparks a question of to what extent should the fair value model be implemented in emerging markets

Earnings management refers to the practice followed by company leadership in which accounting methods are selected strategically to support managerial objectives. The influence of profitability in the use earnings management is observed by Ersu Tri Wahyuni, Gatot Soepriyanto, Ilya Avianti and William Pratama Naulibasa (2019) who leveraged a regression model from 96 companies listed on the Indonesia Stock Exchange between the years 2013–2015 to demonstrate this effect. Specifically, results have shown that profitable firms are more likely to apply the cost model over the fair value model for investment property. Conversely,

firms with a “high percentage of institutional investors and higher growth are less likely to use the cost model.” Other reasons such as taxation complexity, owners' conservatism, and volatility risk played a significant role in firms' decisions to apply the cost value model over the fair value model. Specifically, the cost model is preferable over the fair value model (Watts, 2003) as it is more efficient for the purposes of taxation—reducing agency costs generated by creditors' protection and supporting the political cost hypothesis. The political cost hypothesis suggests that managers manipulate earnings to avoid unnecessary recognition by public authorities.

Finally, research on earnings management under the fair value model in developing countries is analyzed by Dr Kin Lo, et al. (2013). According to their research “earnings management firms are more likely to adopt the fair value model when the firms' headquarters and investment properties are located in less developed regions.”

4. FINDINGS/CONCLUSION

Analysis of empirical data on the impact of the fair-value accounting method for investment properties (IAS 40) in emerging economies as classified by criteria set forth by Annushkina et al. (2016) was conducted to determine its decision usefulness. Leveraging findings from Duhovnik's research on the emerging Slovenian market (2007) and Al-Khadash & Khasawneh's (2014) study of Jordanian Shareholding Companies, several concerns in the use of the fair-value accounting method were identified. Specifically, it was determined that Eugene Fama's efficient markets hypothesis (EMH) cannot be applied to emerging economies due to the lack of an active market & readily available, accurately quoted prices; large price fluctuations based on noise rather than relevant information may create abnormal price fluctuations in financial statements under the fair value model; and overall, the reliability and relevance of financial information will be highly susceptible to manipulative earnings management practices. Conclusively, these themes suggest that the fair value model of accounting for investment properties (IAS 40) is less efficient than other methods (i.e. historical cost) for economies classified as ‘emerging.’

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IFRS 13 METHOD 1: PROBABILISTIC FOUNDATION FOR THE DERIVATION OF CERTAINTY EQUIVALENTS

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Abstract: *IFRS 13 “Fair Value Measurement” defines various techniques for deriving the fair value of a stand-alone asset or liability or a group of assets, as well as a group of liabilities or a group of assets and liabilities (e.g. a cash-generating unit or a business). In this paper a methodology was tested which might complement method 1 of the present value techniques within the income approach. The methodology might allow deriving the interest rate premium based on a transparent definition of the risk acceptance level (or confidence level) if the corresponding Value at Risk is regarded as certainty equivalent of the possible cash flows (IFRS 13, B27-B29). The simulation results suggest that a confidence level higher than 60% can practically rarely be reached. This is because the corresponding interest rate premium remarkably exceeds historically accepted risk premiums. The proposition in IFRS 13, B29 lit. a, to derive the certainty equivalent based on the difference between the risk-free interest rate and the systematic risk premiums (and not from a utility function) seems to be closer to reality.*

Keywords: *Present value techniques, risk-adjusted expected cash flows, certainty equivalent, probabilistic scenarios, Value at Risk*

JEL Code: M41, C18, C30, C44.

1. IFRS 13: THE METHOD 1 OF EXPECTED PRESENT VALUE TECHNIQUES

IFRS 13 “Fair Value Measurement” defines various techniques for deriving the fair value of a stand-alone asset or liability or a group of assets, as well as a group of liabilities (e.g. a cash-generating unit or a business). Method 1 of the present value techniques within the income approach (IFRS 13, B25) follows the utility theory paradigm of replacing possible cash flows, which are uncertain, with a monetary value that reflects the decider’s utility of these uncertain cash flows. Risk is removed by substituting uncertain cash flows with its certainty equivalents, i.e. the monetary valued utility of uncertain outcomes (Fabozzi et al., 2007, p. 428–430; Crundwell, 2008, p. 406–406, 448–449; Zhang, 2010).

IFRS 13, B24–B25, give a specific scheme for calculating the certainty equivalent based on chosen or exogenously given discount rates for uncertain cash flows (“possible cash flows”). But from a theoretical standpoint, such a definition of a certainty equivalent could be criticized. Based on utility theory, the utility function of a decider should determine the certainty equivalent of uncertain outcomes – and not a given discount rate should determine the certainty equivalent.

Therefore, the author sees the need for complementing the approach of IFRS 13 Method 1 that resolves the following drawbacks when determining certainty equivalents: (a) the (necessarily) subjective definition of certainty equivalents should be based on a transparent and objective criterion, and (b) the criterion should correspond with an accepted risk measure, which (openly) integrates the decider’s risk acceptance.

He proposes the utilization of the risk measure Value at Risk because it integrates the decider’s risk acceptance through displaying the most unfavorable outcome (e.g. cash flow) of an event with uncertain outcomes depending on the “confidence level”. By means of the confidence level, the probability (or confidence) is defined which unfavorable outcomes,

occurring with a lower probability than the confidence level, are excluded from the evaluation (Huschens, 2017, pp. 53–55; Jorion, 2006, p. 116; Klugman et al., 2019, pp. 43–44). Comparative standards exist which confidence level can be regarded as appropriate, and therefore, utilizing the measure Value at Risk allows a transparent and objective comparison.

The applicability of Value at Risk as indicator for deriving the certainty equivalent is seen by its usage in decisions under uncertainty. There, the outcomes, which are more unfavorable than the Value at Risk, are excluded from decision making as well as the outcomes, which are more favorable than the Value at Risk (Bohušová et al., 2014; GAO, 2009, p. 158; Jørgensen & Teigen, 2002; WSARA, 2009).

The research question is to explore the consequences of a risk-adjusted expected cash flow, which is derived from Value at Risk with different confidence levels, on the (then) necessary risk premium when applying Method 1 of the expected present value technique of IFRS 13, B29 lit. a. For assessing feasibility, the results are compared with the interest rate spread for non-investment grade assets (from 1996 to 2022).

The paper is structured as follows: In the following section 2, the methodology is given how to derive the certainty equivalent from given discount rates. In section 3, the rationale for applying the risk measure Value at Risk is given as well as the simulation studies in which the new method's feasibility is tested. Section 4 discusses and concludes the work.

2. DERIVING CERTAINTY EQUIVALENTS FOLLOWING IFRS 13

Method 1 of the expected present value technique adjusts the expected cash flows of an asset for systematic (i.e. market) risk by subtracting a cash risk premium from the expected cash flows (IFRS 13, B24–B25).

The “cash risk premium” represents the difference between the value if the cash flows were risk-free (i.e. the cash flows would occur for sure) and the utility of the uncertain cash flows – measured in monetary units (IFRS 13, B25; Fabozzi et al., 2007, p. 428–430; Crundwell, 2008, p. 406–406, 448–449; Zhang, 2010). The utility of the uncertain cash flows, measured in monetary units, corresponds to the certainty equivalent and is the monetary value that would make the decision-maker indifferent between it and the risky alternative (IFRS 13, B25).

Applied to the adjustment of “expected cash flows” in IFRS 13 (statistically: the expected value of the cash flows), the value of the expected cash flows is replaced by its certainty equivalent, giving the “risk adjusted expected cash flows”. The present value (i.e. the fair value) is derived by discounting the risk adjusted expected cash flows at the risk-free interest rate.

In the exemplification to method 1 (IFRS 13, B29 lit. a), it is shown that the certainty equivalent can be derived from two determining factors: the interest rate premium for systematic risk and the risk-free interest rate. The certainty equivalent is derived as follows:

Let

CE: Certainty equivalent

EV: Expected value

r_{rf}: Risk free discount rate

r_{rp}: Systematic risk premium

Then (following IFRA 13, B29, lit. a):

$$CE = EV - [EV - EV * (1 + r_{rf}) / (1 + r_{rf} + r_{rp})] \quad (1)$$

The foundation of that mathematical relationship is the following premise: The net present value of the possible (uncertain) cash flows must be identical with the net present value of the risk-free cash flows if the expected value of the uncertain cash flows (the “expected cash

flows”) is discounted with the sum of the interest rate premium for systematic risk and the risk-free interest rate and the certainty equivalent is discounted with the risk-free interest rate.

$$\begin{aligned} CE &= EV - [EV - EV * (1 + r_{rf}) / (1 + r_{rf} + r_{rp})] \\ &\Leftrightarrow CE = EV * (1 + r_{rf}) / (1 + r_{rf} + r_{rp}) \\ &\Leftrightarrow CE / (1 + r_{rf}) = EV / (1 + r_{rf} + r_{rp}) \end{aligned}$$

With:

$CE / (1 + r_{rf})$: Net present value of the risk-free cash flows

$EV / (1 + r_{rf} + r_{rp})$: Net present value of the possible (uncertain) cash flows

This relationship allows answering the question, which systematic risk premium (“ r_{rp} ”) corresponds with which certainty equivalent. It also allows answering the question, which systematic risk premium (“ r_{rp} ”) corresponds to which conversion factor by which the expected value must be multiplied to obtain the certainty equivalent (the “certainty equivalent coefficient” or “certainty equivalent factor” (Crundwell, 2007, p. 404; Zhang, 2010). By considering the conversion factor, generalizability is achieved.

Let

CEC : Certainty equivalent coefficient

and

$$CE = EV * CEC \quad (2)$$

Then follows:

$$\begin{aligned} EV * CEC &= EV * (1 + r_{rf}) / (1 + r_{rf} + r_{rp}) \\ \Leftrightarrow CEC &= (1 + r_{rf}) / (1 + r_{rf} + r_{rp}) \end{aligned} \quad (3)$$

In essence, when following this model, the utility of uncertain cash flows (the cash flows’ certainty equivalent) is derived from choosing a discount rate for the uncertain cash flows. This approach seems practically accepted with regard to different divisions of a company or different regions served (Bruner et al., 1998). However, based on utility theory, the utility function of a decider should determine the certainty equivalent of uncertain outcomes – and not vice versa: a discount rate the certainty equivalent.

3. DERIVING CERTAINTY EQUIVALENTS REFERENCING TO VALUE AT RISK

The question, whether utility theory as well as the newer modified theories (e.g. Prospect Theory, Cumulative Prospect Theory, Regret Theory) are applicable, is steadily raised in the context of decision making under uncertainty (for excellent reviews see Eichberger & Kelsey, 2007; Johnson & Busemeyer, 2010; Wu et al., 2004).

The author interprets the current state of science (e.g. Andreoni & Harbaugh, 2010; Bernheim & Sprenger, 2020; Birnbaum, 2008; Eichberger & Kelsey, 2007; Fioretti, 2009; Zhang, 2010) that a general or overarching eliciting of utility functions might not lead to reliable results.

He follows the opinion that it is possible to derive situation-specific certainty equivalents under the following conditions. (a) The real situation is mapped when eliciting certainty equivalents, especially the number of outcomes and the numerical values have to be identical with the real situation, (b) the deriving of certainty equivalents is seen as iterative process of problem-framing and problem-solving, rather than applying a conscious utility function (Fioretti, 2009).

The application of the risk measure Value at Risk¹ is seen as beneficial tool because of its characteristic of condensing uncertain outcomes to one risk adjusted value – besides the positive facts that it creates transparency for the decider as well as for the company's stakeholders, and besides the fact that this risk measure can be extracted from the data that are already available (the scenario-based elaboration of the cash flows and their probability of occurrence; IFRS 13, B27).²

Through giving the most unfavorable outcome that can be expected to be exceeded by more favorable outcomes with a certain probability (the meaning of the measure Value at Risk) the decider is put in the position to recognize which unfavorable cash flows can be disregarded because of their low probability of occurrence. Unfavorable cash flows, which can be expected occurring with a lower probability than the confidence level, are left aside. These cash flows are irrelevant, and, therefore, the certainty equivalent must be in the group of more favorable outcomes. Therefore, the Value at Risk of a defined confidence level can be regarded as certainty equivalent in which favorable outcomes are not regarded – the most risk averse certainty equivalent for a given certainty equivalent.

For concretization, it is necessary to differentiate two cases. The measure Value at Risk is derived from the cumulative distribution function of the event's outcomes. For the cumulative distribution function, the outcomes are sorted by their numerical value in ascending order – and not according to their advantageousness. In the first case, higher numerical values of cash flows which are assigned to assets show an increasing advantageousness (the case regarded here). In the second case, higher numerical values of cash flows which are assigned to liabilities show an increasing disadvantageousness.

In this study, we restricted the simulation studies on the case of evaluating the cash flows of assets or a group of assets (e.g. a cash-generating unit or a business).

Comparative standards exist which confidence level can be regarded as appropriate. The median (or percentile 50) represents the cash flow that will be undercut by the group of lower numerical values by a probability of higher or equal 50%. In case of an asset's cash flow, the cash flow next to the median on the left side is the most unfavorable value that will be exceeded by more unfavorable cash flows with a probability of less than 50%. (In case of a liability's cash flow, it is the most unfavorable value that will be exceeded by more unfavorable cash flows with a probability of less than 50%.) This means, the more unfavorable cash flows are to be expected with a probability of less than 50%, the probability of occurrence of more favorable outcomes are “more likely than not” (see e.g. Bohušová et al., 2014; Kasprik & Tettenborn, 2020).

Choosing the cash flow's median as certainty equivalent for the expected cash flows shows a “risk neutral” risk acceptance because the median is frequently situated nearby the expected value. Therefore, the certainty equivalent coefficient, the ratio of the certainty equivalent (here: the median) to the expected value, comes to lie nearby one.

In other areas, higher confidence levels are demanded. The median, which might be exceeded by more unfavorable values with a probability of less than 50%, is not (societally) accepted in the following cases:³ For stress testing in the finance sector (Jorion, 2006, p. 119), a confidence level of 90 to 95% is applied, for budgeting of expensive projects a confidence level between 80 and 90% (GAO, 2009, p. 158; Jørgensen & Teigen, 2002; WSARA, 2009).

¹ The author regards the measure Value at Risk as generic and superordinate measure, and does not differentiate between the objects of consideration. The measure Value at Risk is seen as including uncertain cash flows, therefore the term “Cash flow at Risk” is omitted (other opinion: Hager, 2004)

² For further information how to create scenarios and to elicit probabilities: see Kasprik & Tettenborn, 2020.

³ Therefore, the author cannot agree with the wording of a “risk neutral” behavior when the decision criterion is the median (or the expected value).

Simulation study – To check which confidence levels lead to an interest rate risk, the author conducted a simulation study with four different probability distributions and three conditions (independent variable).

As probability distribution, two Four Parameter Beta distribution were chosen for reaching general applicability with regard to different x-values. A Four Parameter Beta distribution allows the substitution of the variable x by a linear transformation without changing the distribution's shape or skewness (Bury, 1999, pp. 243–244, 257, 261–262; Covert, 2013, p. 186; Klugman et al., 2019, p. 493). As conditions were defined three ratios between the lower limit and the upper limit: a bandwidth of 2 times, of 3 times, and of 5 times the lower limit value. This approach allows a generalizability of the results because for every x-value greater than one the ratios of the input values remain identical.

The dependent variable, the risk premium, was calculated under the assumption that different Value at Risks were chosen as certainty equivalent: the Value at Risk for the confidence levels of 90%, 80%, 70%, 60%, and 50%. If the Value at Risk for a given confidence level ("VaR_z") is set as certainty equivalent, then the Certainty equivalent coefficient for a Value at Risk of confidence level z ("CEC_z"), and, following it, the systematic risk premium for that confidence level ("r_{rp_z}") can be derived following IFRS 13, B29 lit. a, as follows:

If

VaR_z: Value at Risk of confidence level z

is set as certainty equivalent,

then

CEC_z: Certainty equivalent coefficient for a Value at Risk of confidence level z results from (2)

*VaR_z = EV * CEC_z*

<=> CEC_z = VaR_z / EV

The certainty equivalent coefficients resulting from the four distributions and the three conditions are given in table 1 to 4.

Table 1. Certainty equivalent coefficients for a symmetrical Beta distribution

Mode 0.5; alpha: 1.678				
	p(x)	x (2-times)	x (3-times)	x (5-times)
Lower limit		1,00	1,00	1,00
interval1	0,0500	1,06	1,11	1,22
interval2	0,1006	1,17	1,34	1,67
interval3	0,1294	1,28	1,56	2,11
interval4	0,1452	1,39	1,78	2,56
interval5	0,1503	1,50	2,00	3,00
interval6	0,1452	1,61	2,22	3,45
interval7	0,1294	1,72	2,45	3,89
interval8	0,1005	1,83	2,67	4,33
interval9	0,0495	1,94	2,89	4,78
Upper limit		2,00	3,00	5,00
		CEC (2-times)	CEC (3-times)	CEC (4-times)
CEC_Percentile10 (VaR90)		0,782	0,672	0,563
CEC_Percentile20 (VaR80)		0,845	0,767	0,690
CEC_Percentile30 (VaR70)		0,900	0,849	0,799
CEC_Percentile40 (VaR60)		0,951	0,926	0,902
CEC_Percentile50 (VaR50)		1,000	1,000	1,000

Table 2. Certainty equivalent coefficients for a symmetrical Beta distribution (highly peaked)

Mode 0.5; alpha: 5.4				
	p(x)	x (2-times)	x (3-times)	x (5-times)
Lower limit		1,00	1,00	1,00
interval1	0,0010	1,06	1,11	1,22
interval2	0,0247	1,17	1,34	1,67
interval3	0,1100	1,28	1,56	2,11
interval4	0,2249	1,39	1,78	2,56
interval5	0,2792	1,50	2,00	3,00
interval6	0,2249	1,61	2,22	3,45
interval7	0,1098	1,72	2,45	3,89
interval8	0,0246	1,83	2,67	4,33
interval9	0,0010	1,94	2,89	4,78
Upper limit		2,00	3,00	5,00
		CEC (2-times)	CEC (3-times)	CEC (4-times)
CEC_Percentile10 (VaR90)		0,872	0,808	0,744
CEC_Percentile20 (VaR80)		0,914	0,871	0,828
CEC_Percentile30 (VaR70)		0,946	0,919	0,892
CEC_Percentile40 (VaR60)		0,974	0,961	0,948
CEC_Percentile50 (VaR50)		1,000	1,000	1,000

Table 3. Certainty equivalent coefficients for a right skewed Beta distribution

Mode 0.8; alpha: 1.41				
	p(x)	x (2-times)	x (3-times)	x (5-times)
Lower limit		1,00	1,00	1,00
interval1	0,0500	1,06	1,11	1,22
interval2	0,0813	1,17	1,34	1,67
interval3	0,0993	1,28	1,56	2,11
interval4	0,1125	1,39	1,78	2,56
interval5	0,1226	1,50	2,00	3,00
interval6	0,1304	1,61	2,22	3,45
interval7	0,1359	1,72	2,45	3,89
interval8	0,1380	1,83	2,67	4,33
interval9	0,1300	1,94	2,89	4,78
Upper limit		2,00	3,00	5,00
		CEC (2-times)	CEC (3-times)	CEC (4-times)
CEC_Percentile10 (VaR90)		0,756	0,641	0,531
CEC_Percentile20 (VaR80)		0,831	0,752	0,676
CEC_Percentile30 (VaR70)		0,896	0,848	0,801
CEC_Percentile40 (VaR60)		0,956	0,936	0,916
CEC_Percentile50 (VaR50)		1,013	1,018	1,024

Table 4. Certainty equivalent coefficients for a right skewed Beta distribution (highly peaked)

Mode 0.8; alpha: 5.4				
	p(x)	x (2-times)	x (3-times)	x (5-times)
Lower limit		1,00	1,00	1,00
interval1	0,0010	1,06	1,11	1,22
interval2	0,0098	1,17	1,34	1,67
interval3	0,0315	1,28	1,56	2,11
interval4	0,0668	1,39	1,78	2,56
interval5	0,1131	1,50	2,00	3,00
interval6	0,1647	1,61	2,22	3,45
interval7	0,2110	1,72	2,45	3,89
interval8	0,2323	1,83	2,67	4,33
interval9	0,1698	1,94	2,89	4,78
Upper limit		2,00	3,00	5,00
		CEC (2-times)	CEC (3-times)	CEC (4-times)
CEC_Percentile10 (VaR90)		0,843	0,777	0,719
CEC_Percentile20 (VaR80)		0,904	0,864	0,828
CEC_Percentile30 (VaR70)		0,948	0,926	0,907
CEC_Percentile40 (VaR60)		0,985	0,978	0,972
CEC_Percentile50 (VaR50)		1,016	1,023	1,029

4. DISCUSSION

In order to assess the derived certainty equivalent coefficients from table 1 to table 4, the interest rate risk premium for different certainty equivalent coefficients are given in Table 5. In table 6, the certainty equivalent coefficients are given for empirically observed risk premiums from the United States. Displayed are (a) the spread for non-investment (“BB”) graded assets (from 1998 to 2022; Ice Data Indices, 2022), and (b) the corresponding certainty equivalent coefficients in dependency of different risk-free interest rate.

The interest rate risk premium for given certainty equivalent coefficients are calculated from formula (3). The certainty equivalent coefficients for the historical interest rate spreads are calculated based on formula (3) as follows:

$$\begin{aligned}
 CEC &= (1 + r_{rf}) / (1 + r_{rf} + r_{rp}) \\
 &\Leftrightarrow CEC * (1 + r_{rf} + r_{rp}) = (1 + r_{rf}) \\
 &\Leftrightarrow r_{rp} = [(1 + r_{rf}) / CEC] - (1 + r_{rf})
 \end{aligned}
 \tag{4}$$

Table 5. Interest rate risk premium following IFRS 13 for given certainty equivalent coefficients

Certainty equivalent coefficient	If interest rate (risk free) is ...			
	0,010	0,030	0,050	0,070
0,980	0,0206	0,0210	0,0214	0,0218
0,960	0,0421	0,0429	0,0438	0,0446
0,940	0,0645	0,0657	0,0670	0,0683
0,920	0,0878	0,0896	0,0913	0,0930
0,900	0,1122	0,1144	0,1167	0,1189
0,880	0,1377	0,1405	0,1432	0,1459
0,860	0,1644	0,1677	0,1709	0,1742
0,840	0,1924	0,1962	0,2000	0,2038
0,820	0,2217	0,2261	0,2305	0,2349
0,800	0,2525	0,2575	0,2625	0,2675

Table 6. Certainty equivalent coefficients following IFRS 13 for historical interest rate spreads

Risk Premium*	Rel. Frequency**	If interest rate (risk free) is ...			
		0,010	0,030	0,050	0,070
0,022	32,48%	0,9790	0,9794	0,9798	0,9802
0,031	31,75%	0,9703	0,9709	0,9714	0,9719
0,043	21,19%	0,9594	0,9602	0,9609	0,9616
0,055	9,06%	0,9481	0,9491	0,9500	0,9509
0,067	2,29%	0,9381	0,9393	0,9404	0,9414
0,079	0,79%	0,9276	0,9289	0,9302	0,9314
0,092	0,42%	0,9167	0,9181	0,9196	0,9210
0,107	0,40%	0,9046	0,9063	0,9079	0,9095
0,116	1,09%	0,8973	0,8990	0,9008	0,9025
0,128	0,10%	0,8873	0,8892	0,8911	0,8929
0,141	0,42%	0,8772	0,8793	0,8813	0,8833

* Arithmetic mean of interval (lower limit: 0,013; upper limit: 0,147)

** Interest rate spread for non-investment grade assets 1996-12-31 to 2022-09-15.

Source: Ice Data Indices (2022).

The results in table 1 to 4 indicate that in the majority of the situations regarded a certainty equivalent based on the Value at Risk with a confidence interval of 60% or above would lead to a certainty equivalent coefficient of 0.95 – and this is corresponding with a systematic risk premium of 5–6%. A risk premium of 5–6% above a risk-free interest rate is assessed as less realistic: following table 6, in 80% of the observed data the risk premium was below 5%.

The results are interpreted that converting a Value at Risk with a confidence level of higher than 60% as certainty equivalent seems questionable. Either the Value at Risk does not represent the certainty equivalent or the underlying cash flows are compensated by benefits which are not included in the cash flows (e.g. if further benefits in other cash generating units are expected).

It is concluded that deriving a certainty equivalent from the risk measure Value at Risk does not appear feasible. The proposition in IFRS 13, B29 lit. a, to derive the certainty equivalent based on the difference between the risk free interest rate and the systematic risk premium (and not from a utility function) seems to be closer to reality.

The results of the simulation studies are generalizable. They are valid for all input values greater than one as the conditions were set by defining the bandwidth of the input variable as a multiple of the lower limit. And a further multiplicative transformation leads to a multiplicative extension of the fraction (VaR_z / EV) not influencing the ratio.

5. FINAL CONCLUSIONS

This study analyzed the calculation scheme of IFRS 13, B29 lit. a, for deriving certainty equivalents following Method 1 of the present value techniques within the methodology of income approaches. The study raised the point to integrate the risk measure Value at Risk for deriving the expected cash flows from a scenario-based probability distribution following IFRS 13, B27–B29. It is shown that IFRS 13, B29 lit. a, allows deriving the necessary interest rate risk premium when the Value at Risk for a given confidence level is seen as certainty equivalent of the possible cash flows.

The simulation results suggest that a confidence level higher than 60% can practical rarely reached. This is because the corresponding interest rate premium remarkable exceeds historically accepted risk premiums by the capital market.

It is concluded that deriving a certainty equivalent from the risk measure Value at Risk does not appear feasible. The proposition in IFRS 13, B29 lit. a, to derive the certainty equivalent based on the difference between the risk free interest rate and the systematic risk premiums (and not from a utility function) seems to be closer to reality.

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Conflicts of Interest

The author declares no conflict of interest. The funders had no role in the design of the study, in the collection, analysis, or interpretation of data, in the writing of the manuscript, or in the decision to publish the results.

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SELECTED ASPECTS OF CAPITAL TAXATION IN POLISH COMPANIES

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Abstract: *Managing a company creates a lot of opportunities, but also responsibilities. A prerequisite for this is that the capital is available to develop the company. Each entrepreneur decides on the source of capital and forms his own capital by reducing or increasing it, which is related to the regulation of income taxes for companies and individuals. The purpose of this article is to explain the issue of the equity of enterprises and their nature and function. Analysis of the literature and the legal instruments has positively confirmed the hypothesis that the taxation of capital transactions related to the capital of companies is complex and burdens both the company and its shareholders and shareholders.*

Keywords: *equity, capital taxation, polish companies, taxes*

1. INTRODUCTION

There is no doubt that the operation of a business requires capital with which the entrepreneur can grow. The administrator of the economic unit shall decide from which source the capital is raised. This depends on a number of factors influencing the final decision in this respect. The inflow of capital – both debt and equity – is subject to various organisational, legal and other constraints, which lead to individual solutions.

The aim of this Article is to highlight the equity capital of companies with limited liability and thus the economic processes which shape them. There is no doubt that this also has to do with the fulfilment of tax obligations imposed by Polish tax law. Every entrepreneur forms his own capital by reducing or increasing it, and this is linked to the income tax system for companies and individuals.

A research hypothesis to be examined in this article is that the taxation of capital transactions related to the capital of capital companies is a burden on both the company and its owners. The subject of the investigation was Polish legislation resulting from the Corporation Tax Act and the Income Tax Act.

2. THE CONCEPT OF EQUITY IN THE LITERATURE

The financial position of enterprises is determined by the capital and asset structure for which the financial balance sheet is used. The balance sheet is a basic accounting document in the form of a bilateral balance sheet consisting of the assets, i. e. the economic resources of the company, and the sources of their origin, known as liabilities. Both parties must always comply with the principle of balance sheet equilibrium, i. e. they must be determined by the same monetary values (assets = liabilities).

Equity is not clearly defined in the Accounting Act¹, but the value of equity equals net assets (i.e. the company's assets less liabilities). This means, according to Gabrusewicz, that equity corresponds to the part of the assets owned by the company².

Sawicki took the view that the amount of equity is determined by two determinative groups, i. e. the first relating to the increase or decrease of equity by excluding a certain amount of the value previously contributed, and the second relating to the increase or decrease of equity due to excess or loss of equity due to excess or loss of equity due to excess or loss of equity due to the which relates to the business activity³.

Iwin-Garzyńska's publications have devoted much attention to this subject. According to the author, capital is an essential source of financing for the activities of companies and may come from funds accumulated as undistributed profits or from increases in share capital, e.g. by issuing shares or shares⁴. In another publication, Iwin-Garzyńska describes the process as a situation in which equity is the result of the cash flow of the owners who embody themselves in assets while they work in them and generate a financial surplus. Case law and tax rulings decouple the process of raising capital from the impact of subsequent work. Consequently, tax-free income in the form of inflows that increase share capital is closely linked to the cost of raising capital⁵. Glynn, Perrin and Murphy, in their collective publication, assume that capital is "the residual amount remaining after deduction of all liabilities of the Company from all assets of the Company⁶". According to Iwin-Garzyńska, such a capitalisation could indicate that the capital was merely the company's equity. Such an approach may lead to erroneous conclusions, since the entire capital of the undertaking, both its own and external capital, is a liability to its lenders, i. e. its owners and creditors.

Niemczyk refers to the construction principles of the balance sheet and expresses equity by means of two equations:

a) Equity = Assets - Foreign capital (Commitments);

b) Net assets = Equity⁷

According to Witczak, the company should aim to increase the value of equity, as this means an increase in the value of the owners. If the equity is derived from a net profit generated, it is referred to as equity financing. It should also be noted that the nomenclature of each capital depends on the legal and organisational form of the undertaking concerned⁸.

3. TYPES AND FUNCTIONS OF EQUITY

In order to better explain the substance of equity in the company, it is useful to list the components and the individual functions they perform. Equity in accordance with Annex 1 of the Accounting Act shall be subdivided into:

I. Tier 1 capital;

¹ Ustawa z dnia 29 września 1994 r. o rachunkowości, Dz.U. z 2021 r. poz. 217, <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU19941210591> [available 25.07.2022].

² Gabrusewicz W. (red.) (2011), *Rachunkowość finansowa dla profesjonalistów*, SKwP, Warszawa.

³ Sawicki K. (2001), *Rachunkowość finansowa przedsiębiorstw według znowelizowanej ustawy o rachunkowości*, cz. I, Ekspert Wydawnictwo i Doradztwo, Wrocław.

⁴ Iwin-Garzyńska, J. (2012). Wybrane aspekty opodatkowania kosztu kapitału własnego w przedsiębiorstwach polskich. *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 708; *Finanse, Rynki Finansowe, Ubezpieczenia*, 52, 107–129.

⁵ Iwin-Garzyńska, J. (2013). Koszt nowego zewnętrznego kapitału własnego przedsiębiorstwa a idea neutralności podatków. *Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego, Zarządzanie i Finanse*, 2, 2.

⁶ Glynn J.J., Perrin J., Murphy M.P., (2003) *Accounting for Managers* 3rd Edition, Cengage Learning Business Press.

⁷ Niemczyk L., (2021), *Rachunkowość, czyli podstawowy kurs biznesu*, Lesław Niemczyk Sp. Z o.o., Rymanów.

⁸ Witczak I. (2015), *Rola kapitału własnego w kreowaniu wartości firmy na przykładzie hurtowni farmaceutycznych*, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, nr 245.

- II. Reserves;
- III. Revaluation capital;
- IV. Other reserves;
- V. Profit/loss in previous years;
- VI. Net profit (loss);
- VII. Depreciation of net profit during the financial year⁹

In accordance with International Financial Reporting Standards (IFRS), equity consists of assets remaining after deduction of all liabilities of the company. The Accounting Act is identical to the definition of equity in IFRS, with definitions divided into two capital concepts: financial and tangible capital. The financial concept of capital assumes that capital is the purchasing power invested or the money invested, so that capital comes close to the term “net assets”, whereas the physical concept of capital considers the productive capacity of an enterprise, expressed for example in the daily volume of production, to be capital (capital refers, *inter alia*, to the operational potential of an enterprise company)¹⁰.

Traditionally, equity is divided into the two main groups mentioned above, i. e. entrusted (invested) capital and self-investment capital. The first group is capital that the owners contribute to the company, including core capital, reserves and shareholder grants. The second group of self-financing may have different sources, as well as other principles of valuation¹¹.

Equity may also be divided into:

- 1) core capital;
- 2) reserves.

Tier 1 capital is the equivalent of the assets that the parents have contributed to the company when the company was established or when the company was subsequently enlarged. Core capital (depending on the organisational and legal form) consists of share capital, equity capital, start-up funds, etc. Reserves, on the other hand, represent the equivalent of the portion of the assets that the entity has generated from the profits of the entity or from other sources of sustainable financing¹².

Strojek-Filus and Kumor shared their equity capital also on the basis of their sources of origin:

- 1) capital items resulting from investor decisions,
- 2) capital items arising from revaluation of assets,
- 3) capital items arising from the financial results of the current year or of recent years¹³.

4. TAX OBLIGATIONS RELATED TO THE CREATION OF EQUITY AND RECAPITALISATION OF BUSINESS UNITS

Polish companies operating under the Polish legal system must comply with the statutory tax obligations. Substantive tax law requires businesses to tax their economic transactions with indirect taxes such as taxes on goods and services and excise duties. In this context, there is a phenomenon of tax evasion. This involves passing on the tax burden to the consumer within the price of the goods or services.

⁹ GOFIN, Bilans, <https://www.gofin.pl/bilans/> [available 28.07.2022].

¹⁰ MSSF, (2016) Międzynarodowe Standardy Sprawozdawczości Finansowej, SKwP, Warszawa.

¹¹ Kumor, I., Poniatowska, L. (2017). Kapitały własne i ich znaczenie w zachowaniu kontynuacji działalności. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, (484), 120–130.

¹² Pfaff J., Messner Z. (2011), *Rachunkowość finansowa z uwzględnieniem MSSF*, PWN, Warszawa.

¹³ Strojek-Filus M., Kumor I., (2015), *Wartość bilansowa jednostki gospodarczej w ujęciu krajowych i międzynarodowych standardów rachunkowości*, CeDeWu.PL, Warszawa.

Another very large area of taxation is direct taxation. These tax sources include the taxation of income earned by companies during the reference period. Positive earnings are part of the equity shown in the liability of the balance sheet. After the reference year, we calculate the gross result achieved by an economic unit. It is subject to a corporation tax of 9% or 19% before being included in the financing of the assets. The 9% tax rate is applicable to legal persons whose income during the tax year did not exceed the amount expressed in zloty, equivalent to the equivalent of EUR 2 million, converted at the average euro rate published on the first working day of the tax year, rounded to PLN 1000. This rate may also be chosen by legal persons starting their activities in a given tax year. As you can see, this is a fairly favourable tax rate, but it is primarily aimed at small businesses. A low tax burden can certainly contribute to better capital accumulation in small businesses.

In the course of business, it is often the case that the funds accumulated in the company are insufficient to cover the operating costs of the company or to meet its economic objectives. In this case, the company may obtain funds from the owners or third parties. There are several ways to recapitalise a capital company by providing it with additional funds from the owners, and their choice should be adapted to the needs and financial situation of the company and the capabilities of its owners. The recapitalisation of companies with shareholder funds can be achieved primarily by:

- loans from the owners,
- increase in the share capital,
- payment of additional payments – this applies to a private limited company.

The first of the above recapitalisation methods, involving a shareholder loan, may be considered to be the most flexible, simplest and quickest way of mobilising additional funds. In order for such a solution to begin in practice, we need to conclude the loan agreement in writing in the appropriate form. The holder of the capital and the company are free to determine the conditions under which the loan is granted and repaid. An important aspect is the setting of an appropriate interest rate corresponding to the market level of the country concerned. Loans granted directly by the shareholders to a capital company are exempt from taxation on civil transactions (PCC). In other cases, loans may be taxed with a civil tax of 0.5% of the amount of the loan. As a general rule, it should be stressed that the loan is a repayable service, i. e. the company must repay the amount of the loan plus interest, and the funds received are recognised by the company as part of its liabilities and not as equity. From an economic point of view, it is possible to transfer the liability arising from the loan at a later date with the agreement of the lenders for the purchase of a new subscription of the shares or units. The debt is then converted into equity. Such solutions are often used, especially if the company does not have sufficient liquidity to repay the loan on time.

Another method of recapitalising the company is to increase the share capital by paying a corresponding present value. For companies with limited liability, i. e. a private limited company and a public limited company is a rather complicated procedure, as it:

- appropriate resolutions of the shareholders' or shareholders' meeting to be recorded in a notarial deed (in the case of a limited liability company, the increase may be made without amending the articles of association, i. e. without notary fees, if provided for in the articles of association),
- acquisition of shares or subscription of shares by all existing shareholders or shareholders selected by them or by third parties,
- submission of a corresponding application for registration in the commercial register of the KRS,
- registration of the increase by the KRS.

Companies must also bear the notary's costs for the amendment of the articles of association and the application for registration. In addition, the capital company will act as a taxable person for civil actions amounting to 0.5% of the value of the increase in the share capital and will have to pay the tax due on this equity transaction within 14 days. The basis of assessment is the nominal amount of the shares issued by which the share capital is increased, and not the amount of the shareholder's or shareholder's contributions. Excess deposits exceeding the nominal value of the issued shares or shares are included in the company's capital reserves. This recapitalisation of the company does not increase the company's liabilities, but increases equity by increasing the share capital. Equally often, the capital reserve is increased (by *agio*), which has a positive effect on the level and structure of capital in the company.

As already mentioned, companies can also recapitalise themselves through shareholder contributions. The surcharges of the owners of the company may relate to an increase in the capital reserve, a contribution to a newly created reserve or a special capital. The payment procedure is quite simple and requires only the resolution of the shareholders' meeting and the transfer of funds. The company is obliged to make a declaration on behalf of the PCC and to pay a tax on civil transactions equal to 0.5% of the surcharge value. The aid must be paid *pro rata* by all shareholders. Supplements may be reimbursed, but do not have to be paid. It should be borne in mind that the possibility of paying aid must be provided for in the Statutes. It is also appropriate for the company agreement to lay down the rules for the repayment of aid.

With regard to the recapitalisation methods presented and the identification of the most appropriate solution for the company and its owners, the primary consideration shall be given:

- financial standing of shareholders or shareholders,
- the company's financial requirements and related transaction parameters as well as the structure of borrowing costs,
- capital structure of the undertaking and the effect of the recapitalisation of the undertaking on that structure,
- presence of an appropriate capital reserve in the case of a public limited company (in the case of a public limited company, a capital reserve is required, e. g. from profits, until at least one third of the company's capital is reached), which may also result in surpluses arising from the issue of shares exceeding the nominal value of the shares issued (i. e. *agio*).

It should be noted that there is no universal recommendation that can be applied to the choice of the form of recapitalisation of a capital company. Several factors have to be taken into account, including the capital structure of the company, the objectives of the recapitalisation and the timing of a possible repayment, the expectations of management and shareholders. When considering a wide range of solutions, taking into account the tax implications arising from their application, the most appropriate solution may be considered in the given circumstances. Of course, companies expect such a solution to maximise the financial benefits of recapitalisation while minimising the tax burden.

In such cases, companies can build up their own financial safety cushion. Financial resources in the business units must be properly managed. If financial gains are made, they should be kept and not distributed. A financial safety cushion is the basis for the planned investments of the companies. Because of high inflation, many entrepreneurs are wondering how to protect their capital against loss of purchasing power. There are no ideal solutions, but using different investment options will work better than keeping money in your bank account.

5. TAXATION OF OTHER TRANSACTIONS RELATING TO EQUITY

In some cases, the share capital is reduced as a result of a decision to reduce the nominal value of the shares or to withdraw the shares. The entire procedure for reducing the share capital is

based on Articles 263 to 265 of the Commercial Code. However, this legislation does not lay down detailed rules for such a reduction. It merely clarifies that the decision to reduce the share capital must specify the amount by which the share capital is to be reduced and the manner in which it is to be reduced. Shareholders may reduce the share capital by reducing the nominal value of the shares or by reducing their number, i. e. by redeeming part of the shares. If there is a reduction in the size of the shares, sometimes resulting in the departure of the owner of the shares, this has certain tax implications..

A legal transaction involving a reduction in the share capital as a result of the redemption of shares has tax implications for the shareholder or shareholder. This presupposes that a remuneration is received for the shares withdrawn or a remuneration is received for the sale of the shares for the purpose of the redemption. It is important to determine the method by which the repeal was carried out, i. e.:

- by resolution of the shareholders and with the consent of the shareholder (voluntary depreciation),
- on the basis of a shareholders' decision which did not take into account the shareholder's consent (compulsory renunciation)
- due to the occurrence of a special event provided for in the statutes (conditional withdrawal).

In the case of voluntary redemptions, it is assumed that the shareholder will first sell the shares, which will be redeemed one after the other. In the event of the unpaid redemption of the shares, no tax revenue is generated.

On the other hand, tax revenue arising from the receipt of funds by shareholders (natural persons) in connection with a reduction in the share capital or a reduction in the nominal value of the shares is included in the income from cash capital. It follows from Article 17 (1) (4) of the Corporation Tax Act that income from money capital is to be regarded as dividends and other income from the participation of undertakings which actually derive from that participation. Income from participation in the profits of legal persons shall be the income actually derived from such participation, including the redemption of shares. If such income is received by a natural person, it only has to be taxed. Income from dividends and other income from the participation of enterprises is subject to a flat-rate income tax of 19%. The proceeds from the redemption of shares are the excess of the proceeds from the redemption over the cost of profit.

As you can see, all transactions related to equity have to be taxed. In particular, the reduction in equity has tax effects which must be properly recognised by the company in order to avoid incurring tax liabilities.

6. CONCLUSION

Selected topics from the taxation of equity capital in Polish corporations are important for the activities carried out. Companies tend to focus on tax optimization and aim to keep the tax burden as low as possible. It is therefore an important objective for every entrepreneur to choose the solution that brings the greatest possible benefit to him and at the same time does not significantly impair the taxpayer's assets. The capital increase option must take into account the economic operator's objectives of minimizing expenditure. This includes the payment of public service obligations. For the best possible design of the tax return from the point of view of the companies as well as their shareholders and shareholders, it is worth using an experienced tax advisor. The hypothesis set out at the beginning was thus positively verified.

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COVID-19

THE EFFECT OF COVID-19 ON CASHLESS PAYMENTS

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Abstract: *The outbreak of the SARS-CoV-2 coronavirus (COVID-19) has impacted the whole world. To stop the virus's spread, governments enforced regulations requiring face masks and social isolation and also promoted social seclusion, hand-washing, and other hygienic measures. People's movements and consumption were significantly reduced as a result of government-imposed lockdowns, with internet purchasing overtaking in-store purchasing in a particularly noticeable way. Most importantly, people's habits during times of restrictions and lockdowns seemed to reduce overall desire to do cash transactions. Cashless transactions became the most preferred option for daily payment as it helped reduced contact with others and prevented them from becoming infected. These factors contribute to future intentions to eliminate cash payments once the pandemic is ended as well as the choice of payment methods currently in use. Even after the pandemic, people are using digital cashless payments for their daily transactions.*

This study investigates the impact of the coronavirus on consumer demand for cash and cashless payments during the COVID-19 crisis and beyond. This study utilizes the secondary research method by employing the annual statistical report of European Central Bank (ECB) (2021). The data was extracted from the warehouse of ECB, and rigorous analysis was performed to assess the intentions of customers for using digital transactions for payments. In the study, a regression analysis shows that a greater increase in the number of cards used for payment per year occurred during the COVID-19 pandemic than before the pandemic. The study demonstrates that there was a significant correlation between the adoption of cashless payment systems and the restrictions imposed on consumers because of the pandemic. Customers prefer cashless transactions when there is a higher danger of infection while handling cash.

Keywords: *Cashless payments, COVID-19 pandemic, cash, digital payments, regression analysis*

1. INTRODUCTION

The sudden surge of the COVID-19 pandemic influenced the whole world due to its high infectiousness and deadly nature. People around the world became desperate and had to change their lifestyles due to this pandemic. The government even enforced laws and regulations requiring citizens to stay at home. People were required to maintain social distance from others to avoid becoming infected with COVID-19. This epidemic has altered the way of life around the world. People have had to adapt to this situation and make adjustments to how they live their lives. One of the major changes in habits has been seen in terms of payment systems due to the COVID-19 pandemic. Concern over a potential connection between using real money and COVID-19 infections has unexpectedly increased (Auer et al., 2020). The COVID-19 epidemic has enforced changes in a variety of company strategies and economic sectors, as well as in customer habits across a variety of industries, including regular payment habits (Popkova et al., 2021). Most of the citizens of 20 selected European countries preferred a cashless digital payment method for their daily payments in the time of the COVID-19 pandemic because the exchange of physical cash between people increased the chance of getting infected. In times of COVID-19, people's movements and consumption were significantly reduced as a result of government-imposed lockdowns, with internet purchasing overtaking in-store purchasing in a particularly noticeable way (Bounie et al., 2020). According to a survey by European Central Bank (2020), around 38% of respondents from European countries believed that touching

banknotes and physical cash could lead to infection by the COVID-19 virus. This belief significantly reduced the use of cash payments. Surveys by the Federal Reserve System (Kim et al., 2020) and the Bank of Canada (Chen et al., 2020), which also found that some risk-averse retailers stopped accepting cash as a form of payment altogether, reached similar conclusions. Jonker et al. (2021) conducted a study of demographic and transaction-specific behaviors, using a Dutch payment diary data, and they found that payment habits transitioned from cash to cashless payments due to COVID-19. Notably, both more general statistics and the words of specific respondents showed how the epidemic has affected the transactional utility of currency. Studies in Switzerland (Kraenzlin et al., 2020), Italy (Ardizzi et al., 2020), and France (Bounie et al., 2020) that focused on data of national payment schemes, retail systems, or specific banks found that the utilization of digital payments has accelerated quickly in spite of a reduction in overall consumption. Huterska et al. (2021) investigated the payment behaviors of people during times of extreme conditions like COVID-19. They concluded that the fear of SARS CoV-2 infection, and the restrictions regarding government-imposed lockdowns, has changed the financial payment behaviors of the people. They also emphasized the importance of cashless digital payments during the time of COVID-19 and other epidemic situations.

The pandemic has changed the behavior of people in many ways and payment behavior is one of the most prominent. Even after the peak of the pandemic, people have become familiar with easier and smoother digital payment systems. The current study investigated the impact of the coronavirus on consumer demand for cash and digital payments in the time of the COVID-19 crisis as well as after the pandemic. The number of cards will therefore be analyzed which leads to more cashless transactions if there is an increase in the number of cards. This work describes the adoption of digital payment systems from the onset of COVID-19 to the present. The outcome of this study will help various stakeholders make strategic decisions about payment methods for their organizations.

2. LITERATURE REVIEW

Several studies have been conducted by various authors around the globe on the topic of COVID-19 and cashless payments, with the main concern being the possible transmission of the virus through the exchange of physical money between people. Research on the transmission of infectious diseases by using currency first appeared in the 1970s (Abrams & Waterman, 1972). SARS-CoV-2 can persist on surfaces, which increases the risk that the virus might spread through currency (Chin et al., 2020). The COVID-19 coronavirus can still be detected on paper notes and polymer 28 days after infection. The amount of time needed for viral decay in coins may vary depending on the metal used in their production. For copper, it seems to take eight hours, whereas for stainless steel it takes 48 hours. The transition from physical cash to cashless payments can eliminate the risk of spreading the virus through the exchange of cash. Because SARS-CoV-2 may remain alive for seven days on the surfaces of plastic (Chin et al., 2020), users of pin pads and payment card terminals may be in danger. However, due to the epidemic, contactless payment limits were increased in several countries, and MasterCard made pin codes unnecessary for the vast majority of point-of-sale transactions. The huge numbers of financial transactions that were carried out online or through mobile banking also prevented interaction with potentially infectious objects. Therefore, it is possible to claim that altering one's payment practices may lower the chance of infection. It became somewhat unclear how money issuers felt about the subject of compromised public health. The way that central banks reacted to information regarding the potential harm that cash posed varied. However, studies showed that objects including banknotes and coins, which are continuously touched and change hands fairly often, may be a breeding nest for the virus, as it

can survive on these surfaces at 22°C for eight hours and at 37°C for four hours (Harbourt et al., 2020). The virus stayed stable on banknotes for an hour, according to a study by the Bank of England, before the concentration of it was dramatically reduced to barely 5% of its initial level over the course of the next five (Caswell et al., 2020). The Westdeutsche newspaper (2020) reported that the FED even quarantined US-Dollars coming from overseas, especially from Asia, for up to 10 days before releasing them for usage to the general public.

The risk of getting infected still prevails. For this reason, people have started to adopt various types of cashless digital payment systems such as cash card, debit card, credit card and e-money. Bhavya et al. (2021) conducted a case study on Mangalore City to investigate the effect of COVID-19 on cashless payments. Most of the people of Mangalore City believed that utilization of online payments could reduce the spread of COVID-19 significantly. Chi et al., assessed the major influencing factors to adopting cashless payment systems by people in Min Ho City, Vietnam (Chi et al., 2022). Their findings indicated that fear of spreading COVID-19 was one of the major considerations for transitioning to cashless payments. Kotkowski & Polasik conducted a research survey on the people of European countries regarding the impact of COVID-19 on cashless payments (Kotkowski & Polasik, 2021). Their study was focused on the results of a survey that had over 5000 participants from 22 different nations in Europe. It demonstrated that customers who were already using cashless payment methods before the surge of the pandemic have become even more likely to continue doing so since the epidemic first started. On the other hand, despite being provided additional payment choices, customers who had always paid in cash have regularly done so, nevertheless. The same authors have also conducted a survey to investigate how the COVID-19 epidemic impacted consumers' payment behavior in Europe (Kotkowski & Polasik, 2021). They discovered that the number of cashless payments increased substantially during the COVID-19 period.

Most of the existing research, such as Wisniewski et al. (2021) and Kotkowski et al. (2021), has focused on people's perceptions of the effect of COVID-19 on the adoption of cashless payments. They did not show the actual representation of data that could illustrate the real scenario of the growth of digital payments. This study investigates and summarizes the recent statistical report of ECB 2021 to show the effect of COVID-19 on the growth of cashless digital transactions in European countries.

3. METHODOLOGY

The main aim of this study was to investigate the influence of COVID-19 on payment behaviors of people of European countries. This study adopted a secondary research method to determine the influence of COVID-19 on payment behavior of European countries. Secondary research, often known as desk research, is a method of studying that makes use of information that has already been gathered. Existing data is collated and summarized to enhance the overall efficiency of research. Secondary research refers to studies that build upon and expand upon prior studies that have been published in research reports or other similar articles. You may find some of these items in public libraries, internet databases, previously conducted polls, etc. Some non-profit and government agencies also maintain databases with research-worthy information. Since secondary research uses data that has already been collected rather than gathering new information from scratch, secondary research is more cost-effective than primary research. The secondary research method is very popular all over the world. Many studies using secondary research have been conducted by various authors around the world. Warchlewska (2020) conducted a research study using secondary data to investigate the impact of cashless payments on senior citizens. Gupta et al. also conducted a secondary study, considering a previously published article, to investigate the impact of COVID-19 on Digital Payment Services at Towns and Villages (2021).

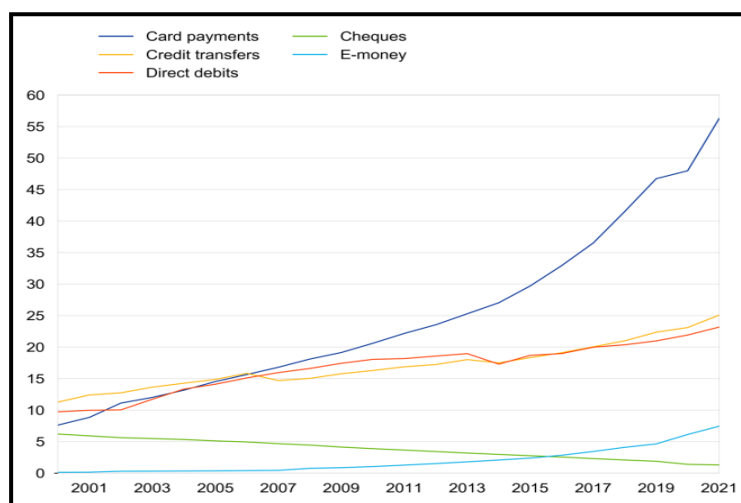
This study utilized the annual statistical report (2021) of European Central Bank (ECB) as a secondary source of data. The ECB has collected data around various major criteria. It has performed major investigations and surveys on the people and organizations of European countries to collect information regarding banking, payments and other business functions. This study focused on the topic of payment methods such as card, credit transfer, direct debit transfer and e-money. The data was extracted from the statistical report to align with the investigation of this study. Then, regression analysis was performed after collecting the data. The regression coefficient depicts the rate of change of behavior of European people in their payment methods. Additionally, the data was extracted and plotted in various graphs and tables to show the change in financial behavior of European people for their daily payments. This research also considered published articles and books from other sources as secondary sources of data to represent the objectives clearly.

4. RESULTS AND DISCUSSION

4.1 Trends of digital payments in Europe

This study utilized the statistical data of ECB to conduct further analysis for pointing out the major impact of COVID-19 on the nature of financial transactions. Figure 1 represents the payment methods of choice from 2001 to 2021. The horizontal axis represents the year of transactions, and the vertical axis represents the number of transactions in billions. It is clear from Figure 1 that there are five types of non-cash payment systems available in Europe, including card payments, credit transfers, direct debits, cheques and e-money. From Figure 1, it is also evident that use of non-cash payment is increasing at a very high rate. The growth rates, or the slope of the curves, are the smallest in earlier years, while the largest and steepest growth rates are from recent years. From the COVID-19 period to present (2019-2022), the use of non-cash payments has increased significantly. Financial transactions through cards show the highest growth rate among other payment systems. Non-cash payments in the Eurozone, which include all kinds of payment services, climbed in 2021 by 12.5% to 114.2 billion, with an equivalent total value rise of 18.6% to €197.0 trillion, compared to the previous year. Payments made using credit cards accounted for 49% of all transactions, while credit transfers accounted for 22%, and direct debits accounted for 20% of all transactions. Furthermore, the use of cheques for financial transactions and payments is decreasing.

Figure 1. Trends of payment systems in Europe



Prepared by author, based on data from the ECB data warehouse

4.2 Number of issued cards with a cash function

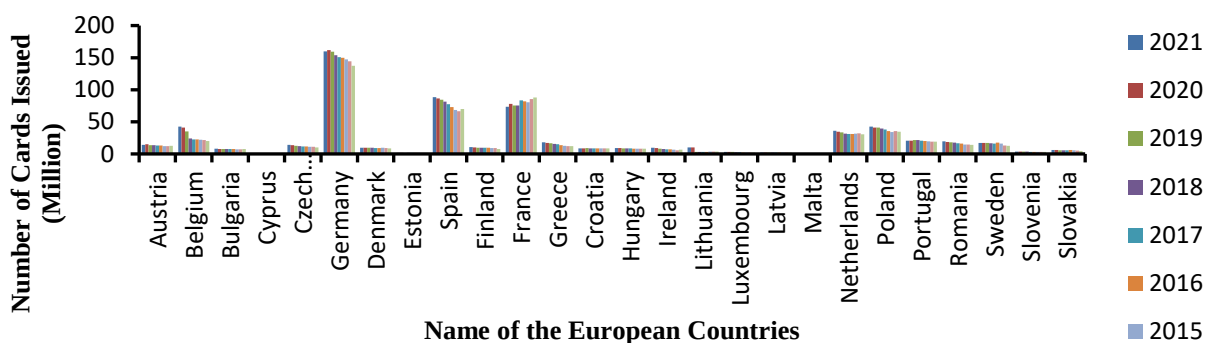
There are various types of cards which can be used for payment online and offline (Yu et al., 2002). These cards are classified according to their usefulness and nature. Figure 2 represents the number of issued cards with a cash payment in various countries of Europe from the years 2014 to 2021. A cash card is a reloadable e-wallet that may be used to make a variety of different kinds of payments (Upadhayaya, 2012). Bank debit cards, pre-loaded debit cards, gift and payroll cash cards are all examples of cash cards. There are no credit cards included in the list because credit cards are a kind of debt rather than cash. Cardholders can conveniently make electronic payments using cash cards. All retailers who accept the network processor usually also accept standard-branded cash cards. The most prevalent sort of regular cash card is a bank debit card. It is common for these cards to be connected to a bank account at a financial institution, and one may use them to make electronic withdrawals from their bank account. It is also possible to withdraw money from a bank account using a standard cash card. A bank-operated or connected ATM will not charge you any fees if you use a cash card that is linked to a checking account.

From Figure 2, it is evident that the number of cash cards is increasing year by year. If we look at Spain, for example, it can be seen that the number of cash cards is increasing continuously as a way to make daily payments. In 2013, the number of cash cards was 69.75 million. However, in 2021, it increased to 88.46 million. This is likely because COVID-19 infected Spain very severely. That's why the people of Spain have adopted digital physical cashless payment systems for their daily needs. Even after the end of the pandemic, they have continued to use cash cards for their daily payments. Germany also has shown a significant amount of increase in the use of cash cards. The number of cash cards has increased around 22.63 million from 2013 to 2021. The highest number of cash card users was counted around 161.71 million during the COVID-19 period in 2020. In a nutshell, it can be concluded that the overall adoption of cash cards for digital and electronic payments has increased significantly in European countries. It can be predicted that this trend of cash card and digital payments will continue in the foreseeable future. People will utilize cash cards more often for their daily needs.

4.3 Number of payment cards with a debit function:

Figure 2 represents the number of payment cards with a debit function for various European countries from 2013 to 2021. It functions as a bank debit card for the payment of any transaction. Debit cards are linked directly to a person's bank account, so when one is used to make a transaction, the money is withdrawn straight out of that account. These cards may be used to buy goods and services, but they can also be used to withdraw cash from an ATM or to receive cash back while making a purchase at certain stores. They are also known as "check cards" or "bank cards." The number of people using debit cards is increasing continuously in European countries. For example, in Italy, it is clear that more people are using debit cards to make daily payments. There were 44.22 million debit cards in use in 2013. But in 2021, it increased to 60.94 million. Italy was severely affected by the COVID-19 infection. For their daily necessities, Italian citizens have adopted digital and physical cashless payment methods. Even after the peak of the epidemic was over, people continued to use cash cards for daily payments. Likewise, Germany has exhibited a large increase in the use of cash cards. Between 2013 and 2021, there were an additional 15.74 million debit cards issued. Around 121.33 million people used debit cards at their greatest level during the COVID-19 era in 2020–2021. In summary, it can be said that debit cards have been widely accepted for digital and electronic payments in European nations.

Figure 2. Number of issued cards with a cash function

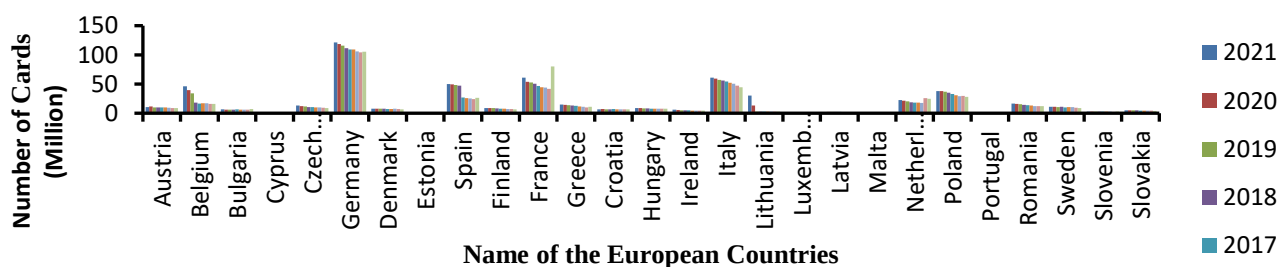


Prepared by author, based on data from the ECB data warehouse

4.4 Number of payment cards with all functions such as cash, debit, credit, e-money and credit with delayed debit.

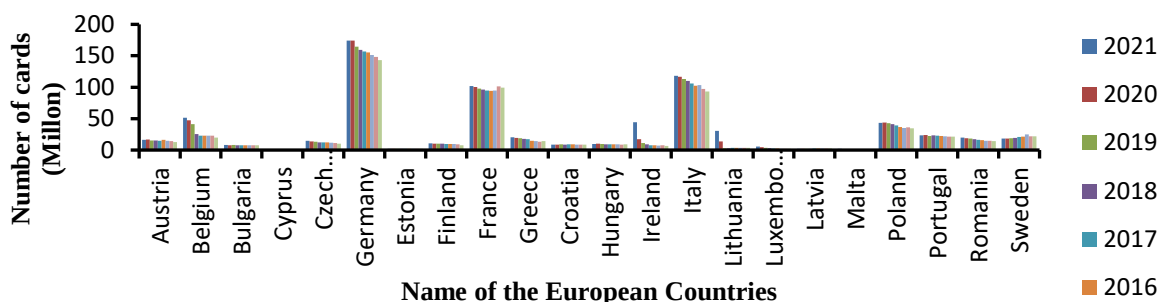
There are several types of digital payment systems such as cash card, debit card, credit card, e-money and credit with delayed debit. Previously, this study discussed the major digital payment methods of cash and debit card. This section has combined all types of digital payment systems. Figure 4 shows the total number of digital payment systems used in various countries over the past 9 years. This section shows the same results as previously. The adoption of digital payment systems by various European countries is has increased continuously over 2013–2021. The COVID-19 pandemic has accelerated the adoption and growth rate of digital payment methods significantly since 2020. That is the reason why the growth is greater in 2020 and 2021 than in prior years. Figure 5 represents the percentage of growth rate in the number of cards with a payment. This growth rate is calculated in terms of percentage. This growth rate means the rate of adoption of payment cards from the previous year. For example, the growth rate of 2021 indicates the amount of change from the condition of 2020. The positive sign of change indicates that the adoption of digital payment cards is increasing continuously, while a negative sign indicates that the adoption of digital payment cards is decreasing continuously. Most of the countries have shown a positive growth rate each year. Austria, Belgium, Denmark, Croatia and Portugal have shown negative growth at some points during past years. However, all countries have shown a positive growth rate of digital payments during the COVID-19 period. There are, however, some countries that show a negative growth rate just after COVID-19. Austria shows a -6% negative growth rate just after the pandemic was over. By observing all the data, it can be predicted that digital payment systems will predominate cash payments soon.

Figure 3. Number of payment cards with a debit function



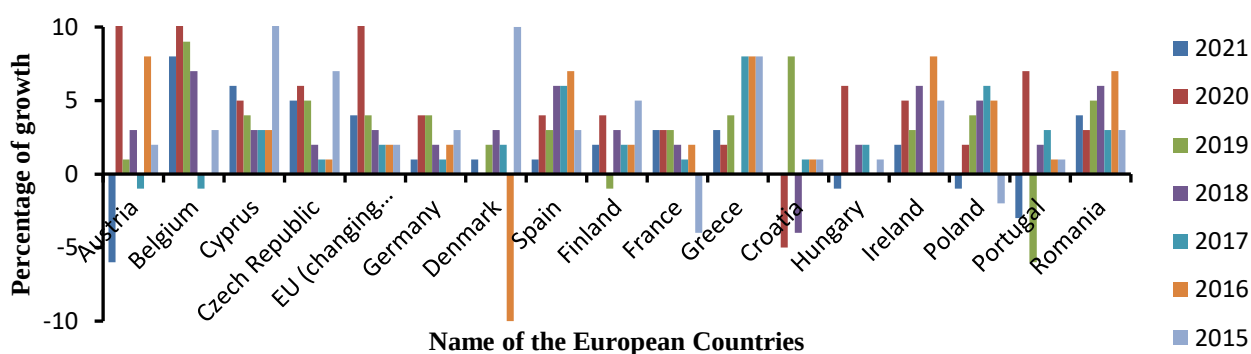
Prepared by author, based on data from the ECB data warehouse

Figure 4. Number of payment cards with all functions such as cash, debit, credit, E-money and credit with delayed debit.



Prepared by author, based on data from the ECB data warehouse

Figure 5. Percentage of growth rate in number of cards with a payment



Prepared by author, based on data from the ECB data warehouse

4.5 Regression analysis

This study conducted a regression analysis to show whether the use of cards was predicted by year, before and during the pandemic. We divided the number of cards between 2 segments. The first segment denotes the number of cards before the pandemic considering the years from 2013 to 2017. The second segment denotes the number of cards including the pandemic period year (2018–2021). The data for regression analysis was collected from the statistics of ECB 2021. The total number of various types of issued cards for digital payment was collected from the statistics of ECB 2021. ECB has published its statistics for each individual European country. This research has summed up the number of issued cards in each country. The total card number represents the total number of issued cards in the European zone. For this analysis, we used an alpha level of 0.01 to indicate significance. In this regression analysis, the year is considered as the independent (x) variable and the number of total cards in European countries (Including all European countries) is considered as the dependent variable (y). Figure 6 represents the regression analysis of the total number of cards before the COVID-19 pandemic. The regression model was $y=102.3x - 200529$.

From Figure 6 and the regression model, we can see that the regression coefficient was 102.3, which indicates that the total number of cards was increased by 102.3 million per year before the pandemic. The mean square-R value was 0.957 which is very high. The P-value of the regression model was 0.004 which is less than 0.01, indicating that this regression model was statically significant. On the other hand, Figure 8 represents the regression analysis of the total number of cards during the COVID-19 pandemic. The regression model was $y=432.54x -$

200529. From Figure 8 and the regression model, we observe that the regression coefficient was 432.54, which indicates that the total number of cards was increased by 432.54 million per year during the pandemic. The mean square-R value was 0.9875 which is again very high, and the P-value was 0.0062, indicating that the model was significant. By comparing the regression coefficient of the total number of cards before COVID-19 and the total number of cards during COVID-19, it is evident that people used more cards in the time period of the pandemic than before the pandemic. It can be stated that the COVID-19 pandemic increased the use of cards for digital cashless payments.

Figure 6. Regression analysis of number of cards before COVID-19

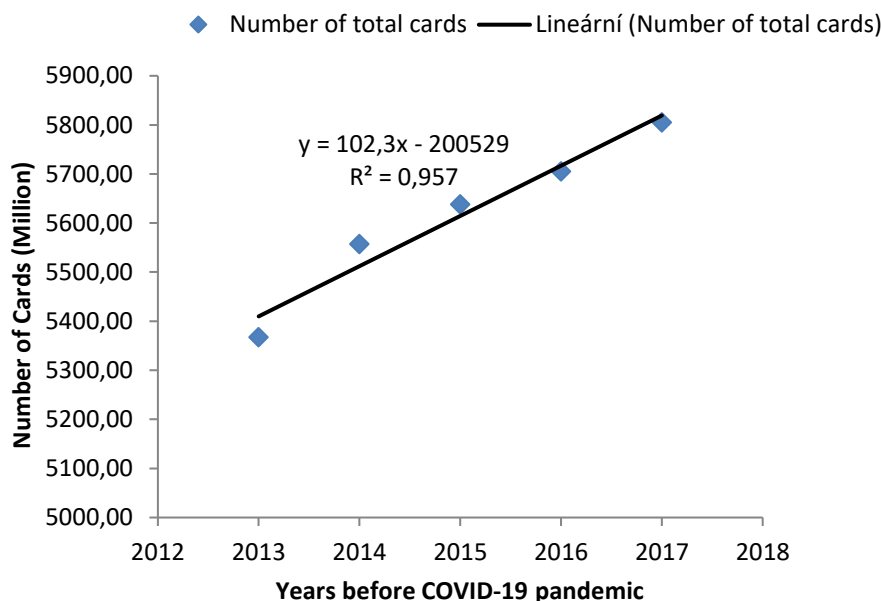


Figure 7 represents the regression analysis parameters of the number of issued cards predicted by years before the outbreak of COVID-19. The standard error of the x variable in this analysis is 12.53. The standard error measures the distance of observed data from the predicted data on the regression line. The average distance between the observed values and the regression line is shown by the standard error of the regression, which is sometimes referred to as the standard error of the estimate. Utilizing the units of the response variable, it is informative of how consistent the regression model is. Better values are smaller ones since they show that the observations more closely parallel the predictions of the fitted line. The prediction of card numbers fluctuates around 12.53 million from the real amount using this model. On the other hand, Figure 9 represents the regression analysis parameters of the number of issued cards predicted by years during the outbreak of COVID-19. The standard error of x variable in this analysis was 34.45. The regression model during the COVID-19 period will provide wrong data from the actual condition with a fluctuation around 34.45 million. By comparing the two regression models, $y=102.3x - 200529$ can provide more accurate results than $y=432.54x - 200529$. The P value can be considered as another parameter to evaluate within the regression models. The P value should be less than 0.01 to be statistically significant. The P value of the $y=102.3x - 200529$ regression model was 0.00384, which is less than 0.01. On the other hand, the P value of the $y=432.54x - 200529$ regression model is 0.0062, which is again less than 0.01. In this case, it can be concluded that both the first model, $y=102.3x - 200529$, and the second model, $y=432.54x - 200529$, were statistically significant. However, the $y=432.54x - 200529$ model had a greater regression co-efficient than $y=102.3x - 200529$. This phenomenon indicates that the increase in COVID-19 infections resulted in an increased number of cards for cashless digital payments.

Figure 7. Regression analysis parameters of number of cards before COVID-19

SUMMARY OUTPUT (Before COVID 19)								
Regression Statistics								
Multiple R	0.97824153							
R Square	0.956956491							
Adjusted R Square	0.942608654							
Standard Error	39.6133204							
Observations	5							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	104661.8167	104661.8	66.69692	0.0038402			
Residual	3	4707.64546	1569.215					
Total	4	109369.4621						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-200528.8622	25241.57233	-7.94439	0.00416	-280858.811	-120198.914	-280858.811	-120198.914
X Variable 1	102.304358	12.52683182	8.166818	0.00384	62.43838837	142.1703276	62.43838837	142.170328

Figure 8. Regression analysis of number of cards during COVID-19

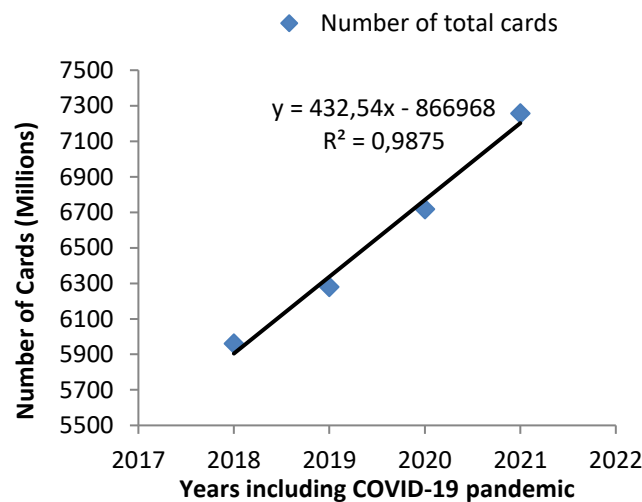


Figure 9. Regression analysis parameters of number of cards during COVID-19

SUMMARY OUTPUT (during Covid-19)								
Regression Statistics								
Multiple R	0.993714317							
R Square	0.987468144							
Adjusted R Square	0.981202215							
Standard Error	77.04520333							
Observations	4							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	935467.9047	935467.9	157.5933	0.006285683			
Residual	2	11871.92671	5935.963					
Total	3	947339.8314						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-866967.5601	69583.22088	-12.4594	0.00638	-1166360	-567575.125	-1166360	-567575.125
X Variable 1	432.543155	34.4556624	12.55362	0.006286	284.2924051	580.7939049	284.2924051	580.793905

5. CONCLUSION

The spread of the coronavirus shifted the direction of our lives and established a constant feeling of anxiety. The COVID-19 pandemic has influenced the lifestyles of people negatively. People have had to cope with this virus by adopting new social life standards. Due to government-imposed lockdowns and fear of becoming infected with the coronavirus, people had to maintain social distance from others. This phenomenon has altered the traditional financial transactions of physical cash. People preferred to use cashless and digital payment systems because they believed cash payment might cause infection of coronavirus from others. This study investigated the impact of COVID-19 on cashless digital payment methods. This study used a secondary research strategy by collecting documents from legitimate sources of already-collected data. This study considered the statistics of European Central Bank (ECB) (2021) as secondary sources of data for interpreting the impact of COVID-19 on digital cashless payments.

The analysis of the data reveals that the number of online payment systems has been increasing continuously over time. But, in the time during the pandemic, the adoption of online payment systems accelerated a lot. People have adopted online payment systems significantly for their daily needs. The data also represents that the adoption of online payment systems has been high even after the end of the COVID-19 pandemic. People have become accustomed to the new digital payment systems. It is also clear from the results that because of COVID-19 the number of cards issued increased more rapidly which led to more cashless transactions overall. It can also be predicted that the utilization of digital payments will continue to rise in the near future and have an impact on society and the way financial transactions and payments are conducted. With a more digital environment, people will have to adapt. It remains to be seen if the continuing transition to new payment methods will be smooth and easy.

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THE PROVISION OF ACCOUNTING SERVICES IN TIMES OF COVID-19 PANDEMIC

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Abstract: *Accounting plays a key role within the business since it provides financial and non-financial information about the past, present and estimates for the future. In case of small and medium-sized enterprises, outsourcing of accounting is very common. In times of crisis, characterized by uncertainty, social and economic imbalances, the information need frequency increases for all stakeholders. Updated information and consultations with the experts are needed in order to make fast and good decisions to ensure the business continuity. This paper investigates the changes that occurred in the provision of accounting services because of Covid-19 outbreak. We employed a qualitative approach using the theory of change as theoretical framework, accounting services market under Covid-19 pandemic as context and semi-structured interviews as research method. The results showed that Covid-19 pandemic put high pressure on companies and people to adapt to the new reality and overcome their resistance to change. We found that digital transformation was accelerated; the importance of accountants as advisors increased a lot; the loss of staff and the need to reduce the costs forced some companies to choose outsourcing; digital delivery of services was predominant; most clients submitted documents in digital format and had instant access to information; most accounting firms implemented remote and hybrid work for their employees; some companies in order to survive reinvented their business with the help of external accountants and some accounting firms in order to cope with the shortage of professionals embraced the possibility to hire remote workers from other cities. The main contribution of our study was to show the impact of Covid-19 pandemic on the provision of accounting services by highlighting the major changes experienced by accounting firms and their clients.*

Keywords: *accounting information, business resilience, Covid-19 pandemic, outsourcing decision, remote work*

1. INTRODUCTION

In our modern business world change is the necessary condition that companies have to meet in order to evolve and within organizations the success of change depends on the people and technologies involved. Accounting information both financial and non-financial is used to assess the past actions and prepare for future decisions (Hall, 2010). Accounting information can be provided by internal and external accountants and most small and medium-sized enterprises use to outsource their accounting services (Barrar et al., 2002).

The outsourcing decision of accounting services is mainly driven by reasons such as cost reduction, access to expertise, focus on core business and flexibility (Zandi et al., 2019). In times of uncertainty the companies manifest an increased demand for guidance and advice from internal and external accountants in order to meet their goals (Robson and Bennett, 2000). External accountants represent the main source of information and advice for small and medium-sized enterprises (Dyer and Ross, 2007).

In case of small and medium-sized companies, external accountants besides providing regular accounting activities play also the role of business advisors (Gooderham et al., 2004). Larger companies compared to smaller companies tend to outsource less accounting activities and namely only those that require a high level of expertise (Everaert et al., 2007). In accounting digitalization can ensure near real-time information and allow making more timely interventions in the business plans (Knudsen, 2020) and automation can increase the processing

speed of documents and deliver information faster (Cooper et al., 2019). In the context of Covid-19 outbreak due to physical distancing and mobility restrictions companies were forced to accept new ways of interaction, working and trading (Ernst & Young, 2021). In times of crisis all stakeholders need financial and non-financial information more often and at a higher level of detail in order to assess the existing situation, explore alternative business scenarios and minimize the risks (Velayutham et al., 2021). During Covid-19 pandemic the role of accounting to reveal the accurate and entire truth was more emphasized since managers used figures provided by accountants to make decisions (Leoni et al., 2021). In these dark times, accountants provided ongoing support to their clients and reinforced the call of accounting to do good to society (Ahrens and Ferry, 2021).

People usually resist to major changes, but in time of crisis they adapt very fast and quite well to changes (Lewin, 1947). During lockdown many employees experienced depression and anxiety and some of them engaged in a workaholic behavior as a coping mechanism for their depression and anxiety ignoring the risk of acquiring the burnout syndrome and putting their health at risk (Rinaldi, 2022). In times of financial crisis companies tend to use earnings management techniques (De Luca and Palone, 2019) but external accountants restrict their clients to use these practices and encourage them to comply with tax regulations (Höglund and Sundvik, 2016). Due to remote work and digital delivery of services during Covid-19 pandemic the use of cloud applications increased significantly in sharing data and information between parties (Carungu et al., 2021). Most companies in order to survive and ensure the business continuity engaged in organizational transformation applying measures such as retaining the key employees, implementing digital solutions and outsourcing some business support functions (Robles, 2020)

After reviewing the relevant scientific literature on Covid-19 pandemic and its negative effects on social and economic level and having our preliminary interviews we found that research area related to the impact of Covid-19 pandemic on the provision of accounting services is underexplored and considering that gap existing in the literature we decided to conduct this research in order to expand the body of knowledge. The aim of this study is to investigate the changes that occurred in the provision of accounting services because of Covid-19 outbreak by presenting a comprehensive picture that involved three dimensions technologies, employees and clients. In doing so, we used the theory of change as theoretical framework, accounting services market under Covid-19 pandemic as research context and semi-structured interviews as research method. Considering the aspects mentioned before, this paper seeks to answer the following two research questions:

RQ1. How was the provision of accounting services before the outbreak of Covid-19?

RQ2. What changes occurred in the provision of accounting services because of Covid-19 pandemic?

Our findings revealed that during Covid-19 pandemic the digital transformation of companies was accelerated, the importance of accountants as advisors increased a lot; physical meetings were replaced with virtual ones; in some cases the loss of staff and the need to reduce the costs forced companies to outsource the accounting services; digital delivery of services prevailed; most clients submitted in cloud scanned copies or photos of documents and they could access online the standard reports; most accounting firms implemented remote and hybrid work for their employees; some companies in order to survive reinvented their business with the help of external accountants; stakeholders showed an increased need for information and some accounting firms decided to recruit and hire remote workers from other cities where they do not have offices in order to cope with the shortage of professionals.

The reminder of this paper is structured in four sections. The first section presents the review of scientific literature and the theoretical framework. The second part introduces the research context and methodology used to achieve the purpose of this research and answer the

research questions. In the third section the focus is on the results of this study and discussions on the findings considering the prior research. The final part is dedicated to the main conclusions, limitations of this study, recommendations and directions for future research.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Literature review

Accounting information represents a major part of the information set that managers use to gain knowledge about the company and the market performance in order to assess the past actions and prepare for future decisions (Hall, 2010).

According to Barrar et al. (2002), when it comes about the provision of accounting services the managers have three main options namely to use own employees, staff of a shared service center or external accountants.

Zandi et al. (2019) indicated that the most common outsourcing reasons are related to cost reduction, access to expertise, focus on core competences, improve the business processes and gain flexibility in case activity grows or shrinks.

Everaert et al. (2007) mentioned that access to external expertise is an outsourcing motivation that is more specific to large companies since compared to small and medium-sized enterprises, big corporations tend to outsource a smaller number of activities and especially those requiring high specialized knowledge and skills.

As regards the accounting services Everaert et al. (2010) claimed that small companies usually resort to full outsourcing whereas most medium-sized and large companies choose selective outsourcing considering the cost and the information need frequency in carrying out daily business transactions.

Dyer and Ross (2007) stated that external accountants represent the main source of information and advice for small and medium-sized enterprises and this type of companies are more likely to seek external advice to fill their internal expertise gaps and ensure the growth of the business.

Gooderham et al. (2004) argued also that in many countries in small and medium-sized enterprises external accountants play the role of business advisors for these companies in addition to providing regular accounting services such as recording and reporting.

Marriott and Marriott (2000) observed that small companies that are managed by owners tend to use the services provided by external accountants mainly to fulfill their statutory obligations and only in few cases these experts are asked by owners to guide them in managing the business.

A study conducted by Bennett and Robson (2005) showed a positive relationship between service quality, trust, client satisfaction and client intention to use again and again the services rendered by external accountants.

Kothari and Lester (2012) stated that from time to time companies face crises that can disrupt them from achieving their goals. Financial, personnel, organizational, technological and natural crises can threaten the stability and the development of the company and its success by affecting the conduct of the business operations.

On the other hand De Luca and Palone (2019) observed that in time of financial crisis large companies tend to resort more to earnings management practices that increase the profitability in order to show investors, lenders and other business partners a good performance, while small and medium-sized enterprises have the propensity to use more earnings management practices that decrease the profitability in order to reduce the corporate income tax since for these companies taxation is an important component of the business strategy.

Furthermore, Ball and Shivakumar (2005) stated that private enterprises compared to public companies are more likely to engage in earnings management practices because in case of private corporations there is less external monitoring, the market pressure to report high profits is missing and in most cases their financial statements are not available for the large public.

Outsourcing of accounting services is expected to lead to an increase in the tax reporting quality since accounting firms restrict their clients to use tax earnings management and provide them necessary support to comply with the tax regulations (Höglund and Sundvik, 2016).

Venter et al. (2018) mentioned that accounting and auditing play an important role in the economic development of the countries because they promote financial reporting integrity and tax compliance which are followed by more capital inflows in the economy brought by investors and the state.

Johnstone-Louis et al. (2020) claimed that in times of crisis companies having the main focus on the financial profit are enticed to cut staff costs and by doing that they fail to recognize, protect and value their employees because without the support of their staff these companies are not able to achieve the business resilience and recovery.

According to Rinaldi (2022), Covid-19 pandemic started as a global health issue and caused a major social and economic crisis because of the large number of sick and dead people, lockdowns, layoffs, poverty accentuation, depressed people, business interruptions, disruption of supply chains and business shutdowns. In his opinion during Covid-19 pandemic the importance of information and communication technology increased exponentially since the companies had to implement digital solutions in order to keep their business running and complying with the safety requirements imposed by authorities.

Knudsen (2020) claimed that the speed of delivering accurate and complete accounting information is crucial in order to make timely decisions since the business environment is dynamic and competitive. In his opinion digitalization fits very well to accounting since it deals with large volumes of data and the implementation of digital solutions within the company can ensure more real-time information.

Velayutham et al. (2021) indicated that in times of crisis all stakeholders need to receive financial and non-financial information more often and at a higher level of detail in order to assess the existing situation, explore alternative business scenarios and minimize the risks. They also emphasized that companies were more open to seek external advisors and ask their support in order not to go through these dark times only on their own.

Kokina and Blanchette (2019) found that large companies use robotic process automation (RPA) tools also known as software bots for repetitive and rule-based tasks in order to increase the speed of transactions, produce more accurate information in a shorter period of time and comply better with the business rules and regulations. In their opinion the adoption of these software bots might be a solution for problems such as employee turnover and shortage of professionals.

Moreover Cooper et al. (2019) indicated that large accounting firms have already implemented RPA solutions in order to increase work efficiency and effectiveness. The results of their study showed that implementation of RPA did not reduced the headcount but decreased a lot the processing times consumed before by employees in carrying out repetitive and mundane tasks and that change made the employees feel more satisfied regarding their new roles and tasks increasing the employees' retention.

Carungu et al. (2021) observed that in times of Covid-19 pandemic the accountants adapted quite fast and well to the new working conditions such as remote delivery of services and virtual meetings with the clients and colleagues even though they experienced an increased stress level in the beginning of the crisis because of the high workload. They outlined the

importance of cloud and remote connection applications in sharing data and information between parties.

Rinaldi (2022) claimed that the impact of Covid-19 pandemic outlined the strong existing relationships between social, environmental and economic aspects of life and increased the stakeholders' demand for high-quality information and more frequent disclosures because of the fast changing circumstances.

According to Leoni et al. (2021) the role of accounting to reveal the accurate and entire truth is emphasized even more in times of crisis since accountants as key actors have the responsibility to show the figures exactly as they are, hinder the waste of resources, mitigate the risks of opportunistic behaviors and facilitate the business resilience and recovery.

Many years ago, Robson and Bennett (2000) emphasized the idea that companies being in the startup, growth and restructuring phases, because of the high level of uncertainty, manifest an increased demand for guidance and advice from internal and external accountants in order to meet their goals.

Ahrens and Ferry (2021) observed that in many countries governments provided financial support for companies struggling with the negative effects of Covid-19 pandemic with the purpose to avoid the occurrence of the bankruptcy in chain in the economy. In their opinion accountants were supportive since these companies were asked to submit application forms accompanied by financial reports and business plans. After their applications were approved they received financial resources from governments in form of grants or loans in order to make investments and keep their employees on the job.

Leoni et al. (2021) argued that during Covid-19 pandemic the role of accounting function increased a lot since the managers asked the accountants to give them more advice and provide them the necessary support in monitoring and controlling the business activity in order to ensure the business continuity under those difficult economic and social conditions.

Rinaldi (2022) mentioned that Covid-19 pandemic affected people on a deep personal level and most individuals experienced frustration and anxiety because of the sudden shift of working practices, mobility or travel restrictions, physical distancing measures and new forms of social interactions. In order to cope with the frustration and anxiety caused by these constraints related to personal freedom, some people engaged in a workaholic behavior ignoring the risk of acquiring the burnout syndrome.

Robles (2020) emphasized that under Covid-19 pandemic most companies in order to survive and ensure their business continuity engaged to a large extent in organizational transformation which involved measures like retaining the key employees, implementing digital solutions and outsourcing business support functions such as accounting, payroll and IT services to reduce the costs and rely on experts to use the best practices.

2.2. Theoretical framework

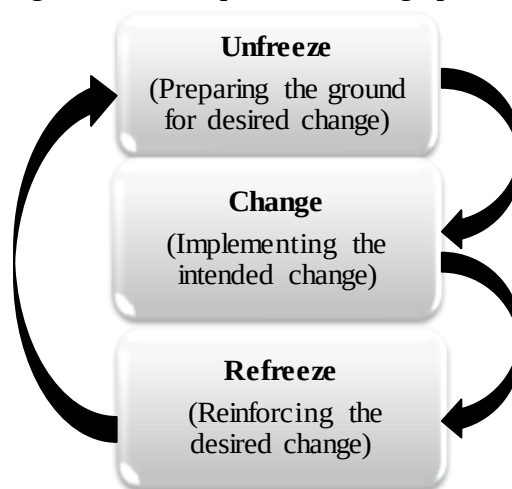
Considering that Covid-19 pandemic caused major changes within the business environment, on social, economic and technology level and challenged the economies all over the world, we chose to use the theory of change developed by Lewin in 1947 as theoretical framework. This theory is suitable to explain forced or voluntary changes that happen in teams, organizations and society.

The theory of change has in view the change of perceptions, attitudes and behaviors as a result of interaction between two forces identified as resistance to change and adaptation to change. Lewin (1947) believed that companies need to change and adapt on a regular basis considering the evolving business environment, if they want to be successful. Since the companies are made up of people working together, the implementation of the change within the company is possible by changing the perceptions, attitudes and behaviors of the employees.

According to Lewin (1947), people usually resist to major changes, but in time of crisis they adapt very fast and quite well to changes. As regards change, there are driving forces and resisting forces and the change only occurs when there is a strong motivation or pressure to embrace the change. In case the change is required by a law or a regulation since the organization has the obligation to comply with that law or regulation, the managers have to find the ways to reduce the resisting forces and then implement the change.

The management model of change proposed by Lewin (1947) consists in three steps: unfreeze, change also called transition and refreeze (Figure 1). He defined these three steps by making analogy with an ice block where unfreeze involves melting the ice block with the purpose to obtain a new shaped ice, change means pouring the water into a new mold and refreeze involves freezing that new mold with the water inside in order to get the desired shaped ice.

Figure 1. The steps of the change process



Source: Authors' own creation based on Lewin's theory of change

During Covid-19 pandemic the authorities imposed more restrictions and each of them had in a lower of greater extent implications on how companies ran their business considering the main pillars that are represented by technologies, employees and clients. Furthermore our conceptual model of change has in view technologies, employees and clients due to the strong relationship between these three determinants.

3. RESEARCH CONTEXT AND METHODOLOGY

The aim of this study is to investigate the changes that occurred in the provision of accounting services because of Covid-19 outbreak by presenting a comprehensive picture that involved three dimensions: technologies, employees and clients. In doing so, we used the theory of change as theoretical framework, accounting services market under Covid-19 pandemic as research context and semi-structured interviews as research method.

This paper seeks to answer the following research questions:

RQ1. How was the provision of accounting services before the outbreak of Covid-19?

RQ2. What changes occurred in the provision of accounting services because of Covid-19 pandemic?

We presented detailed information about the research context and methodology in the lines below.

3.1 Research context

In Romania, the accounting services market is represented by individuals and firms being members of CECCAR, the body that regulates the accounting profession. The number of active members identified as expert accountants on December 31, 2020 was 18.851 (Accountancy Europe, 2021). Based on statistical information available on the website of National Trade Register Office on December 31, 2020, the number of active companies was 1.04 million and 22.1% of them were entities with foreign participations. Considering the information on the website Top firme, in Romania at the end of the year 2020 there were active 11.159 firms with the main business activity consisting in accounting, audit and tax consulting services and they had a turnover of 872 million euro.

As regards the market profitability, the average rate was 31.6%, the minimum rate was 2.5% and the maximum rate was 48.3%. International accounting firms like Ernst and Young, Deloitte, KPMG, PricewaterhouseCoopers and BDO reached together 22.5% of the market share. In the top list of 20 accounting firms, meaning a turnover greater than 2.5 million euro there are also 3 local accounting firms such as Vulpoi & Toader Management, Contexpert Consulting and Soter having together 1.1% of the market share.

Table 1. Overview of accounting, audit and tax consulting services market from Romania

No of companies	Turnover range	Turnover (mil. EUR)	Average turnover (mil. EUR)	Market share
9	> 10 mil. EUR	178	19.8	20%
3	> 5 mil. EUR and ≤ 10 mil. EUR	17	5.7	2%
8	> 2.5 mil. EUR and ≤ 5 mil. EUR	26	3.3	3%
18	> 1 mil. EUR and ≤ 2.5 mil. EUR	30	1.7	3%
38	> 0.5 mil. EUR and ≤ 1 mil. EUR	28	0.7	3%
11,083	< 0.5 mil. EUR	593	0.1	68%
11,159		872	X	100%

Source: information processed by authors using data of the year 2020 from Top firme website

In Romania after several consultations among the health experts, the authorities declared on March 16, 2020 the state of emergency establishing the lockdown measure until the May 15, 2020 and the companies with non-essential business had to interrupt their physical activity during that two months period.

Digitalization like never before had the great potential to revolutionize accounting. Accounting firms had to find new ways to keep running their activity and provide ongoing support to their clients. The adoption of digital solutions like cloud, remote connection and chat applications within the accounting firms ensured the proper functioning for remote work, transfer of documents, digital services and communication with the clients (KPMG, 2020).

According to a study conducted by Ernst & Young (2021), in the context of Covid-19 outbreak the digital transformation of the companies was accelerated due to physical distancing and mobility restrictions imposed by authorities in order to limit the spread of the virus. Under these circumstances companies were forced to accept new ways of interaction, working and trading. In the same study is mentioned that digital transformation is vital for business development and companies that postpone or hesitate to engage seriously in that will be left behind and lose.

3.2 Research methodology

Subsequent to the review of the relevant scientific literature on Covid-19 pandemic and its negative effects on social and economic level, we organized in the beginning of December 2021

preliminary interviews with three experts working within the accounting profession for more than 20 years to get further information about the impact of Covid-19 pandemic on the provision of accounting services. After we had the discussions with them, we found that research area related to the impact of Covid-19 pandemic on the provision of accounting services is underexplored. Having in view that gap existing in the literature we decided to expand the body of knowledge by conducting this research.

We employed a qualitative approach because in our study we intended to find the answers to the questions such as “how”, “what” and “why” referring to the provision of accounting services in times of Covid-19 pandemic (Bryman and Bell, 2015). By adopting a qualitative approach, our intention was to extract the meaning of the studied phenomenon and not the frequency. The most common method used for data collection in qualitative research is represented by interviews and they are used by researchers to find out in detail the story behind the numbers and trends (Rowley, 2012).

According to Trucker (2020), the interview is a data collection technique that involves the interaction between the researcher and the subjects through questions and answers with the purpose to reach a deep understanding of the context in which events and actions occurred with the help of the subjects that possess a significant field experience.

We organized interviews with experts working within accounting firms to have the whole and clear picture regarding the impact of Covid-19 pandemic on the provision of accounting services. In doing so, in the second half of December 2021 considering the financial data available on the website Top Firme, we selected two samples of accounting firms having in view their turnover achieved in 2020. The first sample consisted in 38 accounting firms with an aggregate market share of 28% and each of them achieved in 2020 a turnover higher than 1 million euro. The second sample consisted in 38 accounting firms with an aggregate market share of 3% and each of them had in 2020 a turnover between half million euro and 1 million euro.

We organized two separate phases of interviews for each sample. In the first phase of the interviews our focus was on accounting firms with a turnover higher than 1 million euro. The interviews took place between January 2022 and March 2022 and 12 subjects participated out of 38 targeted experts. In the second phase of the interviews we had in view accounting firms with a turnover between half million euro and 1 million euro. The interviews took place between April 2022 and May 2022 and 5 subjects participated out of 38 targeted experts.

In selecting the interview subjects we followed the recommendation made by Trucker (2020) namely we chose partners and managers working within accounting firms because of their rich expertise and experience. We visited the websites of the accounting firms and LinkedIn platform in order to get in contact with partners and managers in charge with accounting services and we sent them e-mails with the kind request to participate in an interview as part of an academic research project. Considering both phases of discussions, the interviews were conducted in Romanian, the native language of the participants and they were semi-structured and consisted in open questions. The questions were the same in both phases of the interviews and followed topics related to: the role of accountants in times of crisis, changes caused by Covid-19 outbreak, employees' turnover and retention, recruiting and training the employees, working practices, the options regarding the provision of the services, clients' needs and satisfaction, communication and interaction with the clients, delivery of supporting documents and reports and information need frequency.

Overall we had 17 participants in interviews out of 76 targeted experts. As regards the turnover 12 experts work in accounting firms that had a turnover higher than 1 million euro. Considering the gender of participants 65% were women. As regards the experience of participants the average value is around 18 years, the minimum is 10 years and the maximum is 24 years. From 17 experts participating in interviews, 8 of them work in international

accounting firms and 9 of them work in local accounting firms out of which 7 of these local accounting firms are affiliated to international networks. The average interview duration was around 57 minutes, the shortest lasted 45 minutes and the longest 65 minutes. Hand notes were taken during the interviews in order to incorporate the answers received from the experts. The notes were read and checked at the end of each interview with the support provided by the experts and complemented right away if needed. We provided more details about the experts who took part in the interviews in the Appendix 1.

According to (Dai et al., 2019) in case of data collection using interviews as research method it is necessary to ensure the data saturation which means that in the analysis process there is enough amount of data. In our study we considered this aspect concerning data saturation and we observed that after the 14th interview we had a sufficient amount of data based on the similarity of answers that we received until this moment.

Despite of that we also conducted our last three interviews with the experts since the meetings were already scheduled and we wanted to show our interest towards the information they wanted to share with us. After having these last three interviews it was obvious that conducting additional interviews is very unlikely to bring any new information.

The interview notes were read multiple times and coded manually. We followed an abductive approach in analyzing and coding the data collected from interviews which allowed us to be flexible in moving back and forth between our theoretical framework and empirical data and that helped us not to overlook novel and valuable aspects of data that could be ignored in case of using only a deductive approach (Lukka, 2014).

4. FINDINGS AND DISCUSSIONS

We constructed the narratives on theory-driven themes meaning that we organized the findings around the chosen theory and the main themes (Hoque et al., 2013). In this section, the findings and discussions are formulated considering the themes of the research questions which are strongly connected to our theoretical framework consisted in theory of change and conceptual model of change involving technologies, employees and clients.

The themes of the research questions are: the existing situation before the outbreak of Covid-19 and the changes that occurred because of Covid-19 pandemic. In the next paragraphs we presented our findings and discussions following the chronological sequence of events since for a better understanding of the changes that occurred in the provision of accounting services because of Covid-19 outbreak it is important to compare the image before and after.

4.1 The existing situation before the outbreak of Covid-19

Before the outbreak of Covid-19 according to the information provided by the experts, within the accounting firms the adoption of digital solutions and implementation of RPA tools reached low and medium levels. As regards the working practices the option to work from home was possible just for few days a month and only in hot seasons characterized by high workloads. The supporting documents were delivered to accounting firms by most clients in paper format and some clients with the offices located in other cities used to submit scanned copies of documents in form of electronic archive.

As regards the employee turnover before the outbreak of Covid-19, the estimates made by interviewees indicated an average attrition rate between 8% and 15%. Compared to large accounting firms, small accounting firms faced more difficulties in recruiting the right employees. Since the focus of large accounting firms was on larger medium-sized and large companies, within the large accounting firms the implementation of digitalization and automation occurred in a greater extent than within small accounting firms. The partner working

at the local accounting firm O which is affiliated to an international network mentioned *“Considering that we are not a large accounting firm we did not implemented sophisticated automation tools. We focused more on solutions that allowed us to import files for purchases, sales and payments”*.

Larger medium-sized and large companies need accounting information more frequent to perform day to day business operations compared to small and smaller medium-sized enterprises and this is the reason why the speed of information production is so important for them.

The partner from the international accounting firm A argued *“Two years before the outbreak of Covid-19 we adopted for our clients with a high volume of documents some RPA tools in order to increase the speed of recording the transactions and that also allowed us to prepare the reports in a shorter period of time”*. In prior research Cooper et al. (2019) indicated that the implementation of RPA solutions reduced a lot the processing time of documents and that measure brought an increase in work efficiency and effectiveness.

In most cases both small and large accounting firms used to provide the services to clients from their office. For some clients, large accounting firms used to provide the services at the clients' premises allowing employees to go there on a regular basis or relocating a work team. In case of international clients belonging to a group of companies the digitalization and automation were implemented in a greater extent many years ago in order to ensure the traceability of transactions and the accuracy of information. Moreover these clients needed to complete the accounting entries and report the figures to the parent companies much earlier than local clients. The partner from the international accounting firm E told us *“In case of our large international clients we provided services at their premises and we used their information systems since that option ensured the immediate availability of information. Most of our international clients adopted also digital solutions and RPA tools even before the outbreak of Covid-19”*.

Usually small and smaller medium-sized companies represent the main clients of the small accounting firms as regards the provision of the full package of accounting services. Interestingly, we identified that all small accounting firms worked also with few larger medium-sized companies that used ERP systems and in some cases in order to prepare faster and easier the tax returns and financial reports, the small accounting firms transferred data from the client's ERP system regarding purchases and sales invoices, payments and collections into their accounting software using import interfaces. In his study on digitalization on accounting Knudsen (2020) found that the manual exchange of data between information systems using export and import tools was more specific to early stage of digitalization and it helped the companies to avoid repetitive work, save time and costs.

Most small clients used the services provided by accounting firms consisting in recording and reporting activities only to comply with the legal requirements. In their opinion having an external accountant means someone who works for the benefit of the state being busy with the tax statements and tax payment orders. Sometimes the owners of the small companies perceive the external accountants as if they were their own employees rather than business partners.

The manager from the local accounting firm J said *“In the past from time to time small clients used to tell us that we are expensive employees and they only keep accounting because of the law since they are not very interested in accounting reports. They used to see accounting as cost and if the law gave them the possibility not to keep accounting they would choose that option right away”*. In their study Marriott and Marriott (2000) emphasized a similar idea namely that small companies use the external accountants mainly to fulfill their statutory obligations and their interest to use accounting information in managing the business is low.

Small companies had the tendency not to invest too much in technologies if they were

not operating in information and communication technology industry. The partner working at the local accounting firm N which is affiliated to an international network mentioned *“Even though it seems hard to believe before the outbreak of Covid-19 we had a lot of small clients that used to issue manual invoices that involved paper, pen and hand writing”*.

Larger medium-sized and large companies relied more on their own employees for data entry tasks and asked the support of accounting firms mainly for entries related to period closing, review of accounts, reporting, tax compliance and advisory services. The partner working at the local accounting firm P which is affiliated to an international network mentioned *“For our large clients we are involved primarily in activities that require more knowledge, experience and skills. These activities consist in period-end entries, reviewing of accounts, statutory and group reporting, preparing the tax returns and providing advice”*. In prior research Everaert et al. (2007) found that larger companies compared to smaller companies tend to outsource less accounting activities and namely only those that require a high level of expertise.

All interviewees agreed that keeping in touch with the clients regularly by asking them about the business plans, providing them advice and making courtesy visits from time to time were meant to build a strong business relationship based on communication and trust. The partner from the international accounting firm G stated that *“We used to meet our clients in person and have discussions with them over a cup of tea or coffee in order to understand better their needs and find out their satisfaction level”*.

4.2 The changes that occurred because of Covid-19 pandemic

Considering the empirical data collected from the interviews, during the Covid-19 pandemic within the accounting firms the adoption of digital solutions and implementation of RPA tools reached medium and high levels. The accounting firms had to find rapid solutions to keep their activity running and ensure digital delivery of services. For international accounting firms and local ones affiliated to international networks the digitalization process was implemented easier and faster. The international networks provided the accounting firms both the technical support and training. These international networks use to keep up with the latest technologies, test them on a regular basis, provide ongoing support and ensure their members deliver high service quality. The manager from the local accounting firm Q which is affiliated to an international network told us *“In the beginning it was not easy for us and our clients to move from physical work to digital one but we embraced the changes quite well and fast. In the same time we had the support that we needed from our international network. At this moment I believe that the acceleration of digitalization process within the companies was the only good aspect of the Covid-19 pandemic”*. To our best knowledge in the existing literature up to this moment our finding related to the role of international networks in providing support to their affiliated local accounting firms in times of crisis has not been yet reported.

Considering the physical distancing measures the physical meetings were replaced with video calls and phone calls. During Covid-19 pandemic people understood better the importance of technology for work and keeping in touch with others. The partner from the international accounting firm K outlined *“Covid-19 pandemic forced us to find the right ways to keep in touch with our clients and employees. We have to admit that in the beginning online meetings, video calls, phone calls and chats were exhausting and consumed a lot of time and sometimes we had to do overtime in order to keep up with the workload”*.

As regards the working practices most accounting firms implemented remote and hybrid work for their employees based on the preferences of the employees and the client's need for contact for those contracts stipulating that the client's office is the location of the service provision. Some employees chose to work more from the accounting firm's office since they mentioned that at home they experienced work distractions and that affected their work

productivity. Our interviewees told us that during lockdown more employees became workaholic since they had very few entertainment options and through work they found an escape from their frustration and anger. The manager from the international accounting firm M told us that *“I used to ask my colleagues in the evening to shut down their laptops because some of them seemed to work non-stop and I worried for their mental and physical health”*.

With regard to the work efficiency all interviewees agreed that during lockdown there was an increase in the employee productivity but afterwards the labor efficiency dropped a little and then it normalized. The partner from the local accounting firm I which is affiliated to an international network stated *“We asked some of our employees that did not work overtime to tell us the possible reasons for the increase in their work efficiency. They responded that doing remote work for them meant to have fewer interruptions and being more focused”*.

There were employees who complained about some clients who called them several times a week and even at late hours with all kind of requests and because of that they felt a lot of stress. In order to make sure about the mental health of the employees and their well-being, during Covid-19 pandemic accounting firms assessed many times the stress, anxiety and depression level of their staff. Furthermore, accounting firms provided to their employees some online training sessions for personal development to keep them motivated. In a prior research Rinaldi (2022) mentioned also that many employees experienced depression and anxiety and some of them engaged in a workaholic behavior as a coping mechanism for their depression and anxiety ignoring the risk of acquiring the burnout syndrome and putting their health at risk.

As regards the employee turnover, in the first six months of Covid-19 pandemic the average attrition rates were very low namely between 4% and 7% but afterwards many employees started to leave for a better job and the average attrition rates reached up to 12% and 17%. Accounting firms in their quest to replace the leaving employees, considering the shortage of professionals on the labor market, recruited remote workers even from the other cities. In the same time in case of recruiting employees from other cities, the experts saw the possibility of finding new clients in those cities. Depending on the client's need for contact the employees can even go to the client's office and provide the accounting services there. The recruiting process was performed completely online, the candidates were interviewed using virtual meeting platforms such as Zoom and Teams and they had to pass some accounting, analytical thinking and personality tests. The selected candidates signed the labor contracts digitally and they were allowed to start doing the remote work. The training sessions of the new employees were done remote or in hybrid mode. The partner from the local accounting firm N which is affiliated to an international network stated *“Because of the shortage of professionals on the labor market, during Covid-19 pandemic we became more flexible in recruiting employees from other cities to do remote work for us. We also realized that we have the opportunity to target clients from those cities where our employees live”*. According to our knowledge in the existing literature up to this moment our finding related to the new practice of accounting firms to recruit and hire remote workers from other cities where they do not have offices has not been yet reported.

The importance of accountants as advisors increased significantly since in these times of crisis the clients needed a lot of advice to know what they should do better to make their business stronger. Most of small clients changed their perception regarding the role of accounting during the Covid-19 pandemic since they found that accounting is not only used to comply with the legal requirements but also to provide advice in managing the business.

The manager from the local accounting firm J mentioned *“During Covid-19 pandemic the businesses of our small clients were the most affected and they were more open to receive advice from our side and apply our suggestions in order to save their businesses. They seemed to appreciate our support and some of them even said that accountants are like doctors and it is always good to have one around you”*.

In some cases, external accountants provided their clients the suggestions how they could reinvent their businesses. The partner from the local accounting firm B said *“Because of our expertise and creativity we were able to help our clients to reinvent their businesses and they were so grateful to us. For example, we suggested one client having a restaurant to deliver food by coming into a partnership with a delivery company allowing the customers to order using the application on their phone. Another case regarded a gym club and we suggested our client to organize online sessions with a trainer and conceive exercises that are suitable to be performed at home”*. In a prior research Leoni et al. (2021) also emphasized that in times of crisis accountants have a key role in helping companies to achieve business resilience and recovery.

There were many companies that lost their internal accountants since they failed to pay them the entire salary for two, three or even four months in a row because of the losses caused by lockdown measures. In the end these companies were forced to seek external accountants and they decided to outsource the accounting services because of the lack of staff and for cost reduction reasons.

Accounting firms represented trusted business partners for their clients during Covid-19 pandemic and gave them more advice and support than ever before. Clients that struggled with the negative effects of Covid-19 pandemic were susceptible to receive the financial support provided by the government. In order to access the grants or the loans provided by the government the clients had to register online first, get the user account, then fill the application form online and submit it along with financial reports and business plan. The accounting firms helped their clients to prepare all these requested documents. Ahrens and Ferry (2021) in their study regarding accounting practices in times of crisis also found that accountants provided ongoing support to their clients and reinforced the call of accounting to do good to society.

Accounting firms in order to help more their clients fighting with the negative effects of Covid-19 pandemic with the clients' agreement modified some clauses in the contracts regarding the payment term and the fee charging system in case of flat fee billed clients. The new payment term was longer than before and depending on the client's choice the new fee charging system consisted in hourly rates or the number of transactions. The partner from the local accounting firm F which is affiliated to an international network stated *“We helped our vulnerable clients in many ways and we wanted them to know that we are by their side. We assisted them to fill the application forms and prepare the business plans in order to receive the financial support from the government. Furthermore, we extended the payment term for them and we moved from flat fee invoicing to an hourly or transaction fee system”*.

The interviewees told us that during Covid-19 pandemic clients used to ask for preliminary reports more frequent than before (for example weekly, instead of every other week or monthly) in order to monitor closely their business performance. In the same times clients having loans were asked to send to banks the trial balance on a monthly basis and not like before on a quarterly basis since the banks were interested in the loan repayment capacity of the companies. In addition to that request, banks also asked to receive the schedule of receivables and payables along with the trial balance. Some banks were also interested in business plans containing updated information. Velayutham et al. (2021) also observed that in times of crisis stakeholders request information more often and at a higher level of detail in order to assess the existing situation, explore alternative business scenarios and minimize the risks.

As regards data and information sharing between accounting firms and their clients, all the interviewees claimed that accounting firms adopted cloud solutions and clients were asked to use those applications to submit the supporting documents. Since cloud technology provides real-time collaboration functionalities the clients could access online their standard reports anytime.

The partner working at the local accounting firm C which is affiliated to an international

network mentioned *“We were very pleased that we could implement cloud solutions to receive the scanned copies or photos of documents from our clients. We created for them user accounts to have online access the standard reports whenever they need”*. In their study Carungu et al (2021) also emphasized that cloud and remote connection applications were very useful in sharing data and information between parties during Covid-19 pandemic.

In the end all experts agreed that Covid-19 pandemic was a big challenge for accounting firms and their clients. They mentioned that under these times of crisis employees and clients adapted quite well and fast to the new environment conditions such as remote work and digital services.

5. CONCLUSIONS

The aim of this study was to investigate the changes that occurred in the provision of accounting services because of Covid-19 outbreak by exploring three dimensions such as technologies, employees and clients. In doing so, we employed a qualitative approach using the theory of change as theoretical framework, accounting services market under Covid-19 pandemic as research context and semi-structured interviews as research method. The qualitative research involving interviews as research method is subjective or personal since it explores feelings, motivations, perceptions, behaviors and experiences of the participants but it does not lack research rigor because organization is essential in the collection, processing and interpretation of data and certain steps must be followed.

Considering the theoretical framework and our conceptual model, change mainly occurs under a strong motivation or pressure. The natural inclination of people is to resist change but in times of crisis they adapt fast to the new circumstances. For companies the implementation of the change means to replace technologies, create new perceptions, attitudes and behaviors of the employees and engage the clients.

Our findings showed that during Covid-19 pandemic the importance of accountants as advisors increased a lot since the clients needed ongoing support; physical meetings were replaced with virtual ones; the loss of staff and the need to reduce the costs pushed some companies towards the outsourcing decision for accounting services; digital delivery of services was predominant; most clients submitted documents in digital format and had instant access to information; most accounting firms implemented remote and hybrid work for their employees; some companies in order to survive reinvented their business with the help of accountants and some accounting firms in order to cope with the shortage of professionals embraced the possibility to hire remote workers from other cities.

The main contribution of our study was to show the impact of Covid-19 pandemic on the provision of accounting services by highlighting the major changes experienced by accounting firms and their clients and by that we provided an unprecedented comprehensive picture incorporating a lot of details.

We identified two potential limitations of the current research. Our first limitation could relate to the small number of experts participating in interviews but these experts have significant experience since they came in contact with hundreds and even thousands of international and local clients. According to Rowley (2012) most qualitative studies involve a limited number of participants usually between 10 and 30. Our sample consisted in 17 experts participating in interviews. Furthermore, data saturation was ensured and tested by the similarity of answers. In future studies we intend to involve also accounting firms with an annual turnover lower than half million euro. Moreover, it is also important to know that accounting firms provide near identical services, have a similar internal organization and they act quite the same on the market.

Our second limitation could relate to our research context consisting in accounting services market under Covid-19 because our interviewees work in accounting firms operating in Romania. Considering our interviewees from 17 participants 8 of them work in international accounting firms and 9 of them work in local accounting firms out of which 7 of these local accounting firms are affiliated to international networks. We know that Covid-19 pandemic was a global issue that affected all the economies around the world causing not only business interruptions and shutdowns but also changes in conducting the business operations since companies were forced to accelerate the digitalization process in order to keep their activity running. Having in view the affirmations made above we consider that these two potential limitations have an insignificant or a low negative impact on the relevance and robustness of our research.

Our research has implications for accounting firms, employees and clients. The results of our study are primarily useful for accounting firms because digitalization has brought new opportunities to find new employees and clients all over the country without opening new offices. In the same time employees can choose between on-site, hybrid and remote jobs, clients can choose to collaborate with accounting firms practicing lower fee even though they are located in other cities since the physical distance constraints fade away.

We recommend small and medium-sized accounting firms to engage more in digital transformation of their business, develop strong relationships with their employees and clients and join international networks if they want to grow, have success and gain more visibility on the market.

In this research our focus was mainly on the provision of accounting services in times of Covid-19 pandemic yet we realized there were more aspects that we could have approached in our paper but being outside the purpose of the current study we proposed them as directions for future research. The first direction for future research is a study on the role of international networks in providing support to their affiliated local accounting firms and how these international networks can help their affiliated local accounting firms to ensure the growth of their business. Our second direction for future research is a study on the expectations of accounting firms and their clients related to the provision of accounting services in the post-Covid-19 era considering how much digitalization redesigned the working, trading and communication and continue to reshape the business environment.

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Appendix 1. Interviews details

Firm	Category of accounting firm		Interviewee's code	Interviewee's gender	Interviewee's position	Interviewee's experience	Interview date	Duration
	International/local	Turnover (mil. EUR)						
A	international	> 1 mil. EUR	I1	female	partner	24	January 18, 2022	65
B	local	> 1 mil. EUR	I2	male	partner	18	January 20, 2022	65
C	local*	> 1 mil. EUR	I3	male	partner	17	February 2, 2022	60
D	local*	> 1 mil. EUR	I4	female	partner	15	February 7, 2022	65
E	international	> 1 mil. EUR	I5	male	partner	19	February 11, 2022	55
F	international	> 1 mil. EUR	I6	female	partner	15	March 3, 2022	55
G	international	> 1 mil. EUR	I7	male	partner	15	March 7, 2022	55
H	international	> 1 mil. EUR	I8	female	partner	19	March 11, 2022	55
I	local*	> 1 mil. EUR	I9	female	partner	16	March 15, 2022	60
J	local	> 1 mil. EUR	I10	female	manager	14	March 18, 2022	60
K	international	> 1 mil. EUR	I11	female	partner	21	March 22, 2022	55
L	international	> 1 mil. EUR	I12	female	manager	27	March 29, 2022	60
M	international	> 0.5 mil. EUR and ≤ 1 mil. EUR	I13	male	manager	10	April 5, 2022	55
N	local*	> 0.5 mil. EUR and ≤ 1 mil. EUR	I14	male	partner	21	April 14, 2022	65
O	local*	> 0.5 mil. EUR and ≤ 1 mil. EUR	I15	female	partner	16	May 4, 2022	45
P	local*	> 0.5 mil. EUR and ≤ 1 mil. EUR	I16	female	manager	18	May 10, 2022	45
Q	local*	> 0.5 mil. EUR and ≤ 1 mil. EUR	I17	female	manager	14	May 13, 2022	50

Where the meaning for “**local***” is a local accounting firm that is affiliated to an international network

Source: information processed by authors based on collected information during interviews with experts

INFLATION AS A PHENOMENON AND ITS IMPACT ON THE GASTRONOMY INDUSTRY IN THE CZECH REPUBLIC

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Abstract: *Since the financial crisis in 2009, the central banks have been curing the economy by lowering rates into negative territory. Quantitative easing started the disbalance in the global economy. Cheap money helps keep unprofitable businesses, saving countries from default and inflating investment bubbles. All these factors Covid-19 pandemic to multiply. Governments released enormous money to compensate for losses caused by lockdowns. This aggregate demand did not match with aggregate supply due to a shortage in production. As a result, we have been facing the highest inflation in the last 30 years. This paper aims to describe the theoretical background for New Consensus Macroeconomics (NCM) and Quantitative Easing (QE) with implications on the current inflation period and confirm the impact of rising prices on lower demand for gastronomy services.*

Keywords: *inflation, gastronomy, Czech Republic*

The paper is a part of the internal research Project No. 2022A0019: Dopad pandemie Covid na restaurační segment gastronomického průmyslu, solved at the Department of Economics, Faculty of Economics and Management, Czech University of Life Sciences in Prague.

1. INTRODUCTION

Quantitative easing started the disbalance in the global economy. Cheap money helps keep unprofitable businesses, saving countries from default and inflating investment bubbles. All these factors Covid-19 pandemic to multiply. Governments released enormous money to compensate for losses caused by lockdowns. This aggregate demand did not match with aggregate supply due to a shortage in production. As a result, we have been facing the highest inflation in the last 30 years.

The gastronomy industry (GI) suffered significantly during Covid 19 pandemic from restrictions. There were changing periods of a complete shutdown with limited access measures. The overall impact we can figure out for 76,8B CZK or € 3B in the last two years compared to 2019 (The Czech Statistical Office, 2022). The restriction ended in March 2022. The significant difference between the two restrictionless periods in summer 2020 and 2021 is inflation. The actual inflation rate is 17,5% in the Czech Republic.

If we look at sectors' development, the inflation in Restaurants & Hotels is the highest. Even more than at Energy & Housing. The Czech Statistical Office reports inflation for GI cumulated with Accommodation services. The last published data says that inflation only in Food & Beverages (F&B) services is 24% and in Accommodation 20,5% (Czech Statistical Office, 2022).

As described above, the CPI growth has already begun in 2021. Our goal was to determine which pandemic parameter distracted consumers from dining out. That's why we ran the survey in January 2022, where we asked participants to confirm or reject our hypothesis: (h1) Restrictions or fear of infection plays a more critical role in not dining out than inflation; (h2) Elder population is more sensitive to the fear of being infected; (h3a) Students are more cautious about disposable income; (h3b) Retired people are more cautious about disposable income.

2. LITERATURE REVIEW

The New Consensus Macroeconomics

The New Consensus Macroeconomics is continuously under investigation by economists. Based on the comprehensive analysis of at the time relevant papers done by (Arestis & Sawyer, 2008), we can successfully argue what effect, if any, IT has on inflation. They concluded that there are four aspects of IT questioning the fundament of NCM. We speak about the nominal anchor, a separation between real and monetary politics, inflation causation, and asset pricing issues. Nominal anchor limits central banks in their possible manoeuvre space. Researchers even doubt that there is no trade-off between low inflation and unemployment. The only focus on IT without considering output and unemployment rate also creates political pressure on the central bank from the executive.

The separation of real and monetary factors is incorporated in the equations. The bias is versus the demand side of the economy. The extreme position is that the supply side in equilibrium represents zero output gap. The general conclusion shows doubts whether the impact of IT on aggregate demand has a lasting effect on the economy's supply side. The inflation causality is a fascinating point. The paper's authors couldn't predict the volatile and unprecedented situation the global economy now faces. The IT policy very well worked in the "good times." With all the disturbances I have mentioned in the introductory part, the whole theory is under serious scrutiny. We experience that in actual debate whether further increasing CNB interest rate has any sense in the light of exogenous factors. The dispute over which variable plays a more significant role in current inflation is raging. Theoretically, this argument summarises whether the reduced Phillips function where we in equation (2) neglect wages, material costs, and imported prices makes the NCM unstable.

The last aspect which IT creates is a moral hazard. IT cannot cure debt bubbles and asset price surges. Although the growing stock market brings positive perceptions eventually, all the bubbles burst with disastrous impacts on the global economy. Despite the consensus that considering asset prices has relevance, (Bernanke & Gertler, 2015) think the central bank should not pay attention to the asset prices except if they signal changes in expected inflation. He actively showed this position when he was the Chair of the US Federal Reserve from 2006 to 2014. Finally, the authors concluded there is no significant evidence at this time of the "low inflation" era between IT and non-IT countries. Citing them: *"It has been a great deal of fuss about really very little!"*

Quantitative Easing

Quantitative Easing (QE) is the central banks' solution to avoid the impact of The Great Recession in the years 2007–2009. We call it also "Unconventional monetary policy". Practically, it means a very extensive purchase of assets without restriction in value, risk assessment, and payment due. To have consistency in my paper, I focus on ECB, which we have observed since 2015.

The explanation of each measure is part of many pieces of research. I sourced them from (Mulaahmetovic, 2022). Increased demand for bonds leads to their growing price and decreasing yield. Policy Signaling (macro-policy news channels): central bank signals by sharing information among economic agents expect policy rates to stay low in longer horizons. Liquidity (market functioning effect): Central bank is the predominant purchaser in the market. It relieves the pressure on liquidity premiums (Brózda, 2016). Asset Prices: This is the initial step of the QE program. It is money pumping into the economy via buying state bonds from commercial banks, pension funds, or insurance companies. It is supposed to decrease capital costs and increase wealth (Bowdler & Radia, 2013). Total Wealth: As the value of assets grows in line with that, their owners get wealthier. That's why it stimulates households' and firms'

spending. Cost of Borrowing: The rates will also be lower in the economic environment with a low corporate bond yield. Therefore the expenses of serving the debt will be lower. Output and Inflation: QE aims to influence the money supply positively. The demand for money relies on three variables: transaction costs, overall values of portfolios, and return on investment versus other investment opportunities. It works only if the private sector has confidence in low rates despite growing inflation. In other words, market-makers must believe that low rates will stay forever (Bridges & Thomas, 2012). Not only (Mulaahmetovic, 2022), but the current situation confirms that this policy is time-inconsistent.

The ultimate question is whether QE fulfilled its function in liquidity creation and what's the impact on inflation. As the inflation surge has started recently, no papers so far address the contemporary economic situation. We can find the comprehensive evaluation of QE (Mulaahmetovic, 2022). She evaluated the impact of QE on the inflation rate, bond yields, money supply (M2), unemployment rate, and debt to GDP ratio. Her model didn't find any statistically significant mediating role between ECB's balance sheet and these variables.

Contrary to that, (Boehl et al., 2021) confirmed the positive influence of QE provided by the Federal Reserve (FED) in the years 1998 and 2020 on the output gap by 1,2%, the net growth of investment by 9%, and 0,7% in the drop of aggregate consumption. The liquidity creation based (Kapoor & Peia, 2021) is unclear and depends on the banks' assets structure. They evaluated the three rounds of QE provided by the FED from 2008 to 2014. Banks create liquidity via financing illiquid assets, such as commercial loans, with a liquid asset, such as a deposit (Berger & Bouwman, 2017). (Kapoor & Peia, 2021) proved that the bank disproportionally invested more into real estate than commercial loans. That's why there is a disputable effect of QE. This behavior predominantly occurred at banks with higher positions in mortgage-back securities. We could observe the liquidity creation only in the QE3 phase in 2012 when FED purchased many mortgage-back securities. In line with the quoted paper, we can see this effect in every single economy where the central bank used QE. The money floating into the economy ended in real estate assets or stocks. It pushes real estate prices up as well as the stock exchange indices. The CPI index does not contain the value of assets in its definition. That's why Statistical offices reported a technically low inflation rate. It created complacency and the perception that the current boom would last forever. In my opinion, not considering the factor of an asset bubble is the general issue of actual pricing mayhem.

Negative Interest Rates

The essential part of QE is the policy of low or even negative rates. Low rates keep the cost of borrowing neglectable, which helps to hold government bonds' yield at a playable level. The negative result of low artificial yield is that government borrows more than would reflect the country's economic condition with no visible impact on the budget deficit (Khoury & Pal, 2020). The perception of low rates perpetuity leads to the opinion that central banks invented the financial Perpetuum mobile. But, there is no such thing as a free lunch. Nowadays, when all the negative factors are in place, the yield of bonds grows, and ECB has already started a moderate interest rate increase. This combination pushes yield higher, as we can see, for instance, in Italian state bonds.

Negative interest rates reverse the relationship between the saver and the borrower. Saver pays for his deposit contrary to a borrower who gets money back from his loan. We can find a descriptive explanation of what this exactly means in (Mankiw, 2009): "If you borrow \$100 at a -3% annual interest rate today, then you can well spend \$100 today but only owe \$97 a year from now." It sets economic theories upside down.

The scheme of the negative rates realisation described Khoury and Pal (2020). Central banks launch QE associated with purchasing long-term bonds to manipulate the yield curve downwards: 1. The new money is deposited predominantly in the central banks. 2. The central

banks punish commercial banks for holding excess reserve Negative interest rates are a special tax on those who create a resource and think about the future. The impact of negative rate policy on the economy summarised (Hannoun, 2015):

- Boosts the credit into the real economy
- Supports growth of asset prices
- Provoke riskier investors' behaviour
- Pushes the exchange rate down
- Flourishes inflation

According to the last and the most relevant finding for the paper subject, I must add a remark. There was legitimate worry about the deflationary spiral when Honnoun wrote the paper. Being sarcastic, we successfully enjoy it today. Contrary to the conclusion (Khoury & Pal, 2020), who found no statistical evidence between low-interest rates and inflation evaluating FED's, ECB's, Bank of Japans' and Swiss National Banks' monetary policy. Not only them, but the result of other relevant papers cited (Khoury & Pal, 2020) also don't support the idea. All concluded QE or zero-based interest rate policy neither can fulfil its aim boost GDP growth nor spending or influencing inflation.

3. METHODOLOGY

A quantitative survey was organized in cooperation with the PPM Factum agency and took place between the 17th and 24th of January, 2022. The Covidpass was valid at that time. That's why non-vaccinated people were banned from using restaurant services. Research aimed to find out a change in dining-out behavior and what was the most significant reason not to visit restaurants.

Research question: "Does anything discourage you from visiting a restaurant?"

Given optional answers:

- a) Fear of being infected (case growth, hospitalization, death toll)
- b) Home Office
- c) Government measures
- d) I'm not allowed (non-vaccinated)
- e) Growth of meal prices

Sample and Methodology of Survey:

- Targeted population: General population CR 18+ years
- Collecting method: CAWI – online questioning at a panel
- Quotas: Gender, age, education, living place population, region
- Sample: n = 1000 persons chosen by quotas selection
- Questionnaire: Closed question
- Outcome: Analytical report (PPTX), tables first and second degree of selection (XLSX)
- Graphical visualization of correlations (Sign scheme)

Table 1. Population Categories within The Samples

Category	n	(%)
Gender		
Men	487	48,7
Women	513	51,3
Age		
18-29 years	180	18,0
30 - 39 years	210	21,0
40 - 49 years	162	16,2
50 - 59 years	169	16,9
60+ years	279	27,9
Education		
Elementary school, no education	40	4,0
Secondary without graduation	459	45,9
Secondary with graduation, Higher vocational school	353	35,3
University degree	148	14,8

Source: Own research in cooperation with PPM Factum

Sign scheme has an old tradition in Czech sociology. The sign scheme is the graphic method for evaluating partial hypothesis independency in the pivot table. It identifies the associations between row and column in the 2D pivot table via “+” and “-” signs (Řehák & Řeháková, 1986). Mathematically we can describe this via the “z” criterion. The equation is generally used in statistical models. I sourced that in (Chráska & Kočvarová, 2014).

$$z = \frac{O_{\%} - E_{\%}}{\sqrt{E_{\%} \times (100 - E_{\%})}} \times \sqrt{n}$$

P_% is the observed frequency, E_% is the expected frequency, and n is the total frequency in the pivot table.

Table 2. Economic Activity within Samples,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	66	6,6	6,6	6,6
	Economicly active / employed	601	60,1	60,1	66,7
	Economicly non-active / unemployed	72	7,2	7,2	73,9
	Retired	261	26,1	26,1	100,0
	Total	1000	100,0	100,0	

Source: Own research in cooperation with PPM Factum

The rules listed in Table 3 are used to interpret the results.

Table 3. Sign Meaning in The Sign Scheme in Pivot Table,

+++	The observed frequency is significantly more extensive than the expected frequency at a significance level of 0,001
---	The observed frequency is significantly lower than the expected frequency at a significance level of 0,001
++	The observed frequency is significantly more extensive than the expected frequency at a significance level of 0,01
--	The observed frequency is significantly lower than the expected frequency at a significance level of 0,01
+	The observed frequency is significantly more extensive than the expected frequency at a significance level of 0,05
-	The observed frequency is significantly lower than the expected frequency at a significance level of 0,05
o	There is no statistically significant difference between the observed and the expected frequency

Source: Chráska and Kočvarová (2014)

Standard deviation (StdDev):

$$\sigma = \sqrt{\frac{1}{n} \sum_{i=1}^n x_i^2 - \bar{x}^2}$$

Definition of "Mean "is similar to the weighted average, where the option "Definitely yes (DY)" has the value of "1 ", "Rather yey (RY) "is "2 ", and "Rather no (RN) "is "3 ", and finally "Definitely no (DN) "is "4 ".

$$\text{Mean} = \frac{1 \times \text{DY} + 2 \times \text{RY} + 3 \times \text{RN} + 4 \times \text{DN}}{100}$$

In the case of the first hypothesis, we get:

$$\text{Mean} = \frac{1 \times 11,6 + 2 \times 18,9 + 3 \times 20,2 + 4 \times 40,3}{100} = 2,98$$

The value for equal distribution of the answers is 2,5. So, for Mean < 2,5, we can claim bias towards Yes, and for Mean > 2,5 towards No.

Table 4. Difference Between Observed and Expected Frequency in The Sign in Pivot Table,

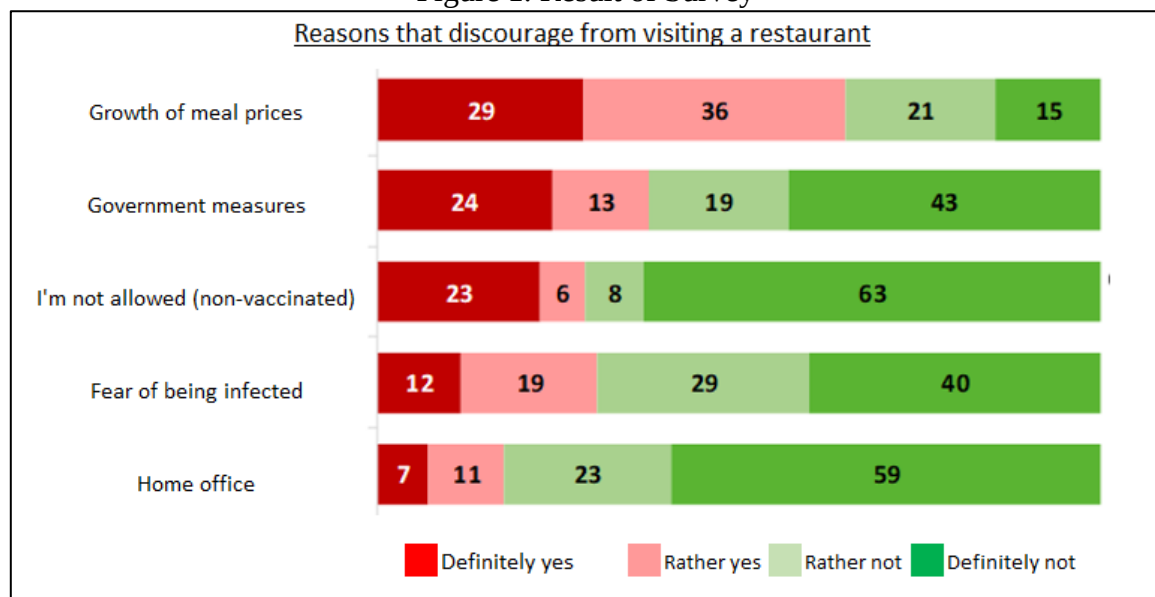
Calculated value	Sign	O – E Significance
$\langle -1,96; 1,96 \rangle$	o	No significant
$\langle 1,96; 2,57 \rangle$	+	0,05
$\langle -2,57; -1,96 \rangle$	-	0,05
$\langle 2,58; 3,29 \rangle$	++	0,01
$\langle -3,29; -2,58 \rangle$	--	0,01
> 3,30	+++	0,001
< -3,30	---	0,001

Source: Chráska and Kočvarová (2014)

4. RESULTS

The research took place in January 2022, when government measures still expel non-vaccinated people from visiting a restaurant, and the mask was obligatory while not sitting at the table. While the inflation versus the previous year reached, in respect of current values, only 11,2% in F&B services (Czech Statistical Office, 2022), the daily case rate was attacking 20000 respectively daily death toll 30, the most significant disruptor from dining out were growing prices.

Figure 1. Result of Survey



Source: Own research in cooperation with PPM Factum

So, the results of the survey debunked the hypothesis (*h1*). Inflation is the most significant reason that discourages consumers from dining for 65% of respondents. Surprisingly, people were more bothered by government measures than worried about getting Covid.

Before deeper analysis of the responses, let's clarify indirect proof of its reliability. According to answers on vaccinated status, 29% of the sample didn't match the condition for entering a restaurant. 26% were non-vaccinated, and 3% got just the first jab. It mirrors 29% of positive responses on options related to vaccination.

To get a granular outcome of the research, we looked at the results from gender, age, education, and economic activity perspective. PPM Factum uses a less granular signing scheme in its methodology than shown in the theoretical background. According to their standard, they focus on “z” values around interval (-2;2). A value less than -2 got red colour coding, higher than two green ones. If the “z” sits between -2 and 2, then there is no statistical difference between the observed and expected frequency. This statement is valid with 95% probability.

Result relating to hypothesis (*h2*) describes in the following table.

We didn't prove the hypothesis (*h2*). Even though older people are more cautious of being infected versus the expected frequency majority of them declined that premise. 60% don't perceive the infection as the main reason for staying at home. It is also visible in the “Mean” value of 2,8, which is significantly higher than the expected frequency in that demographic group. There are two causes of this outcome. First, the vast majority of that age group already got three vaccine doses (63,1), and much more suffered from growing prices.

Finally the last hypothesis (*h3a / h3b*): Output confirmed both hypotheses. As students, pensioners realised they could not afford to visit restaurants as they used to. 69,7% of students

stopped dining out. It is exciting finding that massive disproportionality lies in the variant “*Rather yes*”. Probably, they try to figure out how to manage it, but at the end of the day, the wallet decides. In terms of retired people, we see similar results. 68,6% of them didn't accept new prices in restaurants. I would like to point out the answers “*definitely not*” within the group of people within the “*secondary education without graduation*” group. Their attitude has not changed. No matter the cost, 17,6% of them enjoy the restaurant experience as before surging inflation.

5. CONCLUSION

The survey confirmed and predicted the fact, which we now observe after a seven-month lag. The most significant disruptor from dining out is CPI growth. Even though the inflation was half lower than we face today, consumers have already started limiting their restaurant spending. This attitude continues nowadays, and the GI is still not recovered at pre-Covid figures. However, the current price revenue is higher than the same period in 2019; at constant prices, the industry suffers a 20% decline in volume. That indicates fewer meals sold and fewer consumers at the tables.

The analysis indicates long-term gastronomy industry recovery. That is in line with the general opinion of professionals in gastronomy industry and my daily experience. Overall the situation is volatile and hardly predictable.

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CSR / Integrated and Non-Financial Reporting

THE ROLE OF THIRD SECTOR ORGANIZATIONS IN CREATING COLLABORATIVE SOCIO-ECONOMIC DEVELOPMENT FRAMEWORKS IN RURAL AREAS

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Abstract: *“Third sector organizations” (TSOs) include a range of organizations that are neither public sector nor private sector. These organizations are increasingly contributing to community socio-economic development, and foster sustainability by providing goods and/or services to local people. The purpose of this paper is to explore how TSOs engage in various socio-economic endeavors of different magnitudes in order to foster long-term sustainable development of their localities, with the expanded use of social responsibility tools, and the impact of such exogenous interventions on local populace. Our findings are based on case studies of TSOs operating in rural Romania, and illustrate how these organizations’ goals are deeply embedded in the community’s geography and history, and its long term future development plans. Based on the intertwined nature of our findings, we argue that TSOs encourage social mobility, foster social innovation, and contribute to integrated socio-economic development of their communities. One important aspect of our research targets constitutes preventing rural migration from poor areas, to richer, urban) areas, and with emphasis of curbing legal emigration for labor purposes, which leads to a dangerous trend in depopulation of Eastern European countries.*

Keywords: *Third sector organizations, Exogenous interventions, Social innovation, Social mobility, Accounting technologies.*

1. INTRODUCTION

Rural areas represent a large majority of the European territory. They are key areas in terms of biodiversity, food, energy, or raw materials. Moreover, an estimated 29,1% of the total European Union’s (EU) population lives in rural areas (Eurostat, 2020a), while for Eastern European countries, this percentage is much higher, in the 40s. Our research focused on Romania, an Eastern European Country where 46% of the population lives in rural areas (Rural Population (% of Total Population) – Europe, n.d.).

Rural areas of Eastern Europe (some of which remain bound to semi-subsistence agriculture) are characterized by a lack of intermediate and highly-skilled employment opportunities, skilled labor shortages, with lack of training opportunities for local available resources. This in turn is causing an increase in emigration rates to richer areas. With outdated government programs, and local businesses fighting to survive in a challenging economic climate with razor-thin margins, rebuilding local economies (and people’s trust) seems more and more to become the job fit for “third sector” organizations.

Third sector organizations (TSOs), as defined by the United Kingdom’s National Audit Office, are neither public sector nor private sector, and include voluntary and community organizations (both registered charities and other organizations such as associations, self-help groups and community groups), social enterprises, and co-operatives. TSOs generally are independent of government; they are “value-driven”, motivated by the desire to achieve social objectives, and they reinvest their surpluses generated in the pursuit of their goals (National Audit Office, 2021). For this reason, TSOs are most likened to “not-for-profit organizations”, yet a more fitting name would be “not-for-personal-profit”. They do need to make profits in order to be financially sustainable, yet they mix social, economic and/or environmental goals

and pursue them through entrepreneurial means, i.e. combining resources in new ways (Defourny & Nyssens, 2006).

Rural areas are characterized by resilience and adaptability, and prone to social innovation. Such social innovation doesn't come in a vacuum, but it is fostered through community engagement with exogenous factors, and overall community development is a measure of a successful collaboration. In our research, we have analyzed various key performance indicators (KPIs), such as education, economic sustainability, social mobility, and degree of engagement, which became most representative for the communities' endeavors.

Third sector organizations have shown a number of characteristics that make them significant potential actors for fostering social innovation that can contribute to rural development. Co-ops, associations, or rural social enterprises are organized in forms of collective and collaborative entities which rely on the involvement of local population in order to gain legitimacy and leverage existing resources. While "it takes a village to raise a child", it takes a plethora of stakeholders (government/public institutions, universities or other TSOs), to provide services, otherwise not available, such as transportation, education, healthcare, or social housing, for rural communities. This collaboration allows local communities to leverage resources otherwise unavailable in the areas where they are based (Olmedo et al., 2021).

Furthermore, TSOs have developed innovative infrastructure projects, such as rebuilding community centers, local libraries, or and environmental projects like providing clean water, or renewable energy (Morrison & Ramsey, 2019). Such projects need to be tackled concurrently, which blends TSOs' knowledge of local people and customs, with their potential for new innovative solutions that foster integrated rural development. The rural context provides enabling factors, such as culture of resilience and voluntarism or lack of market competitors, but also constraining factors, such as limited access to trained work force, lack of financing options, or government policy support, for the local actors and the third sector entities that operate in that space. Still, there are countless opportunities for these organizations to foster community development in terms of education, healthcare, and community development, while providing economic sustainability opportunities in rural areas.

TSOs also represent an eclectic system, bound by their common values and aspirations, yet very diverse in terms of structure. One noticeable characteristic of charitable organization, based on author's longstanding observation, is their propensity for continuously "reinventing the wheel", unnecessarily duplicating some activities and processes, which has a tendency to hurt the credibility of many not-for-profit organizations. The antidote consists in developing (and implementing) sound project management principles, and accounting technologies for better visibility and financial sustainability. For TSOs, this is an area that confers legitimacy, and the opportunity for more direct sharing of the outcome of their labor, with potentially increased access to financing. In this context, Big Data, Artificial Intelligence (AI), Cloud Computing, and the use of new software incorporating the aforementioned innovative technologies for better data aggregating and real time reporting are a good match for the shifting business paradigm. These technologies can be used not only on reporting, or auditing, but in sharing information among TSOs to unite these rather disconnected organizations, and create an ecosystem of like-minded entities.

In this paper, we will focus on an aspect that has received little attention to-date, namely the collaboration between various third sector entities, government entities, and actors from local community, with the common goal of fostering integrated, sustainable socio-economic development, and curb legal emigration for labor purposes, while engaging with the local community as a whole.

2. IDENTIFYING PROBLEMS IN RURAL COMMUNITIES

In their quest for identifying (and solving) problems in rural communities, researchers should be mindful of the resilience, closeness, and resistance to change (due to lack of trustiness towards anyone who isn't "like them") of local communities towards exogenous factors. The same patterns of rural Romania which allowed the country folks to weather the storms for thousands of years - including a local flavor of Mao Zedong's "cultural revolution" – are the very same ones that could hold them back from embracing innovation, and make them reject integrated development initiatives.

Needless to say, third sector organizations need to gain local community leaders' trust, their "buy-in", which will allow insider knowledge of the community problems to be solved. Sometimes the community doesn't want to "solve" certain problems, or reveal certain information to exogenous entities. As an example, many rural communities from Romania, alongside Danube river, would find ancient Roman artefacts in their backyards, and promptly hide them from the government. This was not done for any future personal gain (such as selling them on the black market), but in order to "protect" their homesteads from becoming archaeological sites, as the law mandated in such cases. The author has witnessed firsthand such behaviors during his travels to the Southern border of Romania, noting that people were more interested in preserving their "old ways" rather than let anyone intrude in their lives. Shunning progress and innovation can equally harm the future of a potentially thriving rural community.

For this reason, best performing TSOs are the ones that engage community leaders at several levels, including making them part of the decision making process, ideally as newly added TSO resources.

3. METHODOLOGY

For this study, we have chosen interventionist research (IVR) methodology. IVR is a methodological approach, originally created by German-American psychologist Kurt Lewin, that had been recently receiving increasing interest and attention among management accounting researchers. The researchers first selected a predominantly rural region in Eastern Europe (Romania), with few development opportunities. The small community of Filiasi has a population of 20,000 inhabitants, of which many have been forced to work abroad in search of better economic opportunities. Our goal was to create local economic opportunities to counteract the employment-based emigration.

In our research, we have included three entities/groups: first, one non-governmental organization (NGO) from United States, with a track record of more than 15 years in Romania, then another 10-year local not-for-profit association, plus a loosely coupled, unaffiliated, group of volunteers. Together, they have attempted to tackle the phenomenon of economic migration, by providing local education and economic opportunities for the townspeople.

The southwest region is second poorest in Romania with one of the lowest employment rates for recent vocational graduates (Vogt et al., 2022). There, researchers selected a few TSOs that were representative for the community, which they visited and conducted interviews with community leaders, government leaders, volunteers, and members of the of rural social enterprise and other rural development actors in this region. This study has followed different qualitative methods for collecting data, i.e. participant observation, semi-structured interviews and documents. Some data was gathered by the third sector organizations in question throughout most of their existence, namely for over a decade.

Children Aid and Development Organization (www.children-aid.org), established in California in 2003, is a not-for-profit organization 501 (c)(3), and a social enterprise. According

to Social Enterprise UK – the champion for the development of the social enterprise field in the United Kingdom – social enterprises are businesses with specific social objectives that serve their primary purpose, whether it's a social or environmental purpose. Social enterprise is not a distinct legal entity – it is instead an ideological spectrum marrying commercial approaches with social good. In UK, there are more than 100,000 social enterprises, which contribute £60 billion to the economy and employing around two million people. The contributions of social enterprises to the world economy cannot be underestimated, as they are an important factor in reducing economic inequality, in improving social justice, and in promoting environmental sustainability. They can be nonprofit or for-profit organizations. (Perera, 2022).

ProCultura Association was formed in 2010, as a vehicle for education, and for promoting change in the community. In its 10 years in existence, ProCultura had held dozens of seminars on financial literacy, entrepreneurship, or simply book launches, and other cultural events.

We traced the TSOs actions, and interactions with the local community through a 10-year window (fifteen, for the American NGO), and direct interactions with the volunteers, teachers, and representatives of the local government. Notably the organizations, not the government, were the stability factors in the community.

Baard and Dumay define interventionist research (IVR) as “an exciting methodology aimed at real-life problems for a range of social systems and the people that inhabit them”. In our research we have taken both viewpoints, etic and emic, equally moving from the outside in (etic), and from within the social group (emic) to the outer world, with the aim of blending both the perspective of the subject, and of the observer, while having a practical impact, and driving the theoretical research forward. It is widely known that a characteristic feature of IVR projects is to have a practical impact in the community where the research was conducted is, but IVR is even more about producing a theoretically interesting contribution, whether is a new construct, or a more traditional contribution (Lukka & Wouters, 2022). IVR has capability to produce research with theoretical, practical, and societal relevance. This is due to IVR's unique duality of both theoretical and practical output combined with its capacity to effect social change (Baard & Dumay, 2021).

In 2005, a handful of volunteers, alongside the social enterprise, took the daunting task of rebuilding a school in the most impoverished area of the community, where over 60% of the population was out of work. The build was done with local resources, and proved to be a boost for the local community (Children Aid, 2016)

During the year 2007, while still assessing the local impact produced by the school project, researchers and volunteers from Children Aid and Development organization have started social programs in various, impoverished areas, of rural Romania, from Southwest (Oltenia), all the way to the Northern Romania (in an area known as Bucovina). The goal was to create pockets of sustainable economic development through various initiatives, from teaching English and Computers, to providing a Universal Basic Income (UBI) for the programs' recipients. The programs' focus included over 100 children and their families, yet some initiatives involved entire communities. The program was closely monitored every two weeks, for a period of a decade and a half.

Fifteen years later, the results show that every single person involved in the experiment had achieved a high degree of social mobility, a much higher degree of financial sustainability, and they all managed to become very productive members of the society, with 90% of the program graduates earning middle class wages, and above (Children Aid, 2022).

While looking for future UBI recipients among children in rural areas of Romania, the researchers noticed that most parents were working abroad, and grandparents, various relatives, or even the neighbours unwillingly became de facto parents. In the 1990s, the entire world witnessed the “Romanian orphan children” crisis, where over 170,000 children were placed in institutions, through a child welfare system of institutionalization for children who could not

be cared for their parents (Butterfield and Groza, 1994). The 2010s in rural Romania showed a massive population exodus towards the wealthier countries of Western Europe, with one of the highest number of migrants from all the Eastern European countries (The World Bank, 2018). Within the southwest region, the demographic dynamics has historically higher values of attrition, and has recorded a decrease by 4.63% of the population at regional level as compared to a decrease of 1.7% recorded at national level (Vilcea, 2014).

In order to prevent further emigration, local TSOs accelerated the intervention through an integrated set of programs to aimed to bring the community together, such as:

- Creating twelve community centers in the southwest region (Dolj County), which became de facto central hubs for communication, and points of information among community members.
- A bookmobile (mobile library on wheels) was donated as part of a global grant, which started connecting people from remote villages.
- Cultural conferences (including financial literacy), which brought citizens a sense of community.
- Vocational programs helped attract local talent and provided a platform for the future.

As a result, the local community became more engaged, and started participating in large scale volunteer activities, with ecological impact for the community (trash removing, tree planting, gardening).

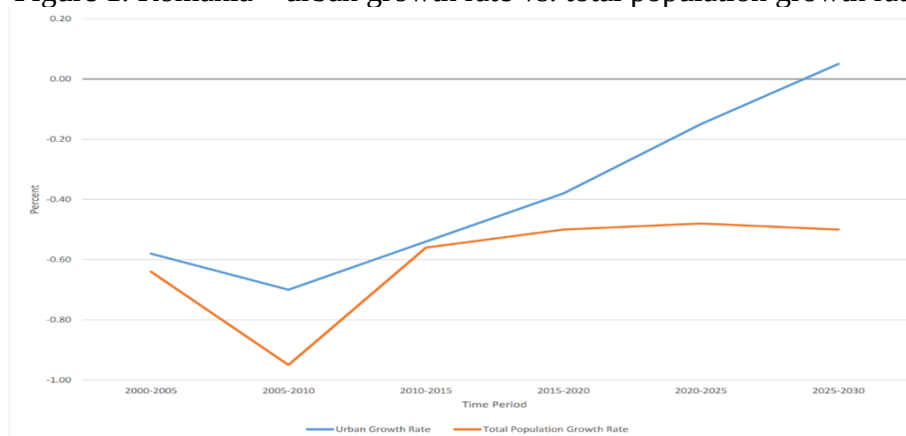
4. FRAMEWORK

Romania, with a population estimated at 21,230,362 and urban population of 54.3% of total population, has 28.3% of its people occupied in agriculture. Having 60.7% of its territory agricultural land (CIA Factbook, 2021), Romania is the only EU member state where agricultural sector is the main employer, providing work for 1 in 4 employed persons (Eurostat, 2017b).

Romania has generally fertile soils, with one-fifth of the country is covered with chernozem—humus-rich black soils. However, ill-advised cultivation methods during the communist period and excessive use of pesticides and industrial pollution after 1990 resulted in a legacy of significant soil erosion (Britannica, 2021).

With 23.9% of Romanian population below poverty line (CIA Factbook, 2021), there is enormous potential for rural third sector organizations of providing socio-economic opportunities for people working in rural areas, especially in agriculture.

Figure 1. Romania – urban growth rate vs. total population growth rate



Source: CIA Factbook, 2021

The above graph shows a depletion of population in rural areas, which can present opportunities for people wanted to join the growing sector of TSOs. It may show very well the effects of automation on a certain industry, but in Romania, agriculture is still in its infancy, and it still has a lot of potential for improving the socio-economic conditions of people involved.

Romania has eight Development Regions, i.e. eight regional divisions created in 1998 in order to better co-ordinate regional development as Romania progressed towards accession to the European Union. The development regions correspond to NUTS 2-level divisions in European Union member states. Our area of focus, Oltenia, corresponds to the South-West development region, one of the poorest in Romania. As of 2020, over 2 million people (equivalent of 21.2% of Romanian labor force) are employed in agriculture sector. This unfavorably compares with 1.3% in United States, and 2.3% in France (TRADING ECONOMICS, n.d.-b).

Figure 2. The South West Region (Sud-Vest) of Romania



Source: adroltenia, 2021

5. FINDINGS

Our findings show four different, but interrelated, mechanisms that explain how third sector organizations engage in a plurality of socio-economic endeavors in order to develop new solutions and social and governance relations, while curbing emigration, and contributing to the development of the communities they serve.

5.1 Creating socio-economic focal points is key to sustainable development

Community focal points (community centers, local libraries) act as anchors for community members. The social aspects of centuries-old rural communities should never be underestimated, as a well-balanced relationship between economic and social development is the main prerequisite of rural community stability. Social appreciation is another necessary prerequisite of a fulfilling life (Majerova, 2015), and a vibrant community center provides such validation to community members. Vocational programs, such as entrepreneurship or study of foreign languages, while starting a business or looking for a job, add to the sense of fulfilment, and stability among the community members.

The twelve community centers in Oltenia were proven to be an excellent investment. The initial project, in 2010, which started as a collaboration between several TSOs, an international NGO and a local association, was to place computer networks in several community buildings that belong to the local administration. First prerequisite was internet

connectivity, and another one was to have community leaders acting as admins (and de facto influencers) for the community center. Once the computers arrived, the local administration became more engaged, and renovated the rooms of the future community center, which wasn't part of the initial agreement. The computers themselves acted as a catalyst for the community, as every stakeholder brought something to the table, in otherwise rather apathetic communities (Children Aid, 2018).

5.2 Continue investing in projects within the same community

Many third sector organizations have limited, seasonal interest in the projects they develop. During the winter holiday season, most individuals open their hearts (and wallets) and donate substantial sums to various charities, all the way through the end of the year, and by January many charities (and the people they serve) are in dire conditions. Conversely, many non-profit organizations finish a project in one area, just to pack up and go to another new area, which can arise their donor's interest. All these are legitimate concerns, and valuable "growing pain" lessons for both TSOs, and their recipients, and well as for the government, or the private sector entities.

Finding a geographical (rural) area of interest, and investing in local population, over, and over, during a longer time period, helps with several aspects of third sector organizations work: first, every new project acts as a building block for future projects, and together they can create a solid structure for community development and sustainable growth; second, it brings a sense of confidence to the local community, to the recipients of the donation or participants of the project, that their needs are understood, and there is a sense of long term investment (and care) for the community; third, and important for donors, and other stakeholders as well, is the message their money and efforts are not diluted, but focus over time for constant growth.

This happened when several international NGOs focused their efforts, and resources, in one specific area of Oltenia South West (Sud Vest) region, in the City of Filiasi. The community involvement grew over time, and local people reacted to continuous investment in-kind, by bringing their own time and resources to the table.

Aside from continuously investing in the same community, being invested in the projects, and having a stake within the community, is equally important.

5.3 Manage all stakeholder communication

Managing stakeholder communication seems like Stakeholder management 101. However, there are many cases when this is heavily missed. There are many resources involved in a project, especially in ones that fill the gap between public, and private sectors. Pitfalls in managing projects include not keeping open the communication with all stakeholders, or not doing the feedback after the project ends. This can be due to the complexity of the project, which may be increasing as the project progresses, the many known unknowns at the start of the project, or even the unknown unknowns during the project's lifecycle.

Many communities have seen TSOs come and go, which often shatters the faith in exogenous interventions. Developing a long term relationship with the community includes open lines of communication, and helps in building trust. It is also half of the battle – as the other half is keeping in constant contact with external stakeholders such as donors, other organizations, or government entities.

5.4 Use social accounting technologies for communication, increased visibility and better financing

Our society and economy are often divided into three sectors: the private sector (business, entrepreneurship), the public sector (government) and the third sector organizations (TSOs).

The latest encompass a wide range of institutions, from voluntary, and community organizations, to registered charities, co-ops, and social enterprises.

Social accounting is being used to measure the environmental, and social impact, of an organization, and can be used to determine the accountability of any organization, beyond the financial statements, and its impact on stakeholders. An organization, whether for-profit, governmental, or a TSO, may use social accounting in order to place a value on the influence its operations have on society. As TSOs and their missions are more targeted at improving socially and environmentally relevant activities, while the government intervention it is said to correct market failures and promote welfare, social accounting was thought to be more “suited” for the aforementioned entities.

However, the last few years were marred by COVID–19 pandemic and countless natural disasters, which brought rising income inequalities and healthcare issues front and center, hence corporations have increasingly been putting more focus on their own Environmental, Social, and Governance (ESG) practices, on top of their corporate social responsibility efforts. ESG is a framework that helps stakeholders understand how an organization is managing risks and opportunities related to ESG criteria. With the emergence of ESG, and the “blurring of lines” between the three sectors of the economy, it seems that a new social contract between business and society is being forged. This, in turn, is making concepts such as social accounting more palatable, as being foreseen by researchers for over two decades ago (Gray, 2002). The active measurement and use of social accounting allows managers to focus on those actions that are especially important to stakeholders, thereby improving the acceptance of the organization over the long term.

TSOs can use a plethora of accounting technologies for beneficial purposes, and social accounting can be one of them. Implementing innovative technologies, based on latest innovation in Big Data, Cloud Computing, and AI, in all areas improves sustainability, provides better visibility, while reducing the need for intensive human labor. Proper accounting technologies help provide a more structured environment in the rather eclectic world of third sector organizations, and while the results of their endeavors are easily shared, they can provide a seamless platform for communication among themselves, with stakeholders, which can bring a potentially easier access to financing.

6. CONCLUSIONS

Non-profit organizations, non-governmental organizations, social enterprises, co-ops, or other volunteer organizations are part of a relatively new area, the so-called third sector organizations (TSOs). With the recent COVID-19 impact on our world, the TSO space is becoming a most important force for change. It plays a pivotal role in creating values worldwide, through building infrastructure, service delivery, cultural programs, and advocating for social change. The long term effect of TSOs intervention on rural communities can keep people together, bond communities, and foster community development.

However, TSO interventions need to be quantified better. The not-for-profit world makes up for its often lack of documentation through energy and goodwill, yet more needs to be done. There are steps to take for better accountability, which in turn makes for better donor interaction.

Engaging with community leaders, and various actors from the community, with rural social enterprises, associations, and volunteer groups, to name a few, is of paramount importance for the success of TSOs endeavors, as it is to enlist the help of various external organizations that leverage their involvement in local matters. Third sector organizations may

act as a catalyst at times, but most of the time they need to be heavily involved in the community they serve.

The efforts of the three third sector organizations we considered, a rural social enterprise, a non-profit association, and a group of volunteers, weren't enough to curb the global emigration in the southwestern Romanian region of Oltenia. Mesmerized by higher salaries, and undeterred even by Brexit, or the COVID-19 pandemic, local people continued the exodus towards what was perceived as better opportunities in the Western Europe. However, every focused local intervention has borne fruits. The recipients of non-profit programs have found economic opportunities within the country, with only 1% choosing to emigrate, and this was only after exhausting all the local avenues. This statistic favorably compares with 17% or higher rate of emigration for Romanian population ("Talent Abroad: A Review of Romanian Emigrants," 2019).

As shown above, local interventions do indeed help tremendously the recipients of a social program. In this context, creating socio-economic focal points with the help of a social enterprise becomes one of the pillars of sustainable development. Continuously investing in the same community has been proven, once more, key to building trust within the society, while providing a sense of consistency to the members of the community, which adds even more hope and confidence in the long term goals of the TSO, and creates the expectations for success. Alongside these two pillars of sustainable social development, authors have identified the use of proper stakeholder communication as the third pillar of providing continuous economic growth within the community (we use the term "stakeholder" as in Freeman's "stakeholder model", as any group or individual who can affect, or is affected by, the achievement of the organisation's activities (Freeman, 2010)). Finally, using proper accounting technologies, will help with better communication, increased visibility and better financing, and social accounting technologies could fit perfectly in the TSOs framework of socially ethical organizations, committed to motivate their stakeholders for a financially viable economic future. We consider this as the the fourth pillar of socio-economic long term sustainability.

The glue that holds everything together is education: value creation through learning, and knowledge sharing, permeating all the layers of society, and cementing the inner structures of individuals engaged in the work of third sector organizations, plus all other stakeholders-at-large. We also emphasize the role of financial education, especially for the young, which helps them build a better understanding of financial sustainability, both for individuals, at personal level, and for the general population, as the individual knowledge seeps through the fabric of our society.

In order to develop a solid socio-economic framework for sustainable growth in rural areas, there is a need for constant outside investment on the part of TSOs, combined with solid government intervention. Third sector organizations can take a lot of financial burdens off the state's shoulders, but they cannot replace the functions of the government. However, while a rural social enterprise discovers, trains, and hires local talent, it creates momentum for change, and a replicable blueprint for future collaboration between the three sectors.

Third sector organizations complement and enhance public, and private sector interventions in many ways. Here, besides education, they can focus on providing more entrepreneurship opportunities, which in turn will provide more socio-economic stability in rural areas.

As our world is continuing to experience changes of epic proportions, with the global economy battered by countless economic and health crises, there is a silver lining to small scale social economies. With grassroots efforts, and attention to detail, and by building trust and engaging entire communities, third sector organizations are able to repair the fabric of the communities they serve.

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CORPORATE GOVERNANCE AND FINANCIAL PERFORMANCE RELATIONSHIP – EVIDENCE FROM THE ENERGY AND HEALTHCARE SECTOR

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Abstract: *This paper assesses the possible relationship between corporate governance mechanisms and financial performance on a sample of 1.116 companies in the energy and healthcare industry. Data were collected using Refinitiv Eikon database for 2018-2021. Financial performance is measured using return on assets (ROA), return on equity (ROE), and earnings per share (EPS) as metrics. Board size (BZ), the existence of an audit committee (AC), CEO duality (CEO), meeting frequency (BM), gender diversity (BG) and board independence (BI) are used as corporate governance metrics. Board size has a negative impact on ROA and EPS. CEO duality has a positive impact on ROA, while on ROE the impact is positive but insignificant. Our results contribute to the existing literature and may help others to better understand the correlations between corporate governance mechanism and performance in the energy and the healthcare sector.*

Keywords: *corporate governance, financial performance, energy and healthcare sector*

1. INTRODUCTION

The relationship between corporate governance and company performance is an interesting research field. Brown et al. (2011), in a comprehensive review on corporate governance research, emphasize the importance of measuring corporate governance, through corporate governance indices Mititean and Constantinescu (2020) show that, in emerging countries, this topic is widely debated. The authors show that the most used metrics for corporate governance are CEO characteristics, board size, board characteristics, board independence or ownership characteristics, while ROA, ROE, Tobin's Q ratio, Firm size, or Sales growth are the most used metrics for financial performance.

For authors such as Benvenuto et al. (2021), Haris et al. (2018), James and Joseph (2015), Salim et al. (2016), or Nedelcu et al. (2015) the relationship between corporate governance and financial performance was an important theme of debate. The results of previous studies are heterogeneous. Onofrei et al. (2018) finds a negative association between corporate governance mechanism and financial performance, while Zagorchev and Gao (2015) and Salim et al. (2018) find a positive association between these mechanisms, measured by different metrics. Benvenuto et al. (2021) and Aslam and Haron (2020) find mixed results.

Other studies investigate a limited number of corporate governance characteristics in relation to various performance indicators. Alodat et al. (2021), Azeez (2015), Khatib and Nour (2021), Mohan and Chandramohan (2018), Herdjiono and Sari (2017), Detthamrong et al. (2017), Rasheed and Nissar (2018), Buallay et al. (2017), Mardnly et al. (2018), Puni and Anlesinya (2020) examine the impact of board structure and size on company performance. To measure financial performance, the authors use ROA, ROE, EPS, Tobin's Q ratio and price-to-

book (PB) ratio, while the size and structure of board of directors is considered to measure corporate governance.

The aim of this article is to analyse the impact of corporate governance mechanisms on financial performance of companies in energy and healthcare industry during 2018 and 2021. Corporate governance is measured using metrics such as board size (BZ), existence of audit committee (AC), CEO duality (CEO), meeting frequency (BM), gender diversity (BG), and board independence (BI), while financial performance is measured using ROA, ROE, EPS as metrics. As part of the methodology, we analyse the impact of corporate governance on companies' financial performance using descriptive statistics, linear regressions, and correlation analyses.

The reminder of this paper structured as follows: the second section presents the current literature on the relationship between corporate governance and financial performance, while the third section presents the research design and method, variables, and data sample. The fourth section is dedicated to results and discussions, and conclusions of the study are provided in the fifth section.

2. LITERATURE REVIEW AND HYPOTESIS DEVELOPMENT

During the last 20 years, corporate governance topics and the relationship with financial performance was largely debated in the literature. Mititean and Constantinescu (2020) show that this relationship is studied by scholars using different metrics for both corporate governance and financial performance. Corporate governance usually is measured by: board size, board structure, CEO duality, or board independence, while financial performance metrics focus mainly on: ROA, ROE, EPS or Tobin's Q ratio.

Alodat et al. (2021) study the relationship between corporate governance and financial performance of companies in Jordan, through extensive corporate governance measures. The research identifies a positive and significant relationship between the characteristics of Board of Directors and Audit Committee and performance metrics. The indicators for financial performance were ROE and Tobin's Q. In terms of board structure, both institutional and foreign structures are positively related to ROE. In terms of Tobin's Q, there is a negative and insignificant relationship between both structures and company performance.

By using a corporate index as metric of corporate governance and cost and technical efficiency as metrics for performance, Andrieş et al. (2018) investigate the relationship between corporate governance and bank efficiency on a sample of 139 banks from 17 European countries during 2005–2012. Their results show that a bank's cost is higher when it wants to implement rigorous corporate governance structures but with a lower level of efficiency. The authors argue that during uncertain times, the cost and technical efficiency of banks are increasing with tight governance mechanisms.

Azeez (2015) investigates the relationship between corporate governance and company's financial performance in Sri Lanka. Board size, CEO duality, and proportion of nonexecutive directors are used as corporate governance metrics. The results show that board size negatively affects financial performance. This suggests that a smaller board size brings higher performance for the company, possibly through close monitoring of management. Also, the separation of the two positions of CEO and chairman has a positive impact on company performance. However, the presence of nonexecutive directors on the board is not associated with the performance of companies.

Khatib and Nour (2021) evaluate the effect of COVID-19 pandemic on corporate governance and company performance on a sample of 188 non-financial companies in Malaysia for 2019–2020. Corporate governance metrics were board size, independence, gender diversity,

meetings, audit committee size, and audit committee. Non-parametric results of the t-test show that COVID-19 pandemic affect all characteristics of companies, such as performance, corporate governance structure, dividend level, liquidity, and leverage ratio. The difference before the pandemic compared to post-pandemic period is not significant. The authors conclude that board of directors' size is the only corporate governance mechanism that has a positive impact on company performance. Board diversity appears to significantly improve firm performance during the crisis period compared to previous year, which has a negative association with firm performance on both indicators. Board and audit committee meetings have a significant negative influence on company's performance. This is due to high remuneration of directors in the form of annual remuneration and meeting fees that companies could not afford (additional expenses) during the pandemic.

For Tunisian companies, Missaoui and Rejeb (2019) study the effect of corporate governance mechanisms on corporate financial performance. Data is collected for the period 2006-2015. The variables used to measure company performance include ROA, ROE, and EPS. The ownership concentration, foreign ownership, and CEO duality are the corporate governance metrics. The results show a non-significant relationship between shareholder concentration and ROE and EPS, or between foreign ownership and ROE while between CEO duality and ROE there is a positive and significant relationship.

Puni and Anlesinya (2020) examine the influence of corporate governance mechanisms on company performance in a developing country. The financial performance of companies is measured by ROA, ROE, EPS, Tobin's Q, and the market value ratio. The corporate governance mechanisms used are: board structure, committee structure, CEO duality, board meetings, and shareholder concentration. The study determines that both insiders and outsiders board members improved financial performance. Similarly, board size, frequency of meetings, and board structure generally have a positive impact on financial performance. However, the existence of board committees has a significant negative impact on financial performance.

Bunea et al. (2018) study the relationship between risk management, corporate governance, and financial performance in the Romanian banking system. The authors conclude that financial experience of board members has a positive impact on banks' performance. Although, the existence of a Chief Risk Officer in the board and the risk committee shows a positive impact on firm size. Onofrei et al. (2018) analyses the influence of corporate governance on Romanian and Bulgarian banks' performance. Using ROA and ROE as metrics for bank performance and CEO duality and CEO board members as metrics for corporate governance, the authors conclude that if the CEO duality exists, it has a negative and significant impact on bank performance, while if this role does not exist, there is a positive impact on bank performance.

For the energy industry, Mititean (2022a) analyse the impact of board characteristics on financial performance for 358 companies during the 2018-2021 period. The results show that board size and board independence are negatively associated with financial performance for both ROA and ROE, before and during COVID-19. During a certain time, CEO duality and board meetings are negatively correlated with ROE, but positively correlated with ROA.

Based on the literature presented above and the mixed results, the following hypotheses are developed for companies in the energy and healthcare industry:

- H.1 The size of the board has a significant positive impact on performance.*
- H.2 The existence of the audit committee has a significant positive impact on performance.*
- H.3 The duality of CEO has a significant positive impact on performance.*
- H.4 The frequency of meetings has a significant positive impact on performance.*
- H.5 Gender diversity has a significant positive impact on performance.*
- H.6 Board independence has a significant positive impact on performance.*

3. RESEARCH METHODOLOGY

The main purpose of this paper is to analyse the impact of board size, audit committee, CEO duality, meetings' frequency, board independence and gender diversity on company's financial performance. The data was extracted from Refinitiv Eikon, a very well-known and widely used by researchers (Ionaşcu et al., 2022, Mititean, 2021). Data are available for 2018–2021. Companies that did not provide corporate governance data were excluded from the model.

The sample consists of 1.116 companies analysed during the period 2018–2021. For the energy sector, a total of 184 companies reported corporate governance information each year. For the healthcare sector 279 companies reported data on corporate governance.

There are nine main categories in the energy field. The predominant category in this sample is oil-related services and equipment, with 88 companies. The next largest category has 76 companies in oil and gas exploration and production. There are 64 oil and gas refining companies, while oil and gas transportation services account for 44 companies. Healthcare has a total of 736 companies distributed as follows: 253 companies are biotechnology and medical research, followed by pharmaceuticals with a total of 236 companies. The next largest category is medical equipment, supplies, and their distribution with a total of 108 companies.

Table 1. Sample distribution

<i>Sector</i>	<i>Year</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>	<i>% in total</i>
Energy		95	95	95	95	380	34%
Coal		3	3	3	3	12	1%
Integrated Oil & Gas		10	10	10	10	40	4%
Oil & Gas Drilling		2	2	2	2	8	1%
Oil & Gas Exploration and Production		19	19	19	19	76	7%
Oil & Gas Refining and Marketing		16	16	16	16	64	6%
Oil & Gas Transportation Services		11	11	11	11	44	4%
Oil Related Services and Equipment		22	22	22	22	88	8%
Renewable Energy Equipment & Services		10	10	10	10	40	4%
Renewable Fuels		2	2	2	2	8	1%
Healthcare		184	184	184	184	736	66%
Advanced Medical Equipment & Technology		20	20	20	20	80	7%
Biotechnology & Medical Research		63	63	63	63	252	23%
Healthcare Facilities & Services		15	15	15	15	60	5%
Medical Equipment, Supplies & Distribution		27	27	27	27	108	10%
Pharmaceuticals		59	59	59	59	236	21%
Total		279	279	279	279	1.116	100%

Figure 1. Region distribution

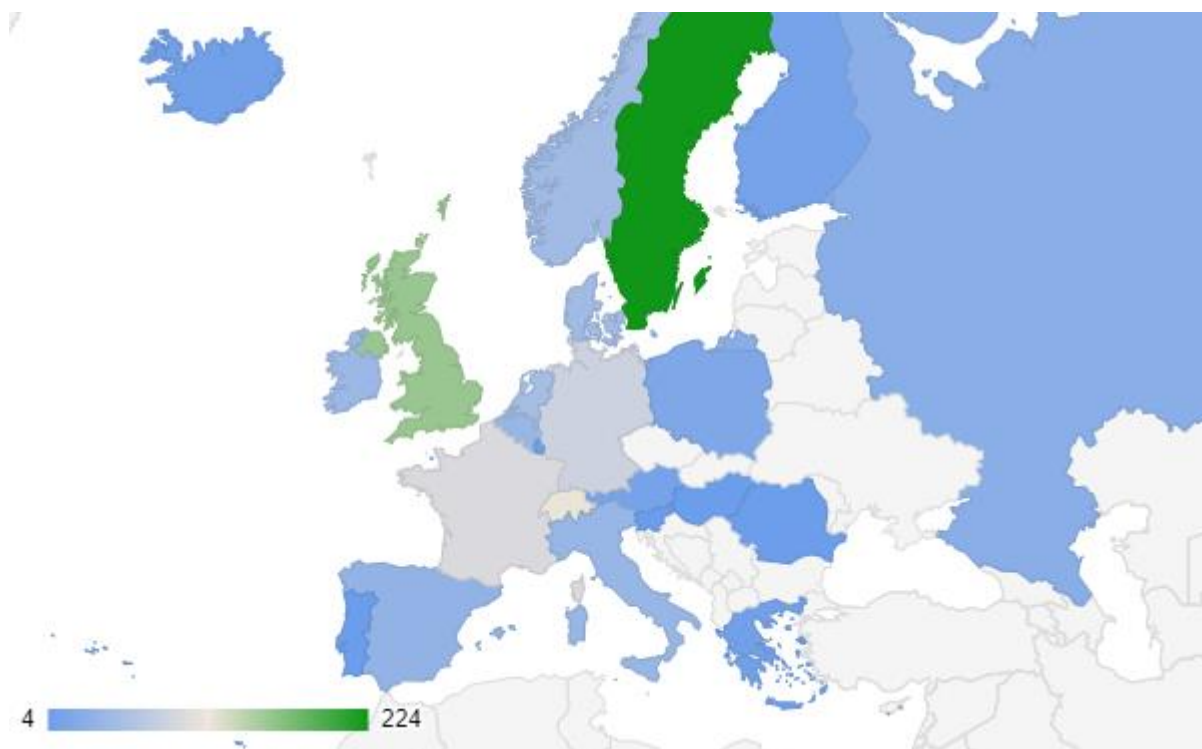


Figure 1 shows the sample distribution for each European country included in the study. Thus, a large part of the sample is concentrated in five countries: Sweden with 224 companies, the United Kingdom with 156, Switzerland with 116, France with 96 and Germany with 84 companies, representing more than half of the sample. At the other end of the spectrum, countries for which companies reported information at the end of 2021 included in the study are as follows: 52 were Dutch companies, 48 were Denmark, and 48 were Norway.

To observe the impact of corporate governance on companies' financial performance, the variables included in this study are analysed using SPSS. The equation model is presented below:

$$Financial\ performance_{it} = \beta_0 + \beta_1 Corporate\ Governance_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$$

Where:

The dependent variable is financial performance; measured through ROA, ROE, and EPS.

The independent variables consist of corporate governance mechanisms. The variables studied are: board size (BZ), audit committee existence (AC), CEO duality (CEO), meeting frequency (BM), gender diversity (BG), and board independence (BI).

Two control variables allow us to control the impact of the independent variables more effectively, represented by: company size (FZ) and leverage (LV). Company size (FZ) is calculated as the natural logarithm of total assets, while leverage (LV) is calculated as the ratio of total liabilities to total assets. All variables are presented in Table 2.

Table 2. Sample distribution

Variable	Type	Description	Source
Board size (BZ)	Independent	Total number of board members	Alodat et al. (2021), Ullah et al. (2017), Azeez (2015), Khatib and Nour (2015), Mohan si Chandramohan (2018), Herdjiono and Sari (2017), Detthamrong et al. (2017), Rasheed and Nissar (2018), Buallay et al. (2017), Mardnly (2018), Puni and Anlesinya (2020), Ahmed and Hamdan (2015) and Mititean (2022b)
Existence of the Audit Committee (AC)	Independent	Is equal to 1 if the committee exists and 0 otherwise	Khatib and Nour (2021), Herdjiono and Sari (2017), Detthamrong et al. (2017), Mardnly (2018).
Duality of the Chief Executive Officer (CEO)	Independent	Equals 1 when the CEO acts as chairman of the board and 0 otherwise	Azeez (2015), Mohan and Chandramohan (2018), Detthamrong et al. (2017), Missaoui and Rejeb (2019), Rasheed and Nissar (2018), Puni and Anlesinya (2020), Ahmed and Hamdan (2015) and Mititean (2022b)
Frequency of meetings (BM)	Independent	Number of meetings organised	Khatib and Nour (2021), Puni, and Anlesinya (2020) and Mititean (2022b)
Gender Diversity (BG)	Independent	Percentage of women on the board	Khatib and Nour (2021), Detthamrong et al. (2017) and Mititean (2022b)
Independence of the Board of Directors (BI).	Independent	Percentage of independent directors on the board	Khatib and Nour (2021), Ahmed and Hamdan (2015), Detthamrong et al. (2017) and Mititean (2022b)
Return on assets (ROA)	Dependent	Ratio of earnings before interest and taxes to total assets	Azeez (2015), Missaoui and Rejeb (2019), Rasheed and Nissar (2018), Buallay et al. (2017), Mardnly (2018), Puni and Anlesinya (2020), Ahmed and Hamdan (2015), Mendoza-Velázquez et al. (2022) and Mititean (2022b)
Return on equity (ROE)	Dependent	Ratio of profit after tax as a percentage of total equity	Alodat et al. (2021), Azeez (2015), Mohan and Chandramohan (2018), Missaoui and Rejeb (2019), Rasheed and Nissar (2018), Buallay et al. (2017), Puni and Anlesinya (2020), Ahmed and Hamdan (2015), Mendoza-Velázquez et al. (2022) and Mititean (2022b)
Earnings per share (EPS)	Dependent	Ratio of net profit for the year to number of shares	Azeez (2015), Missaoui and Rejeb (2019), Mardnly (2018), Puni and Anlesinya (2020)
Company size (FZ)	Control	Natural logarithm of total assets	Detthamrong et al. (2017), Puni and Anlesinya (2020), Ahmed and Hamdan (2015) and Mititean (2022b)
Leverage effect (LV)	Control	Ratio of total liabilities to total assets	Detthamrong et al. (2017) and Mititean (2022b)

4. RESULTS AND DISSUCTIONS

Table 3 presents the descriptive statistics. The mean values for our independent variables, ROE, ROA, and EPS are 0,57%, 2,75%, and 155,50%. By analysing the descriptive statistics of the board of directors (BZ), we can see that the minimum size of the board of directors is 1 while the maximum is 24, with a mean of 8.78. The descriptive statistics on the existence of the audit committee (AC) shows that 0.96 of the sampled companies have established an audit committee. Analysing the position of the Chief Executive Officer (CEO), it can be observed that 0.23 of CEOs hold both the position of Chairman of the Board of Directors and the position

of Managing Director of the company. The number of meetings per year (BM) has a minimum of 0 and a maximum of 66 meetings per year with a mean of 10,57. Gender diversity (BG) has an average of about 27% women in important positions. An analysis of the independence of the Board of Directors (BI) shows that there are on average 60% independent members.

Table 3. Descriptive statistics

Variable	N	Minim	Maxim	Mean	Std. Devi	Skewness		Kurtosis	
						S	SE	S	SE
ROE	840	-363,1%	273,5%	0,57%	42,91%	-1,877	0,084	15,146	0,169
ROA	580	-97,9%	113,4%	2,75%	15,75%	-1,168	0,101	12,091	0,203
EPS	1.092	-1.552,7%	4.010,3%	155,50%	423,75%	3,793	0,074	23,745	0,148
BZ	852	1	24	8,78	3,197	1,062	0,084	2,108	0,167
AC	829	0	1	0,96	0,198	-4,637	0,085	19,550	0,170
CEO	853	0	1	0,23	0,418	1,319	0,084	-0,261	0,167
BM	712	0	66	10,57	6,900	3,833	0,092	22,681	0,183
BG	852	0,00%	100,00%	27,41%	15,04%	-0,080	0,084	-0,091	0,167
BI	851	0,00%	100,00%	59,71%	28,08%	-0,588	0,084	-0,373	0,167
FZ	975	14,01	26,73	20,98	2,32	0,068	0,078	-0,254	0,156
LV	975	0,00%	256,83%	23,81%	22,79%	2,271	0,078	13,682	0,156

Table 4 presents the Pearson (below the diagonal) and Spearman (above the diagonal) correlation matrix for all variables. Board of directors (BZ) size is positively correlated with ROE and EPS at level 0,01, and with ROA, at level 0,05. The existence of audit committee (AC) has a strong positive correlation with EPS at the 0,05 level, for ROE there is a positive correlation, while ROA is negatively correlated with the existence of the audit committee.

Table 4. Pearson and Spearman correlation

	ROE	ROA	EPS	BZ	AC	CEO	BM	BG	BI	FZ	LV
ROE	1	,884**	,501**	,224**	,017	,066	-,042	,079*	-,083*	,363**	,085*
ROA	,783**	1	,450**	,135**	-,057	,144**	-,039	,069	-,065	,190**	-,120**
EPS	,268**	,353**	1	,318**	,044	,141**	-,172**	,169**	,015	,502**	,204**
BZ	,152**	,112*	,179**	1	,249**	,199**	-,032	,073*	-,029	,636**	,116**
AC	,005	-,021	,051	,227**	1	,054	-,012	,023	,128**	,178**	,048
CEO	,069	,120**	,096**	,203**	,054	1	-,098**	,050	-,021	,088*	-,004
BM	,043	-,038	-,150**	,031	-,005	-,104**	1	,186**	,007	-,050	-,081*
BG	,055	,021	,080*	,053	,007	,042	,005	1	,153**	,052	,101**
BI	-,104**	-,065	,115**	,026	,166**	,018	-,079*	,180**	1	,023	-,023
FZ	,349**	,274**	,313**	,594**	,186**	,076*	,090*	,066	,050	1	,360**
LV	-,021	-,110**	,015	-,008	,031	-,003	-,040	,082*	-,001	,195**	1

** . The correlation is significant at the 0.01 level (2-tailed).

* . The correlation is significant at the 0.05 level (2-tailed).

The CEO duality has a positive relationship with ROE and a positive significant relationship with ROA and EPS at the 0,01 level. There is a positive correlation between board meetings (BM) and ROE. The correlation between board meetings and ROA is negative, while EPS has a strong negative correlation at the 0,01 level. Gender diversity (BG) has a positive correlation with ROE and ROA, and a significant correlation with EPS at the 0,05 level. Board independence (BI) is

negatively correlated with ROE and EPS at the 0,01 level, while ROA has a negative but insignificant correlation.

Table 5 presents the results on the impact of corporate governance mechanisms on ROE. The impact of board size (BZ) is negative and insignificant, thus our first hypothesis is partially rejected. Our results are consistent with Mititean (2022a) and contrary to Herdjiono and Sari (2017) who found a positive impact. The existence of an audit committee (AC) has a negative and insignificant impact, so our second hypothesis is partially rejected. Khatib and Nour (2021) obtain similar results, while Alodat et al. (2021) find a positive impact. The duality of CEO (CEO) has a positive and insignificant impact. This is consistent with Missaoui and Rejeb (2019), but opposite to Mititean (2022a). The impact of board meeting (BM) is negative and insignificant. This is consistent with Khatib and Nour (2021), and opposite to Puni and Anlesinya (2020). Gender diversity (BG) has a positive but insignificant impact; thus our hypothesis is partially rejected. Khatib and Nour (2021) find similar results, while Detthamrong et al. (2017) show that gender diversity has no impact on financial performance. Board independence (BI) has a negative and significant impact at the 0,01 level, our hypothesis on the positive and significant impact on financial performance is partially rejected. Our results are similar with those of Mititean (2022a) who found a negative impact for board independence.

Table 5. Impact of corporate governance mechanisms on return on equity

Variable	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
(Constant)	-	0,00	-	0,00	-	0,00	-	0,00	-	0,00	-	0,000
BZ	139,917	0	125,66	0	132,190	0	130,846	0	137,577	0	125,447	
AC	-0,671	0,26										
CEO		2	-	0,21								
BM			12,199	1			4,289	0,23				
BG								1	-0,001	0,99		
BI								8			0,167	0,12
FZ												2
LV											-0,190	0,001*
F	7,298	0,00	6,883	0,00	6,591	0,00	6,617	0,00	6,685	0,00	6,863	0,000
Adjusted R Square	-0,349	0,00	-0,339	0,00	-0,334	0,00	-0,359	0,00	-0,348	0,00	-0,326	0,000
Durbin-Watson		0		0		0		0		0		
Anova Sig.	27,320		26,700		27,346		22,367		27,746		30,937	
	0,109		0,104		0,102		0,107		0,118		0,118	
	1,938		1,959		1,893		1,932		1,936		1,936	
	<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b	

**. The correlation is significant at the 0.01 level (2-tailed).

*. The correlation is significant at the 0.05 level (2-tailed).

The results on the impact of corporate governance mechanisms on return on assets ROA are presented in Table 6. The impact of board size (BZ) is negative and insignificant. These results are in accordance with those of Rasheed and Nissar (2018) and contrary with the results of Buallay et al. (2017).

Table 6. Impact of corporate governance mechanisms on return on assets

Variable	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
(Constant)	-	0,00	-	0,00	-	0,000	-	0,00	-	0,00	-	0,00
)	42,945	0	34,985	0	38,312		33,866	0	39,455	0	38,626	0
BZ	-0,332	0,156										
AC			-4,852	0,321								
CEO					2,935	0,035*						
BM							-0,180	0,075				
BG									0,021	0,650		
BI											-0,051	0,034*
FZ	2,420	0,000	2,126	0,000	2,026	0,000	1,965	0,000	2,089	0,000	2,214	0,000
LV	-0,152	0,000	-0,146	0,000	-0,144	0,000	-0,150	0,000	-0,148	0,000	-0,139	0,000
F	20,244		19,439		21,115		16,982		19,570		21,148	
Adjusted R Square	0,101		0,098		0,105		0,101		0,098		0,106	
Durbin-Watson	2,207		2,230		2,227		2,105		2,213		2,219	
Anova Sig.	<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b	

**. The correlation is significant at the 0.01 level (2-tailed).

*. The correlation is significant at the 0.05 level (2-tailed).

The existence of the audit committee (AC) has a negative and insignificant impact. This is consistent with Khatib and Nour (2021) confirming our results, while the study of Herdjiono and Sari (2017) is in contradiction to ours. The duality of the CEO (CEO) has a positive and significant impact at the 0,05 level; thus our hypothesis is partially confirmed. Mititean (2022a) identify similar results, while Azeez (2015) show that CEO duality has a negative impact on ROA. The impact of board meetings (BM) is negative and insignificant. Moreover, gender diversity (BG) has a positive but insignificant impact thus our hypothesis is partially rejected. Khatib and Nour (2021) have similar results, while Detthamrong et al. (2017) conclude that gender diversity has no impact on financial performance. Board independence (BI) has a negative and significant impact at the 0,05 level, our hypothesis on a positive and significant impact on the financial performance of the companies is partially rejected. This is consistent with Mititean (2022a), but opposite to Ahmed and Hamdan (2015) findings.

Table 7 presents the results on the impact of corporate governance mechanisms on EPS of companies in our sample. The impact of board size (BZ) and audit committee (AC) is negative and insignificant, thus our first and second hypotheses are rejected. This is consistent with Mititean (2022a) and Khatib and Nour (2021), but in contradiction with Mardnly et al. (2017). Furthermore, the duality of the CEO (CEO) has a positive and significant impact at the 0,05 level; thus, our third hypothesis is partially confirmed. These results are consistent with Missaoui and Rejeb (2019). The impact of board meeting (BM) is negative and significant at the 0,01 level. This is similar to Khatib and Nour (2021), while Puni and Anlesinya (2020) find a positive impact. Gender diversity (BG) has a positive but insignificant impact, and thus our hypothesis is partially rejected. Board independence (BI) has a positive and significant impact at the 0,05 level, and our hypothesis on the positive and significant impact on the financial performance of companies is confirmed. Our results are consistent with Ahmed and Hamdan (2015), and contrary to Azeez (2015).

Table 7. The Impact of corporate governance mechanisms on earnings per share

Variable	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
(Constant)	1196,602	0,000	1119,734	0,000	1149,065	0,000	1189,592	0,000	1190,113	0,000	1233,595	0,000
BZ	-3,953	0,540	-60,722	0,548								
AC					88,170	0,025*						
CEO							-12,890	0,000*				
BM									1,752	0,124		
BG											1,530	0,012*
BI												
FZ	68,371	0,000	65,838	0,000	63,426	0,000	73,310	0,000	64,192	0,000	63,931	0,000
LV	-1,067	0,145	-0,998	0,180	-0,969	0,182	-1,564	0,054	-1,124	0,124	-0,979	0,178
F	24,928		23,475		26,609		31,631		25,657		27,057	
Adjusted R Square	0,086		0,084		0,092		0,125		0,089		0,093	
Durbin-Watson	2,101		2,107		2,110		2,125		2,104		2,115	
Anova Sig.	<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b		<,001 ^b	

**. The correlation is significant at the 0.01 level (2-tailed).

*. The correlation is significant at the 0.05 level (2-tailed).

5. CONCLUSIONS

This paper addressed the relationship between corporate governance mechanisms and company performance. Corporate governance is a controversial topic nowadays due to its impact on financial performance of companies, as described by Khatib and Nour (2021), Ahmed and Hamdan (2015), or Detthamrong et al. (2017).

The aim of this paper was to highlight the influence of corporate governance and its mechanisms on company performance. The dependent variable is financial performance, expressed by ROE, ROA, and EPS. Independent variables were represented by corporate governance mechanisms: board size (BZ), existence of audit committee (AC), CEO duality (CEO), meeting frequency (BM), gender diversity (BG), and board independence (BI). We analysed the impact of corporate governance on companies' financial performance using descriptive statistics, linear regressions, and correlation analyses. The sample consisted of 1.116 companies in the energy and healthcare sectors, with data collected for 2018-2021.

The linear regression's results on ROE were mixed. The relationship between board size, existence of the audit committee, and board meetings is negative with an insignificant impact. Board independence influence is negative but statistically significant. Gender diversity and CEO duality are positively but insignificantly associated.

The linear regression's results on ROA were also mixed. The relationship between board size, existence of the audit committee, and board meetings is negative and insignificant. The impact of board independence is negative and significant, while duality of the CEO is positive and significant. Also, the gender diversity impact is positive, but insignificant.

The linear regression's results on EPS were mixed. Board size and the existence of an audit committee have a negative and insignificant impact. There is a negative but significant correlation between board meetings and board independence with EPS. The duality of the CEO has a positive and significant impact, while gender diversity impact is positive, but insignificant.

Our study is limited to the energy and healthcare industry, covering five years of data. There is also a limitation on the variables used to measure corporate governance and financial

performance. Future research could be extended to more corporate governance mechanisms such as audit committee independence and share ownership of managers, and other financial performance metrics such as Tobin's Q, or return on sales (ROS). Expanding the sample to industries such as food or automobile could bring new insights or more relevant results. An ante- and post- Covid-19 analysis would also be a relevant topic to approach.

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THE IMPACT OF BOARD OF DIRECTORS CHARACTERISTICS ON ENVIRONMENTAL PERFORMANCE: EVIDENCE FROM ENERGY INDUSTRY

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Abstract: *The purpose of this study is to examine the impact of board size, board gender diversity, board independence, and CEO duality on the environmental performance of companies in the energy industry. Data were collected from the Thomson Reuters database for a sample of 1.446 companies during the period 2017-2021, for which the data present social and environmental aspects at the end of 2021. The SPSS statistical program was used to run the regression models for the selected sample. We find that the size of the board and the gender diversity of the board increase environmental performance and its individual scores represented by resource use, emissions, and innovation. The results reveal that board independence has a negative and significant impact on environmental performance and two individual scores represented by resource use and emission, but at an insignificant level, while for the innovation score, a positive and significant impact was identified. This study complements and supports the existing literature on the relationship between corporate governance and environmental performance in the energy sector. The study has practical implications for investors in their decision making and for board members.*

Keywords: *corporate governance, board characteristics, environmental performance, energy industry*

1. INTRODUCTION

Over the past two decades, scholars, authorities, and practitioners have paid great attention to corporate governance and environmental performance, which is an important topic for debate. In recent years, companies have been oriented to obtain not only financial performance but also other aspects, such as social and environmental performance, which are important in the activity of finding new investors. Companies accepted the idea that financial, environmental and social performance must be in the same direction (Radu et al., 2022). Environmental, social, and governance aspects play a key role for the new economy, being important for all interested parties (Batae et al., 2020). Scholars have increased their research on the environmental, social, and governance area that is treated in their relationship with the various aspects of the firm. Furthermore, researchers studied these aspects focusing on their relationship with value firms (Constantinescu et al., 2020), financial performance (Batae, et al., 2021; Alsayegh et al., 2020; Cek and Eyupoglu, 2020), earnings management (Velte, 2020), stock return (La Torre et al., 2020), firm risk (Sassen et al., 2016) or corporate scandals (Buallay et al., 2020).

The purpose of this study is to analyse the impact of board characteristics on environmental performance for companies in the energy industry by developing an econometric model. Scholars such as Radu et al. (2022) or Van Hoang et al. (2021) studied the impact of corporate governance characteristics on environmental performance. The results obtained were that corporate governance has a positive impact on environmental performance, the largest boards, with more independent directors, a higher percentage of women in the board and the

chief executive director being also the president of the board, increase the environmental performance of companies, the companies are more preoccupied and involved in environmental issues.

To test our hypothesis, we used the Refinitiv Eikon database that gives us information about environmental performance and board characteristics metrics for companies. Our sample consists of 1.446 companies in the energy industry, analysing a 5-year period (2017–2021). We ran the regression models using SPSS statistical software version 28.0.0.0 and obtained mixed results. More members on board with a higher percentage of women on board increase environmental performance, while boards that have more independent directors have the opposite effect. Moreover, when CEO duality occurs, environmental performance decreases.

This paper is organized as follows. Section 2 includes an overview of the characteristics of the board and environmental performance studies, developing the hypothesis of the study, and offering an international background. In Sections 3 and 4 the method was explained and the results obtained were discussed, while Section 5 is dedicated to the final remarks of this study.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The board plays an important role in the development of the company strategy and making important decisions to achieve its goals. The role which was given to the board has increased greatly in recent years, especially in the activities to attract investors. Investors are attracted to companies that have a policy on the environment, especially by reducing pollution, greenhouse gases, or how resources are used, companies accepting the idea that financial, social and environmental performance should play the same role (Radu et al., 2022). The relationship between board of directors' characteristics and environmental performance was widely debated by scholars using in special a quantitative method and collecting data from various databases (Van Hoang et al. 2021).

In the last period, several organizations (companies, governments, investors, regulators, and other poly markets) became more concerned about environmental issues, especially because of climate changes and carbon emissions. For example, the European Committee of the Regions (CoR) and the European Commission (EC) met in April 2022 with the aim of setting targets for reducing pollution to zero in the European Union; thus, being a challenge for all the parties involved, the future strategies of the companies should focus on environmental aspects more than in the past.

The impact of board size on environmental performance has been widely debated in the literature in recent years. Van Hoang et al. (2021) studied the impact of corporate governance on environmental performance using a quantitative method, such as OLS regression analysis. The authors used board size as a metric for corporate governance and environmental disclosure, green gas emissions, total water use from water waste, and total waste disposed to measure environmental performance. The results showed that the size of the board does not play an important role in increasing environmental performance. Endo (2020) analysed the impact of Japanese corporate governance mechanisms on corporate environmental performance. The results of the study showed that board size improves corporate environmental performance. Furthermore, Radu et al. (2022) found a positive relationship between board size and environmental performance. It can be concluded that the more members there are on the board of directors, the more focused the company's strategy is on achieving better environmental performance. Thus, the first hypothesis is developed:

H1. There is a positive impact between board size and environmental performance.

The independence of the board plays an important role in the company, monitoring, and protection of the interests of shareholders (Naciti, 2019). According to Nguyen and Thanh (2021) the members should ensure that the laws and regulation are respected by companies. Akram et al. (2018) analysed the impact of board independence and other corporate governance mechanisms on environmental performance for 120 companies from four Asian countries: Pakistan, India, China, and Bangladesh. Using a binary logit regression method, the authors identified that board independence has a positive and significant impact on environmental performance. Rubino and Napoli (2020) also founded a positive and significant on environmental performance. Biswas et al. (2018) analysed the impact of board independence on environmental performance of the Australian companies. The authors used a quantitative method based on a multiple regression analysis for a sample of 407 companies listed on the Australian Stock Exchange during 2004-2015. The results identified by the authors showed that companies that have more independent members on board have good environmental performance. To conclude, companies that have more independent members on their boards are more oriented toward the environmental issues related to resource use, gas emission, and pollution.

H2. There is a positive impact between board independence and environmental performance

The gender diversity on the board has received important attention in its relationship with environmental performance, the main assumption being that women are more concerned about environmental issues. The performance of the board will depend on human and social capital, the diversity of the board improving the resources such: knowledge or reputation, to stand for the interest of the shareholders (Lu and Herremans, 2019). Birindelli et al. (2019) studied the impact of women leaders on environmental performance for a sample of 96 banks listed on EMEA, during the period 2011-2016, and their findings suggest that women play a strategic role in shaping this relationship. Orazalin and Mahmood (2021) studied the effects of board characteristics on environmental performance. Using a quantitative method on a sample of 3023 firm-year observations from European companies operating in 22 countries between 2009 and 2016, the authors showed that the presence of women on board has a positive impact on environmental performance. Moreover, Orazalin and Baydauletov (2021) found that gender diversity among boards plays an important role in improving environmental performance. Furthermore, Lu and Herremans (2019) also found that board gender diversity is positively associated with environmental performance. The previous literature shows that board gender diversity plays an important and strategic role in obtaining the environmental performance; our third hypotheses is developed:

H3. There is a positive impact between gender diversity in the board and environmental performance.

The duality of the chief executive duality (the same person being the chairman of the board and the CEO of the company) may involve agency problems when he also holds the position of chairman of the board of directors. The person who has both functions could be a technique to exercise the management authority; in this way, the company performance could be negatively affected (Kan et al., 2021). The duality of CEO in its relationship with environmental performance, using individual components of environmental performance, has been widely debated in recent years. Garcia Martin and Herrero (2020) found that CEO duality is negatively associated with environmental performance measured by three indicators: emissions (waste and gas emission), resource consumption (water and energy), and implementation of environmental initiatives. However, Elsayih et al. (2020) found that CEO duality is positively associated with carbon performance. Mahmoudian and Jermias (2022) studied the relationship of CEO duality and social and environmental performance. The results show that when the CEO is also the

chair of the board, the social and environmental performance decreases. Analyzing the same relationship for the Malaysian context, San Ong et al. (2019) found that CEO duality is negatively associated with environmental performance of Malaysian companies. Furthermore, in the Sri Lankan context, the result provided by Wijethilake and Ekanayake (2020) shows a negative effect of CEO duality and environmental performance. Other studies, such as the study conducted by Lin and Nguyen (2022), found a nonsignificant relationship between CEO duality and environmental performance for a sample of 68 companies from Vietnam. Kumari et al. (2022) also found a non-significant impact on environmental performance in the India context. Based on previous results from the literature, we developed our fourth hypothesis.

H4. There is a positive impact between CEO duality and environmental performance.

3. METHODOLOGY

3.1 Data sample and econometric model

The article examines the impact of board characteristics on environmental performance for companies in the energy industry. The data was extracted from the Refinitiv database hosted by Thomson Reuters, known as Refinitiv Eikon. This database was chosen because it is a well-known database that has one of the industry's most comprehensive ESG datasets. The Refinitiv Eikon database was also used by other researchers, who studied the ESG aspects such as: Ionaşcu et al. (2022), Batae et al. (2021), Batae et al. (2020), Orazalin and Baydauletov (2020), Zhang et al. (2020), Orazalin (2019), due to its credibility and data quality.

Table 1. Sample Distribution by Region and Sector

Region	2017	2018	2019	2020	2021	Total	% of the sample
AFRICA					1	1	0%
America	159	189	199	216	239	1.002	69%
Asia	28	30	35	41	47	181	13%
Europe	39	42	47	49	51	228	16%
Oceania	6	7	7	7	7	34	2%
Total	232	268	288	313	345	1.446	100%

Energy Sector	2017	2018	2019	2020	2021	Total	% of the sample
Coal	13	15	16	17	17	78	5%
Integrated Oil & Gas	13	14	15	16	16	74	5%
Oil & Gas Drilling	9	10	11	11	13	54	4%
Oil & Gas Exploration and Production	75	85	88	92	98	438	30%
Oil & Gas Refining and Marketing	45	50	52	64	70	281	19%
Oil & Gas Transportation Services	23	27	31	31	42	154	11%
Oil Related Services and Equipment	41	50	54	56	56	257	18%
Renewable Energy Equipment & Services	7	11	12	16	20	66	5%
Renewable fuels	3	3	4	4	6	20	1%
Uranium	3	3	5	6	7	24	2%
Total	232	268	288	313	345	1.446	100%

The sample consists of 1.446 companies; data were collected for the period 2017–2021 related to companies presenting social and environmental information at the end of 2021. Companies that at the end of 2021 did not present this type of information were removed from the sample. Only observations for which information is available on all variables included in the analysis will be considered in the regression analysis. The focus is on the energy sector, used by other authors in their studies, such as Baran et al. (2022), Domanovic (2022), Behl et al. (2021), Constantinescu et al. (2020), or Zhao et al. (2018). The sample distribution of the firm-year observations is presented in Table 1.

Analysing by region, we can see that 69%, representing 1.002 observations, are related to companies based in America. Furthermore, the sample is evenly distributed, with data collected from 10 different energy sectors. The oil and gas exploration and production sector from the energy industry represents 30% of the sample, and together with the oil & gas refining and marketing sector and the oil related services and equipment sector represent more than 67% of the sample.

In this study, the multivariate multiple regression model was used, which estimates a single regression model with many outcome variables as other authors have used (see. Radu et al., 2022). To test the hypotheses, several regression equation models were used. To test the impact of the board characteristics on environmental performance, the sample data is tested within the following equation model:

$$ENV = \beta_0 + \beta_1 \text{Board characteristics} + \beta_2 \text{Controls} + \varepsilon \quad (1)$$

Where: ENV represents the environmental score. Board characteristics are represented by: BZ - board size, BG – board gender diversity, BI – board independence and CEO duality, and two control variables represented by Leverage (LV) and firm size (FZ).

3.2 Variable measurement

Table 2 summarizes the measures used for the variables in the regression model to test the hypotheses developed. To have a holistic approach to environmental performance (ENV), four dependent variables were chosen. ENV measures a company's impact on living and non-living natural systems, including air, land, and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks, capitalize on environmental opportunities, and generate long-term shareholder value.

Table 2. Variable Explanations

Variable	Proxy	Type	Source
Environmental score	ENV	Dependent	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Orazalin (2019); Batae et al. (2020), Alsayegh et al. (2020); Biswas et al. (2018)
Resource use	RU	Dependent	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Batae et al. (2021), Biswas et al. (2018); Zhang et al. (2020).
Emission	EM	Dependent	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Batae et al. (2021); Biswas et al. (2018); Zhang et al. (2020).
Innovation	INV	Dependent	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Batae et al. (2021); Biswas et al. (2018); Zhang et al. (2020).
Board size	BZ	Independent	Orazalin and Mahmood (2021); Biswas et al. (2018), Lu and Wang (2020)

Board independence	BI	Independent	Orazalin and Mahmood (2021); Biswas et al. (2018), Lu and Wang (2020)
Gender Diversity on Board	BG	Independent	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Lu and Wang (2020)
CEO duality	CEO	Independent	Biswas et al. (2018); Uyar et al. (2021)
Firm size	FZ	Control	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Orazalin (2019); Biswas et al. (2018); Batae et al. (2021)
Leverage	LV	Control	Orazalin and Mahmood (2021); Orazalin and Baydauletov (2020); Orazalin (2019); Biswas et al. (2018); Batae et al. (2020); Batae et al. (2021); Alsayegh et al. (2020)

Resource use (RU) is the second variable which reflects a company's performance and ability to reduce the use of materials, energy, or water and find more eco-efficient solutions by improving supply chain management. Emission (EM) is the third dependent variable that measures a company's commitment and effectiveness toward reducing environmental emissions in production and operational processes, and Innovation (INV) that reflects a company's ability to reduce environmental costs and burdens for its customers, thus creating new market opportunities through new environmental technologies and processes or eco-designed products (Refinitiv, 2021).

Moreover, board size (BZ) is represented by total number of directors on the board, board independence (BI) is a percentage of independent directors on the board, and board gender diversity (BG) is the percentage of female directors on the board, which and CEO duality, which represent a dummy variable that takes the value 1 when the CEO is also the chairman of the board, and zero otherwise are the board characteristics metrics used to assess our second hypothesis. These variables were also used by Radu et al. (2022) Orazalin and Mahmood (2021), Batae et al. (2021) Biswas et al. (2018), and Orazalin and Baydauletov (2020) in their studies.

As the previous literature relates (Orazalin and Mahmood, 2021; Orazalin and Baydauletov, 2020; Orazalin, 2019; Biswas et al., 2018; Batae et al., 2020; Batae et al., 2021; Alsayegh et al., 2020) I use some control variables to test the hypotheses of this study. In this study, the size of the firm (FZ) calculated as the natural logarithm of total assets and the leverage (LV) calculated as the ratio of total debt to total assets were used as the main control variables.

4. RESULTS AND DISSCUSIONS

4.1 Descriptive statistics and correlation matrix

In a first-level analysis, descriptive statistics are calculated for continuous regression variables. The descriptive statistics of the ENV scores, board characteristics metrics, and control variables are presented in Table 3. The sampled firms show a mean value of the ENV score of 37,207, which with a minimum of 0.00 and a maximum of 96.339. The minimum of RU, EM and INV score is 0.00 while the maximum value is 99.784, 99.797, respectively, 85.897. The mean of board size is 1.00 and a maximum of 24 with a mean of 68% of them being independent and with a low presence of the female directors at bord of 15,52%. The natural logarithm of total assets has a mean of 22.001, which is the size of the firm. With a standard deviation of 1.819, it is slightly distributed, leverage as well with a standard deviation of 22,16%. Furthermore, Table 3 presents descriptive statistics that support the assumption that data are normally distributed and that a regression model based on these variables is valid (Lungu et al., 2019).

Table 3. Descriptive statistics

<i>Variabile</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>		<i>Kurtosis</i>	
						<i>S</i>	<i>SE</i>	<i>S</i>	<i>SE.</i>
ENV	1.446	0.000	96.339	37.207	26.961	0.272	0.064	-1.074	0.129
RU	1.446	0.000	99.784	41.161	33.038	0.180	0.064	-1.334	0.129
EM	1.446	0.000	99.797	46.420	31.938	0.018	0.064	-1.303	0.129
INV	1.427	0.000	85.897	14.978	25.871	1.560	0.065	1.163	0.129
BZ	1.443	1	21	8.96	2.757	0.826	0.064	1.592	0.129
BI	1.443	0.000	100.000	68.346	22.926	-1.041	0.064	0.356	0.129
BG	1.443	0.000	60.000	15.529	12.447	0.643	0.064	0.218	0.129
CEO	1.446	0	1	0.35	0.478	0.617	0.064	-1.621	0.129
FZ	1.721	12.352	27.080	22.001	1.819	0.019	0.059	0.427	0.118
LV	1.721	0.000%	219.880%	29.980%	22.162%	1.902	0.059	10.374	0.118

Notes: S – Statistic; SE - std. Error

Table 4 reports the Pearson (below the diagonal) and Spearman (above the diagonal) correlation matrix for all variables. According to Pearson's correlation, board size (BZ) and board gender diversity (BG) are positively correlated with ENV, RU, EM, and INV scores. Furthermore, independent directors (BI) members are negatively associated with environmental performance and individual scores. The duality of CEO is negatively associated with all our dependent variables, with the exception of innovation score (INN) identified a positive correlation.

The Spearman correlation matrix confirms the correlations of Pearson correlation, the results obtained being similar, with one exception, the Innovation score (INV) is positively correlated with all the independent variables.

Table 4. Correlation matrix

<i>Variabl e</i>	<i>ENV</i>	<i>RU</i>	<i>EM</i>	<i>INV</i>	<i>BZ</i>	<i>BI</i>	<i>BG</i>	<i>CEO</i>	<i>FZ</i>	<i>LV</i>
<i>ENV</i>	1	0.923**	0.921**	0.545**	0.474**	-0.051	0.258*	-0.062*	0.600*	0.059*
<i>RU</i>	0.920**	1	0.795**	0.414**	0.438**	-0.047	0.234*	-	0.559*	0.031
<i>EM</i>	0.918**	0.797**	1	0.353**	0.473**	-0.059*	0.274*	0.078**	-0.054*	0.636*
<i>INV</i>	0.567**	0.399**	0.357**	1	0.267**	0.022	0.120*	0.031	0.255*	-
<i>BZ</i>	0.487**	0.457**	0.472**	0.289**	1	-0.008	0.088*	0.076**	0.540*	0.077**
<i>BI</i>	-	-	-	0.020	-	1	0.260*	0.056*	-0.026	0.062*
<i>BG</i>	0.095**	0.092**	0.100**	0.129**	0.048	0.197**	1	-0.048	0.158*	0.054*
<i>CEO</i>	-0.057*	-	-0.056*	0.047	0.050	0.110**	-0.050	1	0.020	0.008
<i>FZ</i>	0.613**	0.567**	0.631**	0.309**	0.515**	-	0.162*	0.009	1	0.250**
<i>LV</i>	0.019	0.008	0.051	-	0.023	0.042	0.058*	0.033	0.137*	1

Notes: **. The correlation is significant at the 0.01 level (2-tailed). *. The correlation is significant at the 0.05 level (2-tailed).

Furthermore, we again checked the multicollinearity potential issues for each regression model using the variance inflation factor (VIF). Multicollinearity does not exist, the VIF factor being

between less than 2.00, below 10.00 with a tolerance range higher than 0.1 (Shan, 2015 and Wang et al. 2019).

4.2 Regression results

Tables 5 and 6 present the results obtained on the impact of board characteristics on environmental performance, and its individual scores represented by resource use (RU), emissions (EM), and innovation (INV) scores. The size of the board has a positive and significant impact on environmental performance (ENV) and its individual scores represented by the resource use (RU) emission (EM) and innovation (INV) scores. Similar results were found by Hussain et al. (2018) and De Villiers et al. (2011), our first hypothesis being accepted. Stakeholder theory can explain the significant positive impact of board size on environmental performance and its individual scores.

Table 5. The Impact of Board Characteristics on Environmental and Resource Use Performance

Variable	Environmental Performance (ENV).				Resource Use Performance (RU)			
(Constant)	-151,79*	-168,17**	-168,18**	-171,21**	-172,21**	-191,23**	-191,95**	-194,79*
BZ	2,25**				2,65**			
BI		-0,04				-0,05		
BG			0,40**				0,42**	
CEO				-3,46**				-5,18*
FZ	7,70**	9,49**	9,10**	9,55**	8,67**	10,77**	10,37**	10,85**
LV	-0,07*	-0,08**	-0,09**	-0,08**	-0,09**	-0,10**	-0,12**	-0,10**
F statistic	344,38	294,23	335,17	297,61	271,03	232,53	257,23	237,70
Durbin-Watson	1,68	1,65	1,62	1,64	1,69	1,64	1,63	1,64
Adjusted R-square	0,42	0,38	0,41	0,38	0,36	0,33	0,35	0,33
Anova Sig	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b

Notes: **. The correlation is significant at the 0.01 level (2-tailed). *. The correlation is significant at the 0.05 level (2-tailed).

Table 6. The Impact of Board Characteristics on Emission and Innovation Performance

Variable	Emission Performance (EM).				Innovation Performance (INV)			
(Constant)	-188,10**	-203,53**	-203,96**	-207,71**	-73,41**	-94,16**	-85,67*	-89,04**
BZ	2,30**				1,58**			
BI		-0,06				0,06*		
BG			0,48**				0,26**	
CEO				-4,09**				2,57
FZ	9,69**	11,49**	11,02**	11,57**	3,54**	4,94**	4,57**	4,85**
LV	-0,03	-0,04	-0,06	-0,04	-0,15**	-0,16**	-0,16**	-0,16**
F statistic	358,13	320,15	366,70	323,37	71,88	60,84	68,266	60,36
Durbin-Watson	1,71	1,68	1,66	1,67	2,03	2,02	2,031	2,01
Adjusted R-square	0,43	0,40	0,43	0,40	0,13	0,11	0,124	0,11
Anova Sig	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b	<,001 ^b

Notes: **. The correlation is significant at the 0.01 level (2-tailed). *. The correlation is significant at the 0.05 level (2-tailed).

The board independence has a negative impact on environmental performance (ENV), resource use performance (RU), and emission performance (EM), this impact being insignificant, and

the results are contrary with the results obtained by Akram et al. (2018) and Rubino and Napoli (2020). A significant impact was found at the 0,05 level between board independence and innovation performance (INV). More independent members help the company obtain innovation and environmentally friendly products to reduce the impact on the environment, but also more independent members on board of directors of the energy industry influence the environmental performance negatively.

Gender diversity on boards appears to have more social and environmental concerns (Li et al., 2016; Rao and Tilt, 2016; Lu and Herremans, 2019). The results identified a statistically significant association between gender diversity and environmental performance and its individual scores. Equally, a larger board with higher gender diversity could have more concerns about environmental issues.

In addition, mixed results were found for analysing the impact of CEO duality on social and environmental performance. CEO duality has a significant negative impact on environmental performance (ENV), resource use score (RU), and emission score (EM). The results are similar to those of the studies conducted by Malik et al. (2020) or De Villiers et al. (2011). Furthermore, a positive impact was found between CEO duality and innovation performance (INV).

5. CONCLUSIONS

Today, companies want to get more from markets and attract more investors to develop their products and services. Moreover, investors are now oriented to see how companies engage in environmental issues and how they are involved in reducing the pollution by being carefully with the water waste, with carbon emission, and how they create eco-friendly products. This study intends to see the relationship between board characteristics and environmental performance by analysing one of the most non-friendly industries, the energy sector.

This study uses a quantitative method represented by linear regression analysis, using as metrics for board characteristics the board size (BZ), board independence (BI), board gender diversity (BG) and the CEO duality (CEO). Environmental performance (ENV) was measured using the Refinitiv Eikon database and is calculated on a scale between 0 and 100. Environmental performance is computed by three pylons represented by resource use score (RU), emission score (EM), and innovation score (INV). The characteristics of the board represent our independent variables and environmental performance, and their individual scores represent our dependent variables. The equation model was controlled by two variables represented by firm size (FZ) and leverage (LV), which was used by authors such as Orazalin and Mahmood (2021), Orazalin and Baydauletov (2020) or Orazalin (2019) in their studies.

The size of the board (BZ) and the diversity of the gender of the board (BG) have a positive impact on the environmental performance and its sub-scores. These results are similar with the those found by Radu et al. (2022) who found a positive relationship between them. Thus, the first and third hypotheses are totally accepted. For the energy industry, larger boards with a high percentage of women presence seem to improve their environmental performance, being more involved in environmental issues. On the other hand, the higher percentage of the members that are independent in the board, the less environmental performance, these results being contrary to those of Biswas et al. (2018) and Cui et al. (2020). Moreover, when the duality of the CEO decreases the environmental performance, resource use score and emission score, while on the innovation score the impact is positive but insignificant.

Some limitations of this study were identified. First, only one industry was analysed. Future research could look at more industries separately and find new research avenues. Second, only four corporate governance mechanisms were used. Future studies could construct

a corporate governance index or consider multiple corporate governance variables. However, the sample could be restricted to only a certain region to identify the particularities of environmental concerns in each region.

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THE DIGITAL SINGLE MARKET AND THE SUSTAINABLE DEVELOPMENT OF THE EUROPEAN UNION: A LITERATURE SEARCH AS A BASIS FOR FUTURE RESEARCH

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Abstract: *The main objective of this article is to analyse a currently very interesting topic - the Digital Single Market and the sustainable development of the European Union (EU). The analysis is carried out on the basis of a systematic literature search, where the current state of the art is examined with the help of relevant literature sources. Specifically, the paper looks at the link between the Digital Single Market and EU sustainable development. The data and information obtained will provide a useful basis for further research in this area.*

Keywords: *Digital single market, sustainable development, digitalisation, European Union*

1. INTRODUCTION

The Digital Single Market is the European Union's own strategy for the digitalisation of Europe, and the aim is for people and businesses to have the best possible conditions for doing business, studying, living, etc. Today's world is influenced by digital technologies and digitalisation in general. It is proven that historically new technologies have always increased the efficiency of production processes. Efficiency also increases productivity, and with increasing productivity usually comes an increase in sales and profits (Corejova and Chinoracky, 2021). The European Single Market itself has its own sector dealing with digitalisation, called the Digital Single Market (Single market: A single internal market without borders, c2022).

The aim of this paper is to conduct a systematic literature search that will introduce the Digital Single Market area and will also focus on the sustainability that is closely associated with it. This research will obtain a general overview of the literature and the approaches of each author, which will serve as a relevant basis for future research. The main objective is therefore to answer the following basic research questions:

- 1) How do the authors approach the issue?
- 2) How do the authors perceive the issue?
- 3) What are the results?
- 4) What are the recommendations for future research?

Before conducting the systematic literature search, the theoretical background to the issue is presented. These serve to provide a more detailed understanding of the topic under investigation in the later sections of this thesis. In particular, the term Digital Single Market itself will be defined, but also the concepts of digitisation and sustainability. This paper uses the method of systematic literature search.

2. THEORETICAL FRAMEWORK

Within the theoretical framework, the areas of digitalisation, sustainability and the Digital Single Market are examined in more detail.

2.1 Digitalisation

Digitalisation means different things within different functions and at different points in the business model (Crittenden et al., 2019). According to these authors, digitalization converts all business models into a process of digitalization, digitalization of communications and digitalization of buyers. Digitalization deals with information processing and since it involves almost all areas of life, it is fundamentally transforming the economy and contemporary society (Curran, 2018). On the one hand, more and more companies are investing heavily in new digital technologies, experimenting with new possibilities and changing their business models. On the other hand, digitalisation is affecting individuals' daily lives both privately and professionally: people use social media, interact with smart machines in the workplace, transmit and receive data using tablets or smartphones, and also benefit from integrated and shared systems (Farrington and Alizadeh, 2017; Nambisan et al., 2017; Frishammar et al., 2018).

Digitalisation itself is increasingly important for society and businesses. Digital technologies include any device (anything that can be physically grasped – e.g. hardware, mobile and telecommunication devices, etc.) and applications (are intangible and virtual – e.g. software, electronic communication networks, etc.) that process information in the form of binary codes (Nashelsky, 1994; Vermaat et al., 2018; Urbinati et al., 2020; Khin and Ho, 2019).

Digitalisation in the enterprise is realized by managers' decision to strategically adopt and integrate specific digital technologies with simultaneous changes in business processes and workflows. Therefore, from an internal business perspective, managers and employees are the main actors in the digitalisation of business activities, making decisions about the adoption of new technologies and changes in the way work is performed and organized. From an external business perspective, it is the digitisation of stakeholders such as suppliers, competitors and customers. Digitization is therefore both an organizational internal process and an external shared effort to digitize the broader business ecosystem (Peter, Kraft and Lindeque, 2020).

2.2 Sustainable development

The European Union has never defined sustainable development in its legal system, unlike the United Nations, which defined it in its report *Our Common Future*. However, the European Union does address sustainability itself, with the Europe 2020 strategy as its main document, subtitled 'A strategy for smart, inclusive and sustainable growth':

- 1) Smart economic growth based on knowledge and innovation.
- 2) Sustainable economic growth that is more competitive, greener and less resource intensive.
- 3) Inclusive economic growth characterised by high employment with social and territorial cohesion (European Commission, c2022).

2.3 Digital Single Market

One of the European Union's main objectives is to ensure that its citizens can study, live, work and receive a pension in any EU country, as well as buy and use products from all over Europe. That's why the Union ensures the free movement of goods, services, capital and people in the EU's single internal market. It also allows citizens to trade and do business freely by removing technical, legal and administrative barriers. One of the sectors of the European Single Market is the Digital Single Market of the European Union, which was introduced by the European Commission in 2015. This market covers digital marketing, telecommunications and e-commerce (Single market: A single internal market without borders, c2022).

The Digital Market itself boosts the economy, reduces environmental impact and improves quality of life through e-commerce and e-government. The European Digital Single Market has also played a crucial role in sustaining the EU economy and helping EU citizens during the crisis triggered by the COVID-19 pandemic (Ratcliff et al., c2021).

The Digital Single Market aims to improve access to information, bring increased efficiency, reduce transaction costs, reduce intangible consumption, reduce environmental footprints and introduce improved business and governance models. The growth of e-commerce itself brings tangible benefits to consumers, such as rapid development of new products, lower prices, more choice and better quality of goods and services, as it increases cross-border trade and facilitates comparison of offers. Various programmes such as Digital Europe (DIGITAL) and the Digital Decade are also being used in this market. Both of these programmes are described in more detail in the following subsections (Ratcliff et al., c2021).

Digital Europe Programme (DIGITAL)

The EU's first programme to accelerate the renewal and drive Europe's digital transformation is called Digital Europe. This programme is worth €7.6 billion and is part of the EU's long-term budget covering the period 2021–2027. This programme is set to bridge the gap between research and deployment of digital technologies and bring the results of research to the market, primarily for the benefit of Europe's citizens and businesses, and in particular small and medium-sized enterprises (SMEs). Under this programme, investments support the dual objectives of the Union: the green transition and the digital transformation, and strengthen the Union's resilience and strategic autonomy (European Commission, 2018).

This programme will provide strategic funding to address digital challenges and support projects in 5 key capacity areas: artificial intelligence, cyber security, supercomputing, advanced digital skills and digital technology provision through innovation centres. The aim is to accelerate economic recovery and shape the digital transformation of European society and economy, benefiting all, but especially SMEs (European Commission, 2021a).

The Digital Decade and the Digital Compass

The Digital Decade is a programme through which the EU aims to pursue a sustainable, people-centred vision of the digital society to empower citizens and businesses during the Digital Decade. However, there are many challenges associated with digital transformation that need to be addressed during the Digital Decade. The main challenge is the digital divide, which the European Union must address (European Commission, 2021b).

The Digital Decade agenda is based on a digital compass that sets out digital ambitions for the next decade through clear and concrete goals. The Digital Compass has four points to identify the main objectives:

- 1) A digitally skilled population and highly skilled digital professionals – the goal is that by 2030 at least 80% of all adults should have basic digital skills and 20 million ICT professionals should be employed in the European Union, with more women entering these jobs (European Commission, 2021c).
- 2) Secure and sustainable digital infrastructures – by 2030, the goal is for all EU households to have gigabit connectivity and all populated areas to be covered by 5G, high-end and sustainable semiconductor production in Europe should account for 20% of global production, 10,000 climate-neutral, highly secure edge nodes should be deployed in the EU, and Europe should have its first quantum computer (European Commission, 2021c).
- 3) Digital transformation of businesses – by 2030, three out of four companies should be using cloud computing, big data and artificial intelligence, more than 90% of SMEs should reach at least a basic level of digital intensity, and the number of EU unicorns should double (European Commission, 2021c).
- 4) Digitisation of public services – in this area, by 2030, all key public services should be available online; all citizens will have access to their electronic medical records; and 80% of citizens should use eID solutions (European Commission, 2021c).

3. METHODOLOGY

At the beginning of this article, the basic theoretical background is presented, which focuses on the approach to the issue. Subsequently, a systematic literature search is used to further clarify the topic and identify the authors' evaluation methods as well as their conclusions.

This study presents a review of the existing literature in which the authors present their perspective on the Digital Single Market and sustainable development in the EU. The aim was to produce a study that summarises systematic research in the field to date in a clear way. The PRIMO unified search interface was used to collect data and analyse the articles, which allows to search most of the information sources. With regard to the relevance of the selected sources, emphasis was placed on articles within the Scopus and Web of Science databases.

For best results, I used keyword-based searches using Boolean AND and OR operators. The following keywords were used for the topic: digital single market, EU and sustainability. Due to the creation of the Digital Single Market in 2015, the focus of the publications was just in the range of 2015–2022. 100 publications were found for this period using the keywords mentioned. It was also interesting to look at how many of these publications were from the period when the COVID-19 pandemic started, i.e. for the period 2019–2022. 64 publications were generated from the Scopus and Web of Science databases.

Exclusion and selection criteria

- 1) Specific focus: articles with a specific focus, e.g. specific countries, specific industries, etc. were excluded from the search.
- 2) Article concept: articles were excluded if they contained keywords, but these were only a secondary issue of the article.
- 3) Business environment: given the future research objectives, publications focusing on the areas of digital entrepreneurship in the context of sustainability in the digital single market were accepted for relevance.
- 4) Comparisons: articles comparing the digitalisation of the European Union and other continents were also considered, which can help to compare the current state of the EU with the world.

4. RESULTS

In the context of the European Green Deal, digital technologies are an important factor in achieving the sustainability goals. Whether the digitalisation trend will contribute to the sustainable development of societies in the long term depends on how we understand and shape it (Šimberová et al., 2022). The Digital Single Market is based on the digitalisation of individual sectors and markets within the European Union. This market has set its digital strategy to achieve digital transformation and thus to digitalize the European Union (European Commission, 2018). Digital transformation, innovation and sustainability are among the very important and relevant aspects of transformation processes and development policies (Esses et al., 2021). Digital transformation brings new opportunities and challenges and solutions for stakeholders, businesses, sectors and regions (Trașcă et al., 2019). It may also have the potential to effectively support the achievement of the SDGs based on the new opportunities created, which could also reduce transaction costs (Esses et al., 2021; ElMassah and Mohieldin, 2020). The digital single market is one of the latest features of the ongoing digital transformation of the public sector, providing not only digitalisation but also a radical, disruptive experience for an otherwise rather dependent civil service (Mergel et al., 2019). The transition from the European

Single Market to the Digital Single Market has itself become a key element of the European Commission's policy agenda over the last decade (Schmidt and Krimmer, 2022).

The COVID-19 pandemic is considered to be one of the main drivers of the digital transformation of our society, and is potentially seen as an impetus for further integration of the Digital Single Market. The pandemic itself has also triggered a major push to digitise services within Member States, associated countries and at a pan-European level (Schmidt and Krimmer, 2022). Especially in times of crisis, the EU's new industrial strategy proposes new measures to strengthen the sustainability of the European Single Market and to accelerate the green and digital transformation. The strategy focuses on 14 industrial ecosystems that face the most important challenges in achieving the climate, sustainability and digital transformation objectives that are key to market competitiveness (Marichova, 2021).

The development of the digital economy and society is cited as the basis for growth in the 21st century. In this context, the information and communication technology (ICT) sectors play a special role here, whose importance for the development of the world economy, including the economies of its regions (Europe, Asia, America, etc.) is expressed in dynamic growth. The main trends in this sector include Big Data, Cloud technologies, cyber security and the Internet of Things. However, the development of the digital economy itself concerns all markets. (Borowiecki et al., 2021) For the convergence of markets, it is important to take into account the differences of the different markets of the countries. From an economic perspective, the minimum of two pillars of EU market convergence need to be taken into account:

- The horizontal dimension of economy-wide measures, and this includes the regulation of universal solutions, law and capabilities (Iosifidis, 2002).
- The dimension of specific measures based on analysis, country development options and understanding of obstacles. In addition, also on specific sectors, industries, groups of actors, etc. (Hsu et al., 2018; Kyriakidou et al., 2011).

The development of the digital economy and society is itself a multifaceted issue, which is economic, social and technological in nature. The studies most often take into account components that include:

- Economic impact and effects achieved.
- Growth, which is expressed in terms of the availability and use of the necessary tools, techniques, functions, methods, etc. to support digital development.
- The willingness to develop by the resources and skills that are necessary for its emergence (Borowiecki et al., 2021).

Businesses are an integral part of the Digital Single Market, for which digitalisation is very important and can bring a lot of benefits not only for the businesses themselves, but also for consumers in terms of pricing of products and services or more efficient delivery of products/services. For businesses, there is increasing talk about the importance of artificial intelligence (AI). It is increasingly being used by companies (Hickman and Petrin, 2021). If we look at artificial intelligence in a general sense, it supports 3 business needs: automating business processes, gaining insights through data analysis and engaging customers and employees (Davenport TH and Ronanki, 2018). However, a fourth frontier is also starting to emerge nowadays, namely artificial intelligence as a tool to manage companies themselves by helping or even replacing humans in the management of the company (Kolbjørnsrud et al., 2016). Already, even there are just companies that claim to have appointed AI machines to managerial or board positions (Burridge, 2017).

In this area, in May 2016, the EU issued a document entitled “Civil Law Rules on Robotics”, which addressed the issue of AI governance. Even though this document addressed the ethical and social issues associated with the development and use of AI, a number of shortcomings were highlighted by Cath et al. (2018), including not recognising accountability or transparency as guiding ethical values and viewing AI as only a fundamental part of robotics. The

most recent law on AI was published by the European Commission in 2021. This law proposes a risk-based approach to AI regulation and defines 4 categories of risk: unacceptable, high risk, limited risk and minimal/no risk. Systems deemed unacceptable will be banned. High-risk AI then includes systems that are very safety-critical as well as systems that will pose specific risks to fundamental rights. High-risk systems have specific obligations for providers, importers, distributors, users and authorised representatives. Limited risk systems are those that interact with people; these systems have special transparency requirements. Non-high risk systems are supported by voluntary codes of conduct (Robert et al., 2021).

5. DISCUSSION

According to the literature review, we can conclude that the knowledge linking the digitalisation of the European Union, i.e. the Digital Single Market and sustainability, is insufficient. Most publications focus on specific sectors or specific countries but do not take into account the digitisation of the European Union in conjunction with sustainability as a whole. This area therefore offers a gap that can be the basis for future scientific research. The following research questions may be the subject of future research:

- Which sectors in the EU are leaders in linking digitalisation and sustainability?
- Which countries are the most prosperous in the field of digitalisation and sustainable development?
- Which industries are the least/most digitised in the EU?
- How are countries complying with the EU Digital Strategy?
- etc.

6. CONCLUSION

The research paper was based on a literature search on the link between the Digital Single Market and sustainable development in the European Union.

It was pointed out that there are many unexplored areas in this issue, especially when focusing on the issue as a whole. There are many research questions in the link between the Digital Single Market and sustainability. For my future research, I am most interested in exploring the answer to the question: Which countries are most prosperous in the area of digitalisation and sustainability? This question offers many possible approaches to address. For example, analysis of the DESI and SDGs indicators can be used to compare EU countries on this issue. The DESI indicator measures and monitors the digitalisation performance processes in the EU member states. The SDGs (the United Nations Sustainable Development Goals) is an indicator that can be used to assess the sustainability performance of individual countries within the framework of the United Nations Sustainable Development Goals. A comparison of these analyses would allow to highlight the interrelationships between the two transformation processes, while improving the scientific knowledge regarding synergies and interdependencies (Esses et al., 2021; Bánhidi et al., 2020; European Commission, 2020; United Nations, 2015; Afonassova, 2019).

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CODES OF ETHICS FOR ACCOUNTANTS – PREFERENCES AND TRENDS IMPLIED BY A CENTURY-LONG PRACTICE

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Abstract: *Accounting has a history several thousands of years long, marked by Egyptians and Mesopotamian auditing systems, Phoenician trading, Greek philosophy, Roman organization and Christianity. Its modern era started one hundred years ago when there emerged the first Codes of Ethics for businesses. Indeed, they have evolved in parallel, while mutually influencing and reacting to crises, such as the current COVID-19 pandemic and the war in the Ukraine. Recently, the demand for sustainable and ethical behavior of businesses and transparent and consistent reporting about it has increased. A good orientation in and deeper understanding of the current interaction of the Codes of Ethics and accountant universes is integral for reporting, which is expected to go above and beyond law requirements. In order to appreciate this, it is necessary to dynamically explore points of intersections during the last hundred years and to imply from them trends perhaps indicative for the future. The data for it is to be extracted from the official database of the Codes of Ethics kept by the Illinois Institute of Technology by searching for Codes of Ethics related to accountants. In total, 10 such Codes of Ethics are selected and holistically explored by using an advanced content analysis based on key word frequency, LIWC and manual Delphi with Likert scaling regarding four key ethical principles. The yielded results are juxtaposed, critically compared, glossed and refreshed by complementary Socratic questioning. Preferences and trends emerge which provide interesting messages about accounting ethics and even about the ethical dimension of reporting in the third decade of the 21st century in general.*

Keywords: *Accounting, Code of Ethics, Reports, Sustainability*

1. INTRODUCTION

International Financial Reporting Standards (“IFRS”) are a set of accounting standards developed and are maintained by the International Accounting Standards Board (“IASB”) in order to facilitate universal and comparable financial and other statements and reports worldwide. Following their Conceptual Framework, the primary purpose of financial information is to be useful to existing and potential investors, lenders and other creditors when making decisions. Consequently, financial statements need to be clear, relevant, reliable and comparable. Particularly during times of crises, such as we are witnessing currently, accountants are expected not only to formally and formalistically satisfy strict requirements implied by the applicable mandatory law provisions and by explicit IFRS provisions, they need to satisfy their spirit. The EU is well known for its teleological interpretation approach. On the global level, due to the common law influence, occurred scandals, etc., the natural law and common sense keep prevailing over strict positivism and formalism. Hence the law provisions are complemented by provisions from ethics and individual morality is to be also to a certain extent, “harmonized”. In the sphere of IFRS, this is a must and recent decades have provided an abundance of examples how a lack of individual and/or corporate ethics can lead to reports which definitely do not provide objective, transparent, relevant and standardized information objectively reflecting the accounting and financial situation of the given business. The shortcomings in this arena dramatically impact the entire society and have devastating consequences not only in macro-economics and micro-economics. In sum, both the accounting system and accountants must meet demands from the ethical dimension, which is

conventionally included in Codes of Ethics of businesses, professional associations, etc. Boldly, unethical accountant doing unethically accounting will hardly prepare objective and standardized reports which provide clear, relevant, reliable and comparable information to all stakeholders.

Interestingly, the modern era for both Codes of Ethics and Accounting with Accountants started around the same time, just over one hundred years ago. The veracity, honesty and general concern to distinguish good from bad and inform about it truthfully, have caused their mutual interaction and influence. They have evolved and developed side-by-side, while being confronted by crises, scandals, disasters and being moulded and shaped while (sometimes allegedly) following in the dark tunnel the little blinking light of honesty and objectivity. Naturally, they were exposed, among other issues, to sustainability concerns as heralded by the UN since the Universal Declaration of Human Rights. The last milestone in this respect is the 2015 UN Resolution A/RES/71/1 “Transforming our World: The 2030 Agenda for Sustainable Development (“UN Agenda 2030”) with its 17 Sustainable Development Goals (“SDGs”) and 169 associated targets, based on the five Ps—an aspirational plan of action for people, planet, prosperity, peace, and partnership (MacGregor et al., 2021). Naturally, the international and rather public sustainability in its projection in national and rather private Corporate social responsibility (“CSR”) is a matter of choice by each individual or business (Dvouletý et al., 2022). They can choose to do a strict minimum and comply only with mandatory law provisions which are enforced and sanctions for their breach are significant such as frauds. However, instead, they can choose to voluntarily issue their moral declaration via a Code of Ethics plus CSR declarations and genuinely follow them (Schüz, 2012), and this even in the sphere of integrated reporting (Hertz Rupley et al., 2017) and even if this is seldom demanded by the law (MacGregor Pelikánová & MacGregor, 2020). A consistent assembly line in this respect should entail accountants following their Codes of Ethics to assist with the accounting and reporting of a business following its Code of Ethics, while all these Codes of Ethics have similar foundations, principles, reasoning, etc. The resulting accounting and reporting could and should be instrumental in creating a competitive advantage (Porter & Kramer, 2002), or even in getting closer to stakeholders by creating shared values (Porter & Kramer, 2011) and that as well as in the distribution of profits (Paksiova, 2017). Naturally, this praiseworthy behavior would be futile and economically not sustainable, if not properly publicized and ideally marketed and informing others about it (MacGregor Pelikánová & MacGregor, 2020). Businesses, especially large multinational corporations, active in controversial (Sroka & Szántó, 2018) and high profit fields are aware the public knows about it and act accordingly (Vveinhardt & Sroka, 2020). In this context, there needs to be emphasized that both the content and the form of divulging information while considering the particularities of each sub-group of stakeholders are critical (Hála et al., 2022). As well, it would be remiss not to mention that the concept of social responsibility and CSR and their visualization via four levels of Carroll’s pyramid (Carroll, 2016), has not been accepted by all. Pursuant to the conventional approach, the only key task for a business is a profit maximization for its shareholders (Friedman, 2007) and this conventional approach is not completely abandoned, especially when the financial situation of the company is assessed (Paksiova & Oriskova, 2020). Indeed, the criticism of the setting of the Green Deal (approving the pro-environmental approach but rejecting steps towards it as advanced by the European Commission), the criticism of the management of the Ukraine war consequences and the criticism about not authentic and honest leadership and reporting (Freeman & Auster, 2011) often leads to ideas that the best way is not to pay any moral or CSR bonus (D’Adamo & Lupi, 2021) and rather save the money and support ethics and CSR directly, without the middle-man, i.e. the corporation (MacGregor Pelikánová & Hála, M, 2021; Hála et al., 2022). Arguably, ethical behavior in reporting, but also an overall ethical approach, satisfies

investors, has a positive effect on suppliers and customers, and satisfies employees (Bočková et al., 2012).

In particular, younger individuals perceive businesses as generating both “good and evil” and imply for it a “moral duty” to inform about it honestly and transparently and compensate for it (Stefko et al., 2022), regardless of what type of reporting and terminology are used (Stolowy & Paugam, 2018). The public-at-large is not impressed if a business merely satisfies the lowest two levels of Carroll’s CSR pyramid. Namely, pursuant to this model of CSR, there are four levels of responsibilities and the lowest one is the economic responsibility meaning that a business has the duty to be responsible and the second lowest is the legal responsibility that a business must obey the law. These two lowest levels merely want a business to get as much profit as legal, period. However, the higher two levels want dramatically more. The third level is the ethical responsibility imposing on a business the duty to be ethical, i.e. to do what is right, just and fair and to avoid harm. The highest four level is the philanthropic responsibility demanding a busies to be a good corporate citizen actively contributing to the community and improving the quality of life, i.e. directly giving away part of its earned profit.

The society and its members expect from businesses more than just economic responsibilities (being profitable) and legal responsibilities aka legal liabilities (obeying law). Namely, they want a business to demonstrate ethical responsibilities (being ethical) and philanthropical responsibilities (being a good corporate citizen) (Carroll, 2016). They hate any lies and manipulations in this respect (Hála et al., 2022). Since crises magnify differences and accelerate trends (D’Adamo & Lupi, 2021), the call for a moral consciousness while preparing something so important as financial and non-financial statements and reporting about it, resonates strongly in the context of the COVID-19 pandemic and the war in the Ukraine (MacGregor Pelikánová & Hála, 2021). The demand for cross-sector partnerships (Van Tulder et al., 2016) and collaborative changes (Van Tulder & Keen, 2018; Schaltegger et al., 2018) along with a request for more “actionability” and “collaboration” of actions and declarations is getting stronger (Van Tulder, 2017; MacGregor Pelikánová et al., 2021). The first step on the journey towards easily accessible, clear, relevant, reliable and comparable reporting of a business satisfying the applicable law, IFRS and even demands for ethics, is both professional and honest accounting done by professional and honest accountants. After all, accounting is a profession, perhaps even an industry, and so its members and organizations should have their Codes of Ethics. Accountants and their accounting practices must have an ethical dimension and they should declare it in a consistent manner by a particular Code of Ethics. Modern accounting and modern Codes of Ethics have undergone one hundred years of history and Codes of Ethics related to accountants can be collected and studied, particularly thanks to the Illinois Institute of Technology, Center for the Study of Ethics in the Professions (<http://ethicscodescollection.org/>). What preferences and trends in the course of a century do they exhibit and what indices for the future can be applied? Codes of Ethics for accountants are a valuable source of information deserving holistic information. In order to take advantage of that, after this introduction (1.) a review of the theoretical and historical background about Codes of Ethics and accounting with accountants needs to be presented, especially while focusing on the underlying concepts in the historic context (2.). Based on properly selected data and methods (3.), a critical study exploring the content of ten pivotal Code of Ethics from a period between 1916 and 2019 is to be performed (4.) to answer the leitmotiv question about the implied preferences and trends and move on to conclusions (5.).

2. THEORETICAL AND HISTORICAL BACKGROUND

Why is it that today, each and every business needs its own Code of Ethics and why are Commissions about Ethics are mushrooming? Well, in the 3rd decade of the 21st century it is becoming obvious that the business and/or corporate development, especially a long-term development (perhaps even a sustainable development), is not feasible merely by economic and technological growth (Turečková & Nevima, 2019). A business cannot just be efficient, it must be as well effective (Nowak & Kasztelan, 2022), i.e. the business needs to engage in “right” thinking. With all due respect to production, financial and technological aspects, still at the center of each business, regardless of whether individual or via a corporation or company, is a human being. Clearly, the human element is a significant dimension of a business. This humanity is materialized with reference to individual moral standards to be appreciated from the perspective of ethics. Indeed, ethics is a philosophical methodologic critical thinking about human behavior while focusing on the categories “good” and “bad” and their distinction. The “good” should respect values, especially defend and promote human life and freedom, consideration for sustainability and the environment and avoid the opposite. During the modern era (1890-1945), ethics has posed questions in the context of human relations and *status quo* implied by traditions. In contrast, during the current post-modern era (1945-present), ethics poses questions about human behavior, not only in the context of human relationships, but as well in ecological contacts entailing the nature and thus being much broader. So far (not yet), the planetary context or galactic context are concerned. Perhaps, it can be generalized and suggested that the evolution during the last hundred years has expanded the focus of ethics and that the human behavior, both intentional and unintentional, is assessed while considering both the present and the future and both human beings and nature. However, now as always, the distinction between “good” and “bad” is inherently subjective, contextual, and does not mean necessarily the rejection of business success or self-realization (Taylor, 2018). This is a question of subjective moral responsibility and not objective legal liability (Balcerzak & MacGregor Pelikánová, 2020), i.e. individual subjective morality is to be objectively consolidated in a philosophy called ethics and expressed by either rather general and abstract Codes of Ethics or by more specific and practical, detail-oriented Codes of Ethics, which are sometimes called Codes of Conduct (MacGregor Pelikánová et al., 2021). They include a written list of moral principles, values, standards, rules of conduct, and corporate policies, requiring communication to insiders (Somers, 2001) as well as outsiders, i.e. to all stakeholders and the public (MacGregor Pelikánová et al., 2021). Therefore, Codes of Ethics can steer towards good behavior by self-regulation, thus reducing undesirable demands for the external legislative regulation of businesses (Babri et al., 2019). Currently, Codes might be the source of the legitimization, or at least explanation, of business strategies, including pricing, during the COVID-19 pandemic (Finestone & Kingston, 2021) and the Ukrainian war.

The general trend in ethics generated by the slow move from modernism to post-modernism, is matched by the evolution of its declarations, Codes of Ethics, and this in individual industries, such as accounting. Namely, modernism had underscored the abstract formalism and exhibited a certain rigidity (Nandy et al., 2018). Over time, this was relaxed and thence followed post-modernism with its liberty, unconventionality and pro-globality, and arguably this leads to the operative choice not between rationality and its opposite, but between decency versus degradation (Robert, 2013). Well, then what sub-trends and preferences can be implied by the evolution of Codes of Ethics and of accounting and accountants during modernism and post-modernism? And how is this projected over time in Codes of Ethics regarding accountants and accounting? Well, before the modern and post-modern era of Codes of Ethics and accounting, it has been a nearly five millennia long evolution which has heavily

influenced the modern and post-modern setting. In sum, Codes of Ethics and accounting with accountants has been around for thousands of years ...

Around 2 300 BC, Ptahhotep, an ancient Egyptian sage and vizier of the Egyptian pharaoh, wrote on papyrus a set of instructions and declarations which nowadays could be labelled a Code of Ethics. These instructions covered a general person's obligations at work, including a duty for observance, self-control, transparency, and anti-bribery, as well as highly practical issues such as a warning against falling asleep at work (Ciulla, 2011) and underlying the importance of one's reputation in business relationships (Instruction 35.), of avoiding exaggeratedly discriminatory treatment of women (Instruction 37.) and of being consistent (Instruction 39 et foll.) (Gunn, 1906). Further, it is often overlooked that, even the Code of Hammurabi (1755–1750 B.C.), which is basically from the same era, is not a solid block of hardship imposed by the law and includes aspects of morality, i.e. it demands the procedural justice by requiring evidence to be presented under the fine of perjury (points 3–12) and setting rules for business relationships (points 100–126), in particular agent-principal issues (points 105–107) (Harper, 1904). Hence, even before the emergence of Greek philosophy with ethical judgments, practically and/or intuitively, moral commitments have been expressed in a semi-binding manner in precursor of current Codes of Ethics and the law was accommodating for that.

Greek philosophy has engaged in the study of ethical judgements and brought a myriad of approaches. Socrates advanced reasoning based on ethical principles that combined the self-interest of the individual and the common good, but he preferred that this be done by experts and not each individual. Plato idealistically perceives all people as virtuous in nature and able to make decisions about the good (objective justice). Aristotle advanced a naturalistic philosophy of ethics and returned to a rather realistically perceived individual. Aristotle's famous works on ethics, Eudemian Ethics and the Nicomachean Ethics, cover the oscillation and balancing while considering circumstances (subjective justice) and advance the famous distinction of arithmetic justice and the geometric perception of justice (Balcerzak & MacGregor Pelikánová, 2020). Romans organically continued on this pathway, while adding a strong touch of pragmatism. Cicero, like Aristotle, was wary of merchants and criticized the people who profit from other people's misery (Ciulla 2011, 336–337). Christianity with the Bible condemned cruelties, promoting brotherhood, and prompted social liberalization by bringing up a new conception of humanity (Stark, 1997: 214–215). The New Testament, in particular, offers a set of parables fully applicable to the business conduct which can be understood as a Code of Ethics *sui generis*, see e.g. the parables of the Sower (Matt 13:3–8), of the Mustard Seed” (Matt 13:31–32), of the Fishing Net (Matt 13:47–50), of the Unmerciful Servant (Matt 18:23–35) or of the Workers in the Vineyard (Matt 20:1–16). The last two mentioned even involved the principal-agent relationship and labour ethics. One of the most important Christian philosophers, St. Augustine of Hippo (354–430), developed the Platonic idea into the concept of the soul and concluded that happiness means the union of the soul with God after the body has died. St. Thomas Aquinas (1225–74), the Scholastic philosopher and proponent of Aristotle, advocated a “natural law” ethic, pursuant to which the difference between right and wrong can be appreciated by the use of reason and reflection on experience, i.e. the foundation was rather in reason than in revelation. The Renaissance brought forth the reformation and Protestantism. During the same time, it developed the famous Protestant work ethic but also the utilitarian pragmatism, perhaps cynicism, of Niccolò Machiavelli (1469–1527). This scepticism about human nature was shared as well by Thomas Hobbes (1588–1679) who believed that the principal motivation for human behavior is desire or pleasure, i.e. hedonism. The Enlightenment, with Jean-Jacques Rousseau (1712–1778) and his Social contract and Benedict de Spinoza (1632–1677) with rationalism and the belief that the highest virtue is the intellectual love or knowledge of God or Nature or Universe. The 19th century

caused a shift in Business Ethics, which was led by the deontologist Immanuel Kant, idealist Georg Wilhelm Friedrich Hegel, nihilist Friedrich Wilhelm Nietzsche, and marxist Karl Marx. They all addressed the capitalistic market reality, but they differed considerably in their assessment about what is good and right, e.g. pursuant to Kant it is determined by the character of the principle that a person or business chooses to act upon (Kant, 1785), while this individualist-deontologist attitude is completely alien to provocatively revolutionary Nietzsche or the utterly labor-force Faustian thinking of *das Kapital* by Karl Marx of collectivist teachings of his Leninists pro-mass oriented followers.

Exactly around the same time started the modern era and reflections about free markets reached America and its many business schools where it transformed into business ethics (Liedekerke and Dubbink 2008, 274). Beginning in 1904, Business ethics lectures started at the University of California and Yale University, Leon Marshall's curriculum at the College of Commerce of the University of Chicago, and the William A. Vawter Foundation on Business Ethics at Northwestern University (Abend, 2013). In 1928, the first business ethics course in an American business school was offered in the Harvard Business School (Ciulla 2011, 336–337). However, even before that, in 1913, probably the oldest Code of Ethics of modernism was issued. It was a Code of Ethics – the Code of the J.C. Penney Company, formerly known as the Golden Rule Company, in 1913 (Schwartz, 2004). And then the Great Depression hit ... Well, crises magnify differences and accelerate pre-existing trends (D'Adamo & Lupi, 2021). Allegedly Albert Einstein stated: *“A crisis can be a real blessing to any person, to any nation. For all crises bring progress. Creativity is born from anguish, just like the day is born from the dark night. It's in crisis that inventiveness is born, as well as discoveries made and big strategies. He who overcomes crisis, overcomes himself, without getting overcome.”* So, the Great Depression created a perfect setting for Codes of Ethics as renewed self-imposed regulations by their subjects (McDonald, 2009), similar to other crises such as wars or scandals, for instance insider trading of stock, unfair marketing campaigns, bribing foreign officials, accounting manipulation, etc. which led to the 1977 Foreign Corrupt Practices Act and the 2002 Sarbanes Oxley Act (Cerchia & Piccolo, 2019). By then, Codes of Ethics had become already a global reality, i.e. even Europe overcame its scepticism about Codes of Ethics due to the communitarianism and moved in the 1970s to the individualist focus marked by a set of world crises (Balcerzak & MacGregor Pelikánová, 2020). A general move from government spending Keynesian economic theory to the minimized state neoliberal market-oriented theory caused the move from the social dimension to the ecological, aka environmental, protection dimension. Regarding moral philosophy, Kantianism with a deontological theory judging the morality of an action not based on its consequences, but based on motivation and duty, has been juxtaposed to the consequentialism, including both egoism (promoting the good of an individual) and Bentham utilitarianism, opting for results and promoting the good of society (Schwartz & Carroll, 2003; Shim & Kim, 2019).

The worldwide spread of Codes of Ethics started in the context of the end of the cold war (1989), the European Monetary System crisis (1992) and the oil crisis (1993). Further, it was boosted by the increased interest in business ethics in academia on both sides of the Atlantic in the late 1980's. A basic empiric observation confirms the exponential rise of the employment of Codes of Ethics. In Europe, a small group of academics created EBEN (European Business Ethics Network) in 1987, which promptly became a global organization, and spread to more than 40 countries with more than 1200 members (Liedekerke & Dubbink, 2008) with 18 National Networks. In America, already in 1992, 93% of U.S. based and 83% of North American and European companies had a Code of Ethics (Adams et al., 2001). One decade later, not only the NYSE and NASDAQ required companies to have a Code of Ethics in order to be listed on their stock exchange, but the 2002 Sarbanes-Oxley Act also required publicly traded companies to disclose their Codes of Ethics in their annual reports (Schwartz, 2004). It

might be argued that the evolution of Codes of Ethics makes their dimension more meta-ethical (Babri et al. 2019) and pushes them from the natural law to the positive law sphere, see e.g. Italian Legislative Decree no. 231/01, while definitely subjecting Codes of Ethics to a general scrutiny by the public-at-large (Balcerzak & MacGregor Pelikánová, 2020). Therefore, post-modern Codes of Ethics have many dimensions and satisfy a myriad of functions (Balcerzak & MacGregor Pelikánová, 2020), such as identifying good and bad, advancing values and balancing of economic, environmental and social factors, such as the Green Deal and circular economy (Razminiene, 2019), which is also reflected in the strategy and management (Peters et al., 2021). Although they are seldom required and enforced by law (Babri et al. 2019), their breach causes sanctions and other negative consequences, such as a lack of personal appraisal or negative publicity (Kaptein, 2011; Oladinrin & Ho, 2016). They describe the business's culture, values, and brands (Cerchia & Piccolo, 2019; Somers, 2001), and even attempt to persuade others about them and inspire their co-engagement (Hála et al., 2022). However, how this is done varies dramatically and academic proponents of “always” nice and good Codes of Ethics have predominantly a background in management, including business ethics, in environmental studies and in political science, and only seldom in anthropology, history and law and only exceptionally are practitioners (De Bakker et al., 2019). Consequently, not each and every Code of Ethics matches with the moral expectations of its auditorium (MacGregor et al., 2021).

Based on the manner of how they address moral values, such as credibility, respect, responsibility, honesty, care, and citizenship (McDonald, 2009), there are four key ethical principles (Balcerzak & MacGregor Pelikánová, 2020):

- (i) The principle of personality to enhance autonomy and authenticity of the individuals;
- (ii) The principle of solidarity which requires being and working together;
- (iii) The principle of subsidiarity against unreasonably distant decision-making leadership;
- (iv) The principle of foreseeable environmental responsibility vis-à-vis the world (Jonas, 1984).

In sum, post-modern Codes of Ethics deal with standards for human behavior for both the present and future. They are fruits of critical reflection based on past experience while addressing both intentional and unintentional consequences. They should be based upon the premise that at the very center is a human being whose ethical drive leads to fair, honest, positive and creative behavior. Consequently, Codes of Ethics should induce each and every employee, worker, manager or free-lance co-operator for his/her ethical behavior and this is feasible only if the business provides sufficiently for these people and extends its solidarity even beyond. Therefore, post-modern Codes of Ethics are realistic and pro-future oriented with solidarity aspects. The Illinois Institute of Technology, Center for the Study of Ethics in the Professions keeps a massive database available at <http://ethicscodescollection.org/> which allows for researching both modern and post-modern Codes of Ethics. Such a search needs to be complemented by academic findings such as that Codes of Ethics are often oriented towards a particular group of stakeholders (Zolingen & Honders, 2010) and reflect the moral maturity of its author(s) and involved management (Messikomer & Circa, 2010; Vogel, 2010) as well as industry particularities (Perez-Batres et al., 2012). Accounting, financial and banking services definitely belong to industries with Codes of Ethics exhibiting particularities (Fatemi et al., 2018).

The history of accounting goes as well back at least to 3 000 B.C. and is related to a similar region as the appearance of Codes of Ethics pre-cursors. Namely, the Assyrian, Chaldaean-Babylonian and Sumerian civilizations in Mesopotamia used records of commerce, standard measures of gold and silver, and even banking services extending credit in some

transactions. The above mentioned Code of Hammurabi recognized and reflected that and from its provision about a price quotation under seal is implied that transactions were recorded and subscribed by a *scribe* on a moist clay tablet and parties added their „signatures” by impressing their respective seals (Chiera, 1938). Ultimately, *scribes* became well respected professionals performing tasks nowadays done by notaries public, lawyers and accountants. The extraction of the bookkeeping task occurred in ancient Egypt due to the use of papyrus and the increased need for inventory records and financial-fiscal information. The audit was performed under the auspices of the pharaoh and the punishment for irregularities was strict - fine, mutilation or death. Since a single valuation measure was not used, the bookkeeping was basically listing all items (Carmona, 2017). The use of coins by Phoenicians and Greeks helped to overcome that. In the 5th century B.C., members of the Athens Popular Assembly legislated on financial matters and controlled the receipt and expenditure of public monies through the oversight of 10 state accountants, chosen by lot (Calhoun, 1926)). In Rome, records were kept by the head of the family via a daybook and a monthly cashbook known as a *codex accepti et expensi*. Roman citizens had to submit regular statements of assets and liabilities in order to determine both their taxation and civil rights. An elaborate system of checks and balances was maintained in Rome for governmental receipts and disbursements by the quaestors, who managed the treasury, paid the army and supervised governmental books (Carmona, 2017). Emperors supervised the Roman treasury and made sure that was prescribed by the centralized legal codes. The chaos, including within the accounting universe, caused by the fall of Rome lasted centuries, while several attempts regarding stabilization and re-integration were launched, see Charlemagne, aka Charles the Great. In this context, it is impressive that William the Conqueror, aka William the Bastard after his (rather surprising) victory at the Battle of Hastings (1066) in consolidating his power, took many steps, such as the establishment of records about all real estate property via the Domesday Book (1086) and the oldest English accounting-fiscal record called the Pipe Roll aka the "Great Roll of the Exchequer." (Alexander, 2002).

A true accounting revolution occurred in Renaissance Italy where Arabic numerals became regularly used in tracking business accounts instead of Roman numerals and where extensive records were kept to keep track of the use of capital and credit while creating the foundation for double entry bookkeeping. In the 15th century, the Franciscan Frater Luca Bartolomes Pacioli came up with a mutli-disciplinary approach and attempted to reconcile mathematics and accounting while reaching harmony and balance. He co-operated with his friend Leonardo da Vinci, i.e. Leonardo da Vinci helped Luca Bartolomes Pacioli with drafting his books and Frater Luca Bartolomes Pacioli calculated for Leonardo da Vinci the quantity of the material to be used for his masterpieces, such as the artist's huge statue of Duke Lidovico Sforza of Milan (Alexander, 2002).

Luca Bartolomes Pacioli developed in his many works and treaties, including *Summa*, the double entry method (Williams, 1978) which was originally conceived by Benedetto Cotrugli (Geijsbeek, 1914). However, the ethical dimension of accounting and moral standards to be endorsed by accounts were not at the center of attention, perhaps even not at the edge. Namely, it started to happen only in Scotland with the Chartered Accountant regarding public accountants. Similarly to a *scribe*, such an accountant in Edinburgh or Glasgow was called a *write* and performed tasks nowadays performed by accountants, notaries public and lawyers, see the activities of the famous Mr. James McClelland at the beginning of the 19th century. In 1854, the Institute of Accountants in Glasgow petitioned Queen Victoria for the grant of a Royal Charter. By then, England enjoyed highly prosperous times brought on by the Industrial Revolution, while being the leading producer of coal, iron and cotton textiles. In addition, England was the financial center of the world, which was also getting more competitive and more inclined to bring about bankruptcies. In 1880, the newly formed Institute of Chartered Accountants in England and Wales brought together all the accountancy organizations and

issued Standards of conduct and examinations for admission. They were very much needed, in particular considering the fast development of innovative accounting practices in leading industries, such as railroads (Boockholdt, 1978; Previts & Samson, 2000). It should be as well considered the role played by accounting educators (Zeff, 2000).

A similar movement occurred in the U.S., especially in New York, Philadelphia and in Chicago, and led to the creation of the American Institute of Certified Public Accountants. After the Civil War ended, a huge economic growth occurred, partially thanks to the shift of attention from agriculture to finances. The dark side of the booming era was represented by financial scandals, such as over-capitalization and stock speculation causing financial panics in 1873 and 1893. The Republican senator John Sherman proposed the first Interstate Commerce Act and the famous Antitrust Act called the Sherman Antitrust Act of 1890, which was passed the Senate by an overwhelming 52–1 vote. It passed the House without dissent and Republican President Benjamin Harrison signed the bill into law. Unlike the British, who used the balance sheet in an effort to monitor management's use of stockholders' monies, American corporations had balance sheets drafted mainly with bankers in mind, and bankers of the era cared more about a company's liquidity than earning power... and then the Great Depression came. Since cash flow slowed, loans defaulted and credit became less available to corporations, and businesses sought financing from sources less tied to their current cash flow – stockholders instead of banks became the primary audience of financial statements, i.e. the income statement began to take center stage over the balance sheet. Accountants used the funds statement to measure the actual flow of monies, rather than simply the sum of working capital changes between balance sheet dates. The funds statement increasingly became a staple for the financial statement (Alexander, 2002). A number of serious scandals around 2000, such as fraudulent practices of the large energy and innovation firm Enron Corp, the telecommunications giant WorldCom and Tyco International, led to disastrous consequences, including dramatic financial and trust lost. The famous legislative response to that is the US federal Sarbanes-Oxley Act of 2002 enacted to protect shareholders, employees and the public from accounting errors and fraudulent financial practices. The Securities and Exchange Commission (SEC) enforces this Act and the ethical accountability and responsibility of accountants perhaps not sufficiently advanced in prior Codes of Ethics is getting the mandatory law dimension, i.e. it is becoming the enforceable liability. Undoubtedly, this move means as well more costs and bureaucracy, i.e. this (allegedly) draconian new legislation is different from the free setting of Codes of Ethics.

On the other side of the Atlantic, the European Commission did not waste much time and has been issuing many proposals for secondary EU law instruments, especially Regulations and Directives, to harmonize and standardize, if not unify, accounting in the EU and address „Enron type” crises. The analysis of these legislative instruments and their teleological interpretation could reveal the extent of the legislative focus on the employment of the four key ethical principles for accountants and accounting, i.e. principles of personality, of solidarity, of subsidiarity and the principle of foreseeable environmental responsibility. However, due to the size constraint, this interesting issue will be left for future searches and publications. Instead, this contribution keeps a strict focus on the message implied by the Codes of Ethics related to accountants and which were issued during the last hundred years.

3. DATA AND METHODS

The leitmotif leading to the fundamental research aim targets a deep and multi-spectral deeper understanding of the interaction of the Codes of Ethics and the accountant universes in the context of a demand for transparent and consistent reporting about businesses. Bodily, it is about the

recognition of indices and trends in Code of Ethics involving the accounting and accountants during a period of one hundred years. Logically, the employed methods are determined by the nature of the sources and data (Yin, 2008), i.e. Codes of Ethics and their analysis which includes both induction and deduction (Krippendorff, 2013; Vourvachis & Woodward, 2015) and entails more qualitative than quantitative aspects (Kuckartz, 2014). Considering the ethics and its impact into the spheres of economics, management and law, subjective features are inherently present. Since ethics, similar to legal science, are rather argumentative than axiomatic, it is fully acceptable to manually proceed and move to argumentation and explanation refreshed by forensic juxtaposition, the critical comparison, glossing (Hyland, 2007) and Socratic questioning (Areeda, 1996; Makhene, 2019). Considering the processed data, especially the Socratic questioning is very suitable, since it is as a dialectical method of inquiry and debate by means of a battery of selected systematic questions leading to logical responses and to stimulate inductive reasoning and rational thinking without being tied to assumptions (Carey & Mullan, 2004).

Therefore, in order to achieve such a recognition of such indices and trends in Codes of Ethics, it is necessary to perform a dynamic exploration of points of intersection during the last hundred years and imply from them preferences and trends, perhaps, which are indicative for the future. The data for it is to be extracted from the official database of Codes of Ethics kept by the Illinois Institute of Technology, Center for the Study of Ethics in the Professions, available at <http://ethicscodescollection.org/>. The selection with the obvious key word „accountant” leads to 10 Codes of Ethics. Namely, as highly relevant came automatically 13 Codes of Ethics, but 3 of them were to be excluded due to their strongly local and particular features. Consequently, these 10 Codes of Ethics are to be holistically explored by using an advanced content analysis (Kuckartz, 2014; Vourvachis & Woodward, 2015) while employing both an automatic rather quantitative approach via key word frequency (frq) and LIWC-22 exploration and a manual rather qualitative simplified Delphi approach (MacGregor Pelikánová et al., 2021; Silverman, 2013) with a panel focusing on the pre-set four key ethical principles (Balcerzak & MacGregor Pelikánová, 2020) and Likert scoring in the format (--), (-), (0), (+), (++) (Allen & Seaman, 2007; Joshi et al., 2015), while considering its methodological update (Jebb & Ng, 2021).

Firstly, the automatic rather quantitative approach via key word frequency (frq) was done. Each and every one of the pre-selected 10 Codes of Ethics was scanned for five key words relating to moral categories (fair, honest, just, respect and trust) and two key words related to sustainability pillars and CSR categories (environment and social) in order to find the total number of the use of such key words and to find a ratio of their presence as opposed to the entire text.

Secondly was the LIWC-22 exploration of the pre-selected 10 Codes of Ethics. The Linguistic Inquiry and Word Count (“LIWC”) is an artificial intelligence instrument for automatic processing which can be complemented by other methods such as manual scoring and glossing (Boyd, 2017; Hyland, 2007; Tausczik & Pennebaker, 2010), in particular a LIWC-22 exploring of 1000 words, see <https://www.liwc.app/>. Namely, LIWC is suggested as the gold standard in software for analyzing word use, is suitable for the assessment of legislative, semi-legislative and policy documents as well various reports and it allows different assessments based on the type of document. LIWC-22 compares the examined text with a standard text from one of seven types (personal writing, formal writing, e-mail correspondence, social media, commercial writing, entertainment and traditional book). The obvious choice for the closest type regarding Codes of Ethics is the formal writing, followed by commercial writing. LIWC offers two sets of results – traditional and summary variables. Traditional LIWC dimensions reflect the percentage of total words within the provided text (categories I-words, positive tone, negative tone, etc.), i.e. Code of Ethics. The Summary Variables are composites derived from

scientific research that have been converted to 100-point scales, where 0 = “very low” along the dimension and 100 = “very high”. (categories analytic and authentic). Due to the conceptual setting of Codes of Ethics, three LIWC conventional categories (positive tone, negative tone, moralization) and both LIWC summary variables categories (analytic and authentic) are relevant.

Thirdly, a manual, rather qualitative simplified Delphi content analysis (MacGregor Pelikánová et al., 2021; Silverman, 2013) was done via two rounds with a panel of three experts (Okoli & Pawlowski, 2004) focusing on the pre-set four key ethical principles (Balcerzak & MacGregor Pelikánová, 2020) and Likert scoring in the format (--), (-), (0), (+), (++) (Allen & Seaman, 2007; Joshi et al., 2015). These three experts were professionals with college degrees in law and economics and with more than 20 years of practice in the business management sphere, including Codes of Ethics preparation and presentation. Two of them were female, one of them was male. Each of them read these 10 Codes of Ethics and upon score cards and outlines and while using Likert scoring graded each of these Codes. The first round ended with the comparison of the preliminary results. Then these experts engaged in the 2nd round to mitigate discrepancies.

The information gathered from this advanced content analysis based on frq, LWC-22 and Delphi facilitates a qualitative evaluation (Silverman, 2013) of individual findings (Creswell, 2003; Denzin & Lincoln, 2005) with quantitative aspects and reflects the interaction of individual parameters and given indicators in such a context (Krueger & Casey, 2000). Such yielded results are to be juxtaposed, critically compared, glossed and refreshed by complementary Socratic questioning (Makhene, 2019). Ultimately preferences and trends emerge which provide a set of interesting messages about accounting ethics and even about the ethical dimension of reporting in the 3rd decade of the 21st century in general.

4. RESULTS AND DISCUSSION

In order to identify and assess points of intersection between accountants, accounting and ethics, in a chronologically dynamic manner, 10 Codes of Ethics from the period between 1916 and 2019 were subjected to the three-fold advanced content analysis and then subjected to critically comparison, glossing and Socratic questioning.

Firstly, the automatic, rather quantitative, approach via key word relative frequency (frq) was done. Each and every one of the pre-selected 10 Codes of Ethics was scanned for five key words relating to moral categories (fair, honest, just, respect and trust) and two key words related to sustainability pillars and CSR categories (environment and social) in order to find the total number of the usage of such key words and to find a ratio of their presence as opposed to the entire text. The yielded results along with comments are summarized in Table 1.

Table 1. Key word frequency in 10 pre-selected Codes of Ethics related to accountants
1916–2019

Traditional LIWC Dimension	Fair	Honest	Just	Respect	Trust	Envir	Social
1916 The Code of Ethics for Accountant	0/726	0/726	0/726	0/726	0/726	0/726	0/726
1979 Rules of Conduct Certified Pbc Accountants	0/2113	0/2113	0/2113	1/2113	6/2113	0/2113	0/2113
1995 Department of the Treasury	0/7419	0/7419	0/7419	6/7419	10/7419	0/7419	1/7419
1997 AICPA Codes of Professionals	3/31786	3/31786	6/31786	0/31786	6/31786	0/31786	6/31786
2004 Code of Ethics Code Conduct NGO	7/8486	6/8489	1/8486	7/8486	15/8486	2/8486	2/8486
2004 Code of Ethics Nat State Planners	0/726	0/726	0/726	3/726	1/726	0/726	0/726
2009 AFCID Code of Conduct NGO	1/4679	0/4679	0/4679	2/4679	1/4679	0/4679	0/4679
2010 Supplemental Standards of Ethical	0/2861	0/2861	0/2861	5/2861	10/2861	0/2861	0/2861
2011 Code of Conduct for Directors and	8/17647	9/17647	3/17647	23/17647	2/17647	0/17647	1/17647
2019 Standards for Excellence	7/3041	1/3041	0/3041	7/3041	1/3041	0/3041	0/3041

Source: Prepared by the Authors while using the Illinois Institute of Technology Database

The key word relative frequency reveals that, regardless of the size of the Code of Ethics, key words relating to moral categories (fair, honest, just, respect and trust) are much more popular than key words related to sustainability pillars and CSR categories (environment and social) and their number oscillates between 1 and 23, most often under 10. The most popular key word is “trust” and it appears that Codes of Ethics evolved significantly in this respect between 1916 and 1997 and that during the last two decades no dramatic changes are taking place. The LIWC brings more point to these preliminary propositions.

The most matching Form LIWC-22 category for Codes of Ethics, is the type called “formal writing”. The LIWC-22 comparison of an “average” formal writing text and these codes while focusing on two conventional categories (positive tone, negative tone, etc.) and two composite variables categories (analytic and authentic), is included in Table 2.

Table 2. LIWC-22 assessment of 10 pre-selected Codes of Ethics related to accountants
1916–2019

LIWC average for formal writing	Traditional			Summary variables	
	Positive tone 2.33	Negative tone 1.38	Moralization .30	Analytic 87.63	Authentic 28.90
1916 The Code of Ethics for Accountant	0.42	0.28	0.31	92.76	44.91
1979 Rules of Conduct Certified Pbc Accountants	0.38	0.75	0.37	96.52	41.06
1995 Department of the Treasury Code of Ethics	1.85	0.86	0.73	95.04	19.87
1997 AICPA Code of Professionals	1.62	0.00	1.50	99.14	15.68
2004 Code of Ethics Code Conduct NGO	2.44	1.36	3.66	94.23	14.74
2004 Code of Ethics Nat State Planners	2.36	0.00	1.10	95.28	4.55
2009 AFCID Code of Conduct NGO	3.30	1.10	1.37	90.80	7.10
2010 Supplemental Standards of Ethical	0.98	0.86	0.62	93.99	41.76
2011 Code of Conduct for Directors and	0.52	0.39	0.91	89.89	40.51
2019 Standards for Excellence	4.26	0.14	0.57	90.48	0.97

Source: Prepared by the Authors while using by Illinois Institute of Technology Database and LIWC-22

The LIWC-22 reveals that the examined Codes have definitely a more positive and a less negative tone than an average formal text. There are even Codes of Ethics totally avoiding the negative tenor, see the 1997 AICPA Code of Professionals and 2004 Code of Ethics of National State Planners. Unsurprisingly, they are more moralizing and going for analytic exposures than what can be observed in an average formal text. These preliminary propositions do not change while considering Codes of Ethics from different time periods. However, a significant difference occurs regarding the authenticity. The average formal text has authenticity around 28.90 and the examined Codes of Ethics went from the highest 44.91 in 1916 to the lowest 0.97 in 2019. However the results from next years, such as 2011 with 40.51, rejects the preliminary proposition that the authenticity declines over time. Boldly, as much as the point of the difference based on the key frequency is the issue of trust, the point of the difference based on the LIWC-22 is the authenticity. Other preliminary propositions, suggestions or trend indices cannot be implied from the key word and LIWC assessment and thus it is desirable to proceed to the manual two rounds Delphi with Likert scale assessment regarding the four key ethical principles, i.e. (I) The principle of personality to enhance autonomy and authenticity of the individuals; (ii) The principle of solidarity which requires being and working together; (iii) The principle of subsidiarity against unreasonably distant decision-making leadership; (iv) The principle of foreseeable environmental responsibility vis-à-vis the world (Jonas, 1984), se Table 3.

Table 3. Delphi-Likert 4 key ethical principles assessment of 10 pre-selected Codes of Ethics related to accountants 1916–2019

	Personality	Solidarity	Subsidiarity	Foreseabl env
1916 The Code of Ethics for Accountant	-	-	-	--
1979 Rules of Conduct Certified Pbc Accountants	-	-	-	--
1995 Department of the Treasury Code of Eth.	--	--	--	--
1997 AICPA Codes of Professionals	+	+	+	-
2004 Code of Ethics Code Conduct NGO	-	+	-	-
2004 Code of Ethics Nat State Planners	-	+	-	-
2009 AFCID Code of Conduct NGO	-	-	-	-
2010 Supplemental Standards of Ethical	-	-	-	-
2011 Code of Conduct for Directors and	+	+	+	-
2019 Standards for Excellence	-	+	-	-

Source: Prepared by the Authors while using by Illinois Institute of Technology Database and on the academic literature (Kant, 1785; Taylor, 2018; de Bakker et al., 2019)

The Delphi-Likert scale assessment regarding the four key ethical principles does not appear to offer pioneering or revolutionary ideas or arguments. As a matter of fact, the only three preliminary propositions to be extracted are that these four key ethical principles are not strongly endorsed by the examined Code of Ethics, the one with convincing results is the principle of solidarity and that no convincing signs of trends can be implied from this assessment.

The juxtaposition of moral categories, sustainability and CSR key word frequency, three traditional and two summary variables categories of LIWC-22 and Delphi-Likert scale regarding four key ethical principles leads to a fragmented picture regarding potential preferences and trends with the following six propositions.

Firstly, Codes of Ethics for accountants go much more for the moralization and ethical dimension than sustainability and CSR, as a matter of fact they do not attempt to find and take advantage of their synergetic interaction.

Secondly, Codes of Ethic for accountants are strongly analytic documents not expressed in a negative tone, i.e. Codes of Ethics attempt to avoid a negative tone and to be over-average analytic.

Thirdly, Codes of Ethics for accountants emphasize moralization, trust and solidarity, i.e. they declare them and attempt to induce accountants to be, and to operate, in this manner. Therefore, an accountant in the 3rd decade of the 21st century should be a morally committed person aiming to achieve trust and show solidarity. Since the work is just a reflection of its author, an accountant should prepare financial and non-financial statements, or assist with their preparation, while focusing on the moral, trust and solidarity aspects. Trustworthy and pro-solidarity accountants should contribute to trustworthy and pro-solidarity reports and ultimately even business conduct.

Fourthly, Codes of Ethics for accountants do not reveal preferences regarding environmental protection/environmental foreseeability and even the social/personality/subsidiarity awareness is rather low, which is partially in contradiction with the top preference for solidarity.

Fifthly, Codes of Ethics demonstrate dramatic differences in the intensity of a positive tone and in their authenticity. As a matter of fact, the criteria for their differences are the positive tone and authenticity. Some are very positive, but not really authentic (2019 Standards ...), while others are not really positive, but very authentic (1916 Code), but others are low on both ends (1995 Department, 2010 Supplem). None of them truly exhibited a strong drive for a positive tone and authenticity.

Sixthly, regarding trends, over time evolution has occurred, especially between 1916 and 1995, but since then no clear trends are to be observed, i.e. during the last three decades no move towards pro-sustainability, pro-CSR or pro-certain values are to be observed.

5. CONCLUSIONS

Tempora mutantur et nos mutamur in illis... the times change and we change with them. Modern and post-modern society has evolved dramatically. Codes of Ethics and accountants with accounting are definitely the same as one hundred years ago. However, does it mean that Codes of Ethics for accountants have dramatically improved in heralding high moral values recognized in the 21st century? Well, a search in the official database of Codes of Ethics kept by the Illinois Institute of Technology brought 10 Codes of Ethics which were holistically explored by using an advanced content analysis based on the frequency of moral, sustainability and CSR key words, three plus two LIWC categories and manual Delphi with Likert scaling regarding four key ethical principles. The yielded results were juxtaposed, critically compared, glossed and refreshed by complementary Socratic questioning, and led to six propositions. Firstly, Codes of Ethics for accountants are pro-ethics but not pro-sustainability oriented. Secondly, they are strongly analytic while avoiding a negative tone. Thirdly, they emphasize moralization, trust and solidarity. Fourthly, they are inconsistent, since they do not go for environmental protection/environmental foreseeability and even the social/personality/subsidiarity awareness, but they are very strongly for solidarity.

Fifthly, Codes of Ethics differ strongly in their preferences regarding the intensity of a positive tone and in their authenticity. Sixthly, no chronological trends after 1995 are to be observed, i.e. neither crises nor the Green Deal nor SDGs seem to inspire more sustainability, CSR, etc. This kind of “immunity” of Codes of Ethics for accountants is worrisome and this especially in the context of the EU law clearly moving towards reporting with respect to both financial and non-financial statements, see the updated Directive 2013/34/EU on statements and reports, Regulation (EU) 2019/2088 aka Sustainable Finance Disclosures Regulation

(SFDR), Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment aka Taxonomy Regulation, etc.

Naturally, all six propositions with the worrisome observation are preliminary, due to the lower number of the examined pool of Codes of Ethics as well as inherent methodologic limitations due to the qualitative nature and involved soft areas such as ethics. In order to improve the academic robustness, it is desirable to conduct future studies regarding a larger pool of Codes of Ethics, perhaps even other documents, and to conduct these studies in a longitudinal manner. Further, it might be enriching to complement the advanced content analysis by other methods and instruments, such as surveys, field observations, etc.

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CODE OF ETHICS AS MORAL SWORD OR MORAL SHIELD - PFIZER CASE STUDY

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Abstract: *The current set of crises magnify both pre-existing trends and issues. The pharmaceutical industry is expected to generate both wealth and ethical commitments and its top multinational companies are under close scrutiny by the public-at-large demanding their moral commitment and expecting to report about it honestly and transparently. Namely, Pfizer, Inc. is well known for its highly profitable business performance, its drugs and vaccines saving lives, its extended portfolio of various pro-ethical and pro-sustainability declarations, including CSR and ESG reports ... and for its rather negative perception by external stakeholders. However, what is the fundamental standing of Pfizer, Inc. via its Code of Ethics and what its own employees think about it and in general? A multi-spectral two-step is to be employed. Namely, do the holistic exploration of an advanced content analysis of the most recent Code of Ethics performed with key word frequency, LIWC and Delphi. As well, a questionnaire survey with Likert scaling by employees of Pfizer CZ offer interesting finding out about, not only the Code of Ethics of Pfizer Inc., but as well more generally about Pfizer, Codes of Ethics and even our current global society. Do we go for a moral sword or merely for a moral shield?*

Keywords: *Corporate Social Responsibility (CSR), Code of Ethics, Pfizer, Sustainability*

1. INTRODUCTION

While the general concern regarding sustainability has millennial roots and its modern history is marked by the German concept of *Nachhaltigkeit*, shaped in the context of the Hanseatic League and forestry and the wood and mining industry in the 18th and 19 centuries, the Corporate Social Responsibility (“CSR”) as its projection into the sphere of individuals, has centennial roots going back in the US. Namely, the sustainability has rather global, continental tradition and international law features reflecting the sectorial long-term responsibility (Schüz, 2012). In contrast, CSR is linked to human beings and their readiness to directly or indirectly, via corporations or other entities, make a commitment, regardless whether or not it is imposed by the national law. Therefore, CSR is close to the ethical pathway of businesses. Particularly in the EU, businesses are invited and induced by various EU policies to engage in a moral commitment exceeding the law requirements and following sustainability trends heralded by the UN endeavors. These include the 2015 UN Resolution A/RES/71/1 “Transforming our World: The 2030 Agenda for Sustainable Development (“UN Agenda 2030”) with its 17 Sustainable Development Goals (“SDGs”) and 169 associated targets, based on the five Ps—an aspirational plan of action for people, planet, prosperity, peace, and partnership (MacGregor et al., 2021). It is up to each and every business how they will respond to this call. They can opt to do just a bare minimum, reduce themselves to a mere strict compliance with the law and issue their moral declaration via a Code of Ethics only if demanded by their national law (which is seldom the case) and their sustainability declaration via a CSR report only if demanded by the EU law or their national law (which is the case only for large businesses) (MacGregor

Pelikánová & MacGregor, 2020). However, they can opt to go for higher moral and other standards, declare them in their CSR reports, Codes of Ethics, on their Websites, etc., and turn them into their competitive advantage (Porter & Kramer, 2002), or even to engage in a closer interaction with a large spectrum of shareholders and engage in creating shared values (Porter & Kramer, 2011) and inform about it (MacGregor Pelikánová & MacGregor, 2020). In the global context, this is especially expected by large multinational corporations doing business in sensitive and/or controversial (Sroka & Szántó, 2018) and/or highly profitable industries (Chmielová & Turečková, 2019), such as luxury fashion (Hála et al., 2022) or pharmaceuticals (Vveinhardt & Sroka, 2020; Streimikiene & Ahmed, 2021). These businesses are perceived by the public-at-large as doing and generating both “good and evil” and as having a “moral duty” to compensate for it, to give back to the community and to be transparent and honest about it, regardless of the implementation and reporting its conceptual and terminological heterogeneity (Stolowy & Paugam, 2018). Perfect examples of such businesses are multi-national top pharmaceutical companies, such as Pfizer Inc. (Dropper & Bennett, 2015), which are expected, following Carroll’s CSR pyramid, to go far above mere economic responsibilities (being profitable) and legal responsibilities aka legal liabilities (obeying law), and to excel as well with their ethical responsibilities (being ethical) and philanthropical responsibilities (being a good corporate citizen) (Carroll, 2016).

Recently, a number of crises have challenged almost all aspects of the setting and operation in the EU and especially the impact of the COVID-19 pandemic was dramatic and proving once again that crises can bring tremendous challenges, but as well opportunities (D’Adamo & Lupi, 2021). The call for a moral consciousness became more pronounced, especially in certain industries and regarding certain groups of stakeholders (MacGregor Pelikánová & Hála, 2021; Hála et al., 2022). The call for cross-sector partnerships (Van Tulder et al., 2016) and collaborative changes (Van Tulder & Keen, 2018; Schaltegger et al., 2018) along with a demand for more “actionability” and “collaboration” of declarations is more and more pronounced (Van Tulder, 2017; MacGregor Pelikánová, 2021). Naturally even outside the EU in less developed countries the issues of ethics in and social responsibility in connection with COVID-19 are calling for attention especially in environmentally exposed segments (Jindřichovská & Eckert, 2021). Pfizer Inc. with BioNTech became the cynosure of all eyes not only regarding their COVID-19 mRNA vaccine branded “Comirnaty” in the EU. This further accelerated the discussion about its (un)ethical and ultimately (un)sustainable behaviour. Naturally, this trend came as well to the Czech Republic and the “local” Pfizer, i.e. Pfizer spol. s r. o. in Prague (“**Pfizer CZ**”) has to address it. The instrument *par excellence* for that is the Code of Ethics and the manpower *par excellence* for that are employees heralding the Code of Ethics. However what is the reality? Is the Pfizer Code of Ethics established as a Moral Sword or Moral Shiled? How is it perceived by Pfizer CZ? What do they expect in general from a Code of Ethics? In order to appreciate these issues and provide answers to these burning issues, after this Introduction (1.) a review of the theoretical and historical background about Codes of Ethics and Pfizer needs to be presented (2.). Based on a properly selected data and method (3.) a critical study exploring both the content of the Code of Ethics of Pfizer and the perception of Pfizer CZ employees is to be performed (4.) and culminate in conclusions regarding the Code of Ethics of Pfizer as well as Codes of Ethics in general (5.).

2. THEORETICAL, HISTORICAL AND CASUISTIC BACKGROUND

The effectiveness of a businesses’ conduct means that the business is engaging in right things and behavior, while the efficiency means that they are proceeding in a right manner. Hence, the effectiveness is about doing right. The appreciation of rightness is inherently subjective,

contextual, and should not lead to an automatic rejection of the modern inclination for self-realization (Taylor, 2018). Therefore, it represents an ethical call which is a subject of various appreciations and does not lead to a legal liability (Balcerzak & MacGregor Pelikánová, 2020). The very individual perception of what is good and what is bad leads to a subjectivity of morals, which needs to be consolidated in a more objective moral philosophy called ethics. When a business moves to issue a declaration about its commitment to good, Code of Ethics, then it inherently belongs to one of many trends known to Business Ethics and which has developed during the last five millennia.

Around 2 300 BC, Ptah-hotep, an ancient Egyptian sage and vizier of the Egyptian pharaoh, wrote on a papyrus probably the most ancient Code of Ethics. It covered a general person's obligations at work, including a duty for observance, self-control, transparency, and anti-bribery, as well as highly practical issues such as a warning against falling asleep at work (Ciulla, 2011). The Greek philosophy has engaged in the search of and for foundation of ethical judgements. Although Socrates thought that, via simple reasoning, people can design ethical principles that combined the self-interest of the individual and the common good, he was inclined to defer critical ethical decisions to “experts”. In contrast, Plato thought that all people are virtuous in nature and do not commit evil voluntarily, consequently each individual should and can find a way to the vision of Good (objective justice). Although Aristotle was a student in Plato's Academy, there were more different features in their philosophy than similarities. While Plato founded his philosophy of ethics on religious and idealistic grounds, Aristotle had a naturalistic philosophy of ethics. Naturalistic philosophers derived standards of value in the needs, tendencies, and capacities of man, rather than divine forces such as God. Aristotle's famous works on ethics include Eudemian Ethics and the Nicomachean Ethics. They cover the oscillation and balancing while considering circumstances (subjective justice) and advance the famous distinction of arithmetic justice and the geometric perception of justice, which has shaped the law's evolution. Romans were both pragmatic and inclined to follow Greek philosophy, they were pro-commerce, including international trade, but knew that trade and commerce may lead to dishonesty. Cicero, like Aristotle, was wary of merchants and criticized the people who profit from other people's misery (Ciulla 2011, 336-337).

Soon after Jesus' crucifixion, circa 33 AD, the mixture of Greco-Roman, Judaism and other Middle Eastern religions and other circumstances and factors led to the rise of Christianity, which brought forth ideas of rewards and punishment, individual responsibility and private ownership. Further Christianity condemned the cruelties and prompted social liberalization by bringing up a new conception of humanity (Stark, 1997: 214-215) and so can be perceived as a pre-cursor of the current advanced multi-stakeholder model with bottom-up initiatives for the sustainability. One of the most prominent Christian philosophers, St. Augustine of Hippo (354–430) developed the Platonic idea into the concept of the soul, according to which bodies are merely instruments to achieve their spiritual ends. The ultimate objective was, as before, to achieve happiness, but unlike in Greek philosophy, for St. Augustine happiness means the union of the soul with God after the body has died. The grace of God became central and necessary for redemption. St. Thomas Aquinas (1225–74), the Scholastic philosopher and proponent of Aristotle, advocated a “natural law” ethic, pursuant to which, the difference between right and wrong can be appreciated by the use of reason and reflection on experience. Although St. Thomas Aquinas closely referred to the Bible and the teachings of Church Fathers, he developed an ethical system based perhaps more on reason than revelation. The Renaissance and the reformation followed. John Wesley, Martin Luther and John Calvin helped formulate the Protestant work ethic, but meanwhile there was the cynicism of Niccolò Machiavelli (1469–1527), ignoring shared ethical rules and departing from moral judgments. This scepticism about human nature was shared as well by Thomas Hobbes (1588–1679) who advanced the idea that the fundamental motivation for human behaviour is desire or

pleasure, i.e. hedonism. Consequently, he perceived “good” as something generating pleasure, regardless of religious or metaphysical assumptions, and this leads to the “war of all against all.” Around the same time, the pendulum kept swinging, as Modern Ethics emerged while shaped by the Enlightenment with Jean-Jacques Rousseau and Benedict de Spinoza and philosophers of the 19th century, such as the deontologist Immanuel Kant, idealist Georg Wilhelm Friedrich Hegel, nihilist Friedrich Wilhelm Nietzsche, and Marxist Karl Marx. The definition of good and rightness by these philosophers varies dramatically, e.g. pursuant to Kant it is determined by the character of the principle that a person or business chooses to act upon (Kant, 1785), while this individualist-deontologist attitude is completely alien to provocatively revolutionary Nietzsche or utterly collectivist teachings of Marxism-Leninism. During the modern philosophy era of Europe, scholars reflected and criticised the profit motive of businesses and the flow of the free market system.

In the 19th century, reflections about free markets reached America and its many business schools where it transformed into business ethics (Liedekerke and Dubbink 2008, 274). The area of business ethics arose in the early 20th century, together with the creation of business schools at major American universities. Business ethics lectures, starting in 1904, at the University of California and Yale University, Leon Marshall's curriculum at the College of Commerce of the University of Chicago, and the William A. Vawter Foundation on Business Ethics at Northwestern University (Abend, 2013). Aside from that, Harvard Business School offered what is believed to be the first business ethics course in an American business school in 1928 (Ciulla 2011, 336-337). European reflections on morality of business reached America, were transformed and led to the first Codes of Ethics in the 1960's and made a return as business ethics to the post World War II Europe, in 1987.

Europe in the 1960s was still dominated by a reinforced interest in the social dimension values, communitarianism and Marxist theory. People were suspicious about profit-oriented business (Paksiova & Oriskova, 2020) and even more about their Codes of Ethics. Codes were met with scepticism. In the 1970s this was superseded by the individualist focus marked by a set of world crises (Balcerzak & MacGregor Pelikánová, 2020). A general move from government spending Keynesian economic theory to the minimized state neoliberal market-oriented theory caused the move from the social dimension to the ecological, aka environmental, protection dimension. Regarding moral philosophy, Kantianism with a deontological theory judging the morality of an action not based on its consequences, but based on motivation and duty, has been juxtaposed to the consequentialism, including both egoism (promoting the good of an individual) and Bentham utilitarianism, opting for results and promoting the good of society (Schwartz & Carroll, 2003; Shim & Kim, 2019). The idea that large companies that impact society carry a social responsibility, see the Carroll pyramid (Carroll, 2016), has not been accepted by all, as shown by the remaining conventional approach believing in only one key task for a business – profit maximization for its shareholders (Friedman, 2007; Tasaryova & Paksiova, 2020). Many could not relate money-making with ethics and morals. Nonetheless, the rise of business ethics as an academic field was astonishingly quick in Europe starting from the late 1980's. The evolution of EBEN (European Business Ethics Network) bears witnesses to this. It grew from a small group of academics in 1987 to a global organization, and spread to more than 40 countries with more than 1200 members (Liedekerke and Dubbink, 2008) with 18 National Networks.

The hallmark of the engagement of businesses in these trends are their Codes of Ethics. Indeed, Codes of ethics are a demonstration of self-imposed regulations by their subjects and their modern era dates back to the Great Depression (McDonald, 2009), see the arguably oldest Code of Ethics – the Code of the J.C. Penney Company, formerly known as the Golden Rule Company, in 1913, and of Johnson and Johnson, published in 1943. (Schwartz, 2004). Their worldwide spread of codes started in the 1990's. By 1992, 93% of U.S. based and 83% of North

American and European companies had a COE (Adams et al. 2001). The evolution and widespread use of Codes of Ethics is marked by various crises and scandals connected to the unethical behaviour of big corporations in the 1970's and 1980's. Those events included insider trading of the stock, unfair marketing campaigns, bribing foreign officials, accounting manipulation, et. and led to the 1977 Foreign Corrupt Practices Act and the 2002 Sarbanes Oxley Act (Cerchia & Piccolo, 2019). By that time, society finally realized the importance of Codes of Ethics in steering away businesses from unethical behaviour. The NYSE and NASDAQ require companies to have a COE in order to be listed on their stock exchange. In 2002, the Sarbanes-Oxley Act also required publicly traded companies to disclose their codes of ethics in their annual reports. If there is no code of ethics, a company should provide reasons for not having one (Schwartz, 2004). In sum, the evolution of Codes of Ethics has a meta-ethical dimension and represents a self-regulation which is not legally binding (Babri et al. 2019), though their violation may lead to certain sanctions and other negative consequences, such as a lack of personal appraisal, or a lowered impression of the integrity of the management (Balcerzak & MacGregor Pelikánová, 2020).

Modern Codes of Ethics are multifunctional, since they represent and enhance a business's culture and value as well as assist in the adoption of a specific organization and/or governance structure (Cerchia & Piccolo, 2019). They can even have a meta-ethical dimension and represent ethics as the foundation stone of the sustainable (economic) success of the business. They can be either rather general and abstract (Codes of Ethics) or more specific and practical, detail-oriented (Codes of Conduct) (MacGregor Pelikánová et al., 2021). They include a written list of moral principles, values, standards, rules of conduct, and corporate policies, requiring communication to insiders (Somers, 2001) as well as outsiders, i.e. to all stakeholders and the public (MacGregor Pelikánová et al., 2021). Therefore, Codes of Ethics can steer towards good behavior by self-regulation (Bočková et al., 2012), thus reducing undesirable demands for the external legislative regulation of businesses (Babri et al., 2019). Currently, Codes might be the source of the legitimization, or at least explanation, of business strategies, including pricing, during the COVID-19 pandemic (Finestone & Kingston, 2021) and the Ukrainian war. Indeed, Codes of Ethics should distinguish good from bad while showing the consideration of various values and the balancing of economic, environmental and social factors, such as the Green deal and circular economy (Razminiene, 2019). They should not only incorporate a business's culture, values, and brands (Cerchia & Piccolo, 2019; Somers, 2001), but as well persuade others about them and inspire their co-engagement (Hála et al., 2022). This task is an especially challenging call for controversial companies from controversial sectors, such as Pfizer, Inc. in its pharmaceutical domains.

Pfizer, Inc. was founded by German immigrant cousins, chemist Charles Pfizer and candymaker Charles Erhart, in 1849 in Brooklyn, U.S.A. After a humble beginning, Pfizer, Inc. expanded, moved to Manhattan in 1868 and ultimately became a multinational company developing, manufacturing, and selling a wide range of biopharmaceutical products around the world. Indeed, after having had both successful and less successful results with various types of products, Pfizer, Inc. settled for pharmaceuticals and made, e.g., great profits from penicillin. Further, Pfizer Inc. has become a massive private investor in a global manner deserving protection (Dixon, 2013: 283) but as well exposed to high responsibility expectations, see *Pfizer, Inc. v. Government of India* (Cameron, 2015: 426). The call for traditional financial statement information but as well non-financial information regarding governance and social impact, CSR, has clearly targeted Pfizer, Inc. and Pfizer, Inc. has complied (Hertz Rupley et al., 2017), i.e. for decades has been issuing various CSR, ESG and other reports along with sets of Codes of Ethics. This call even increased its volume during the COVID-19 pandemic when Pfizer, Inc. came up with Comirnaty, and its price. Some perceived it as an act of the Saviour, others perceived it as an act of the Devil. The discussion of the Faustian Pact between the

society and Pfizer, Inc., with its intellectual property, has moved to another level dealing with both law and moral duties. The Pfizer Code of Ethics became increasingly a center of attention and 's values and responsibility has become a highly relevant topic (Freeman & Auster, 2011).

3. DATA AND METHODS

The leitmotif leading to the fundamental research aim targets a deep and multi-spectral understanding of a Code of Ethics, in particular the conventional content analysis of the newest version of the Code of Ethics of a large multinational company in a sensitive industry of Pharmaceuticals, Pfizer, Inc., and the perception of such a Code of Ethics, and Codes of Ethics in general, by the most internal stakeholders. This translates into three questions. What is the fundamental standing of Pfizer, Inc. via its newest Code of Ethics? What do its own employees think about such a Code of Ethics? What do they think in general about Codes of Ethics? In order to address these three questions, a multi-spectral two-step exploration is to be employed and complemented by the juxtaposition of its results. Firstly, the holistic exploration of an advanced content analysis of the most recent Code of Ethics performed with a key word frequency, LIWC and Delphi, is to be completed. Secondly, the questionnaire survey with Likert scaling by employees of Pfizer CZ has to follow. Interesting findings not only about the Code of Ethics of Pfizer, Inc., but as well more generally about Pfizer, Codes of Ethics and even our current global society need to be critically confronted, glossed and subjected to Socratic questioning. This plethora of facts and arguments leads to a decision about whether we go rather for a moral sword or merely for a moral shield.

Two sets of data were researched and analyzed to appreciate Pfizer Code of Ethics and its perception by employees as well as the attitude of these employees regarding Codes of Ethics in general. Consequently, two steps needed to be performed. Firstly, the Pfizer Code of Ethics was to be located and subjected to a content analysis. Secondly, a survey was to be performed about the employees perception of the Pfizer Code of Ethics and Codes of Ethics in general.

Regarding the first step, the newest version of the Pfizer Code of Ethics was located on the internal Pfizer Website place on its domain Pfizer.com (https://cdn.pfizer.com/pfizercom/investors/corporate/Pfizer_2020BlueBook_English_08.2021.pdf), which is called 2020 Blue Book: Pfizer's Code of Conduct and has a light ppt format with dominating pictures and signs („**Pfizer Blue Book**”). In addition to the Pfizer Blue Book, Pfizer also has a “Code of Business Conduct and Ethics for Members of The Board of Directors”, which includes Conflict of Interest; Using Corporate Opportunities; Confidentiality; Compliance with Laws; Rules and Regulations; Fair Dealing; Encouraging the Reporting of Any Illegal or Unethical Behaviour; Compliance Standards, Waiver of Code of Business Conduct and Ethics (Pfizer Inc. 2020). Although, the Pfizer Blue Book is formally the internal source of data, it is clearly oriented toward the public-at-large, consider its availability and marketing design. The Pfizer Blue Book encompasses only 32 pages, addresses four core values (Courage, Excellence, Equity, and Joy) and is available in over 30 languages. The collected data was subjected to an advanced content analysis (Kuckartz, 2014; Vourvachis & Woodward, 2015) while employing both an automatic rather quantitative approach via key word absolute frequency (frq) and LIWC-22 exploration and a manual rather qualitative simplified Delphi approach (MacGregor Pelikánová et al., 2021) with a panel of three experts focusing on the pre-set six dimensions and Likert scoring in the format (--), (-), (0), (+), (++) (Allen & Seaman, 2007). These six dimensions included the Code of Ethics, i.e. the Pfizer Blue Book, reflects (i) human nature, (ii) moral values (iii) ethical principles, (iv) reasoning, (v) sustainability pillars and (vi) CSR categories (MacGregor Pelikánová et al., 2021). This system allows for a qualitative evaluation (Silverman, 2013). of individual findings (Creswell, 2003; Denzin &

Lincoln, 2005) with quantitative aspects and reflects the interaction of individual parameters and given indicators in such a context (Krueger & Casey, 2000).

Regarding the second step, the questionnaire, with a battery of closed and semi-open questions, were electronically distributed, completed and returned while using Google forms platform. The process commenced in the Fall of 2021 and ended in the Spring of 2022 while reaching 100 employees of Pfizer spol. s r. o. in Prague (“**Pfizer CZ**”). The questionnaires were designed to find out the awareness and implementation of COE provisions by employees in everyday business life. The questionnaires mostly contained close-ended, multiple-choice questions. The questionnaires included three sets of questions – self-identification questions, questions about the Pfizer Blue Book and questions about Codes of Ethics in general. In total, 47 employees duly and timely replied and returned the completed questionnaires, i.e. the remaining 53 employees either did not reply during this six months long period or provided only fragmented answers. Considering the total number of all Pfizer CZ employees not even reaching 200, the difficulty in getting fully completed questionnaires and the collection of 47 completed questionnaires, an advanced quantitative exploration with highly robust statistical data was excluded. At the same, the analysis with calculated proportions and by using five-point Likert type scale coding (from 1 as the lowest to 5 as the highest), where average results were calculated, provided a sufficient foundation for the methodological assessment and generation of indication and propositions about the inside perceptions regarding the Pfizer Blue Book as well as Codes of Ethics in general. Concerning the Information provided based on self-identification questions, it revealed that 26 respondents identified themselves as female, 20 respondents as male and one respondent declined the binary gender identification. All 26 female respondents hold at least a bachelor’s degree and 19 out of 20 male respondents hold at least a bachelor’s degree. Greater diversity occurred regarding their departments – 20 respondents worked in the Accounting/Finance department, 15 in the Procurement department, seven in the IT department and five in the Marketing department. Regarding their work history, 23 respondents have worked for Pfizer CZ for more than five years, 19 respondents between one and five years and five respondents less than one year. Therefore, the respondent pool consists of educated employees sufficiently reflecting the diversity of the inherently highly professional workforce of Pfizer CZ and satisfying the requirements to generate indices and recommendations about the perception of the Code of Ethics of Pfizer and Codes of Ethics in general, as stated above.

4. RESULTS AND DISCUSSION

Three burning questions led to a multi-spectral two-step exploration with findings subjected to a critical confrontation, glossing and Socratic questioning and culminating in a recognition whether the trend, as implied by the Pfizer case study, is rather for a Code of Conduct performing the role of a moral sword or merely as a moral shield.

Regarding the first step, the Pfizer Blue Book is to be explored and assessed based on conventional tools for a neutral and arguably objectively universal analysis. Consequently, the advanced content analysis of the Pfizer Blue Book includes the performance and interaction of the automatic quantitative approach via a key word absolute frequency (frq), the LWC exploration and the qualitative simplified Delphi exploration. The key word absolute frequency reveals that the most popular key words, i.e. conventional key words as suggested for these types of studies by prior performed research (MacGregor Pelikánová et al., 2021) are law (44x), commitment (24x), social (21x), environment (21x), ethic (16x), responsibility (9x), while certain typical Code of Ethics words are unrepresented, such as liability (1x), or entirely absent, such as moral(ity) or justice or fair. This is rather puzzling and invites the LIWC-22 exploration.

The most accurately matching Form LIWC-22 category for Codes of Ethics, including the Pfizer Blue Book, is the category called “formal writing”. The LIWC-22 comparison of an “average” formal writing text and the Pfizer Blue Book, along with comments, is included in Table 1.

Table 1. LIWC-22 assessment – comparison of the Pfizer Blue Book and an average formal text

Traditional LIWC Dimension	Pfizer Blue Book	Average for Formal Text	Comments
I-words (I, me, my)	0.00	0.67	Commitment, consistency
Positive Tone	2.24	2.33	
Negative Tone	0.89	1.38	
Social Words	12.08	6.54	Advanced social focus
Cognitive Processes	12.30	7.95	Knowledge-proof
Allure	2.46	3.58	Low Attractiveness
Moralization	1.79	0.30	Inherent
Summary Variables	Pfizer Blue Book	Average for Formal Text	
Analytic	72.94	87.63	
Authentic	23.25	28.90	

Source: Prepared by the Authors while using Pfizer.com and LIWC-22.

The juxtaposition of frq and LIWC-22 leads to serious discrepancies and inconsistencies. Namely, the Pfizer Blue Code attempts to demonstrate a high focus on the law and its observance, but is much less interested in the consequences, such as liability and responsibility. Indeed, considering the law-ethics dynamics, it appears that the pro-law attitude is exaggerated and usurping the space for the true sphere of morals as projected into ethics. This conceptual hesitation is even more obviously visible via LIWC-22, which shows that the Pfizer Blue Book is, despite its apparent drive for social and cognitive aspects, perceived as inconsistent and not really attractive. This leads to the question about the Pfizer Blue Book standing regarding all five dimensions based on the Delphi-Likert assessment. The six dimensions analysis of the Pfizer Blue Book is summarized, along with comments, in Table 2.

Table 2. Delphi six dimension assessment – the Pfizer Blue Book as a Code of Ethics

	Strongly	Partially	Weakly
Perception of auditorium (perception of human nature)	Socrates-- imposition (Author of the Code autonomously sets ethics – men are perceived as “animals”)	Aristotle—searching (Author of the Code balances and considers various demands and GOOD perceptions – men are perceived between “animals” and “divine” (subjective justice))	Plato-- divinity (Author of the Code should look for the GOOD set by others – men are perceived as “divine” (objective justice))
Advanced values	Responsibility, Care	Honesty, Respect	Credibility, Citizenship
Ethical principles	The principle of solidarity (being and working together)	The principle of environment protection (respecting the world)	the principle of personality (autonomy of individuals) the principle of subsidiarity (no distant decision-making)
Reasoning	Kant – Deontological	Rawls – Integrated social contract	Bentham - Utilitarian
Sustainability pillar	Social (People)	Environment (Planet)	Economic (Profit)
CSR categories	Employees, Environment	Social, Human rights, Anti-Bribery, R&D,	

Source: Prepared by the Authors based on the academic literature (Kant, 1785; Taylor, 2018; de Bakker et al., 2019)

In sum, the Pfizer Blue Book is written in a “we” form in a paternalistic tone for a large audience which is perceived as consisting of subjects needing to be reminded about legal duties and various anti-discrimination and anti-cartel provisions. The advanced values are labelled as responsibility and care, but content wise they are more like liability and order. The endorsed principles deal with solidarity and protection of the environment, but definitely not with an independent personality and bottom-up decision-making. The prevailing reasoning is deontological, i.e. Kantianism and deontological theory prevails here over Bentham utilitarianism and teleological theory (Shim & Kim, 2019). The key sustainability pillar is social (people) and the dominant CSR categories are employees and environment.

Regarding the second step, the Pfizer Blue Book is to be explored and assessed based on an investigation via a questionnaire completed by the very most internal stakeholders, namely Pfizer CZ employees. This survey, with Likert scaling, targeted the perceptions of these employees in re the Pfizer Blue Book, as well as Codes of Ethics in general. Their replies regarding their perceptions of critical aspects and features of the Pfizer Blue Book and its application are summarized in Table 3, below.

Table 3. Questionnaire survey of Pfizer CZ Employees regarding their perceptions of the Pfizer Blue Book and its application (Liker scaling – 1 is the lowest and 5 is the highest)

	Clarity of provisions (from 1 to 5)	Number of recalled statements	Company support	Reporting unethical behavior
Pfizer Blue Book	3.85	0.7	4.13	78%

Source: Prepared by the Authors based on their questionnaire survey of Pfizer CZ employees

This is confirmed by the extremely low number of recalled statements from the Pfizer Blue Book, i.e. remembering even one point is rather problematic for them. Although they appear to endorse the Pfizer Blue Book and to appreciate the company’s support of the Pfizer Blue Book, still 22% of the Pfizer CZ employees would not report unethical behavior. Interestingly, the statements from the Pfizer Blue Book most often recalled by them are “Violation of law, bribery, money-laundering, harassment”, followed by “Human Rights – no discrimination” and “Health and Safety”. Further, 42% of the respondents express the wish that Pfizer CZ would provide repetitive (2-5x/year) training sessions to enhance both their understanding and compliance with the Pfizer Blue Book, while nearly 60% of the respondents opt for at least one training session annually. Regarding more general questions about Codes of Ethics and possible recommendations for their improvements, the respondents, through the Likert scaling, expressed their virtue preferences, i.e. what virtues are to be projected into a Code of Ethics. Their responses regarding the typical six virtues for Codes of Ethics are summarized in Table 4.

Table 4. Questionnaire survey of Pfizer CZ Employees regarding their perception of Codes of Ethics in general – virtues to be reflected (Liker scaling – 1 is the lowest and 5 is the highest)

	Law-abidance	Tolerance	Honesty	Professionalism	Fairness	Loyalty
Code of Ethics	4.36	4.31	4.28	4.20	4.13	3.19

Source: Prepared by the Authors based on their questionnaire survey of Pfizer CZ employees

The fact that Pfizer CZ employees are interested in, and potentially committed to, all six classical virtues and want them to be included in a Code of Ethics, is admirable. However, the rather low results for the virtue usually most highly demanded by supervisors, company loyalty, is cause for concern.

The juxtaposition of findings regarding all three questions, as implied by the two-step exploration reveals a dichotomy between Pfizer, Inc. and Pfizer CZ employees. The holistic exploration indicates that Pfizer, Inc. is aware about the importance of issues of sustainability

and CSR, and about their marketing and other impacts, and carefully acts to bolster its image in the eyes of the pertinent audience. However, the Pfizer Blue Book is basically imposed from above upon its employees and is more a spelling out of legal provisions than a declaration of moral duties, it comes across more as a moral sword. Interestingly enough, the employees (perhaps through lack of anything else) are open to accept it, but they do not have sufficient information about it. This results in this moral sword becoming dull, rusty.

Surprisingly, inasmuch as the Pfizer Blue Book is freely available only, the lack of awareness about its provisions by Pfizer CZ employees, and their corresponding complaints about insufficient awareness, is confounding. The employees seem to treat the Pfizer Blue Book rather as a convenient moral shield to be pulled out when needed, when convenient, preferably by them. These employees want to have more training sessions about Codes of Ethics and in particular about the Pfizer Blue Book, but don't appear to take any initiative in this respect. Perhaps they want to learn about it while being paid to attend training sessions, rather than taking the Blue Book home and studying it on their own time. Even more puzzling is their general preference regarding clauses to be included in Codes of Ethics in general, i.e. the focus on law abidance and tolerance, but not on loyalty. At the same time, considering the nature of Pfizer, Inc., both its business and importance of intellectual property assets, the loyalty of employees would seem to be critically important. In sum, the Pfizer Blue Book is a Code of Ethics with a colorful and beautiful appearance, glossy, but its content lags behind expectations and hardly can be labelled as a Code (lack of coherent logical structure) of Ethics (poorly reflecting fundamental requirements for Codes of Ethics). A company such as Pfizer Inc. should definitely revisit its Pfizer Blue Book, modify it and make it complementary to its extensive CSR, ESG and other reporting outlets.

5. CONCLUSIONS

What is the fundamental standing of Pfizer, Inc. via its Code of Ethics and what do its own employees think about it, and in general? A multi-spectral two-step exploration with the juxtaposition of findings supports the clichés about a 'cold', "German-American" Pfizer run by technical, unfeeling and hard-working engineers under the dominance of one autocratic leader. Namely, the Pfizer Blue Book has a nice formal appearance with a lot of pictures, but its text-content is basically a repetition of various law provisions in a "we" form. The re-writing of law overshadows any possible attempts to declare moral duties. However, the edge of such a sword is made dull due to a lack of awareness about it by Pfizer CZ employees. Indeed, although it has quasi-mandatory features and is freely available, Pfizer CZ employees have a difficult time to name even one provision from it. They treat the Pfizer Blue Book more like a convenient moral shield to be pulled out when needed, preferably by them. These employees would like to have more training and more knowledge about it, but are passive about it. They expect Codes of Ethics to be similar to that, i.e. to be pro-law but not so much pro-loyalty. This all constitutes a rather sad message, the content of the Pfizer Blue Book is not about moral commitments and employees know very little about it and, although they are pro-Codes of Ethics, they have very vague and ambiguous feelings about them in general. A company such as Pfizer, Inc. should definitely revisit its Pfizer Blue Book, modify it and make it complementary to its extensive CSR, ESG and other reporting outlets. A Code of Ethics should perform many functions, including self-identification and marketing functions, and this is certainly not the case of the Pfizer Blue Book. This is a systematic problem which will not be fixed by extra –training sessions or a few added or deleted sentences. In the 21st century, sustainability, CSR and ethics are linked to a multi-stakeholder model with the openness for dialogue, transparency and consistency. The paternalistic imposition belongs to the past.

Pfizer, Inc. is certainly professional and successful, both in its research and pharmaceutical endeavors, and its massive reporting and interest for marketing activities are well known. However, in the mosaic of its various reports, the Pfizer Blue Book represents a rather unimpressive element oscillating between law duties and moral declarations. Pfizer, Inc. might perceive it as a sword, but its employees as a shield. The ongoing discrepancies undermine underlying efforts and a deeper, longitudinal, multi-stakeholder discussion should be performed. In particular, a larger questionnaire survey with a more numerous pool of respondents, all with longitudinal studies, is needed in order to better understand and appreciate the internal perspectives and motivation of Pfizer, Inc. This should enhance awareness and take advantage of Pfizer, Inc.'s genuine conviction and commitment in order to, ultimately, effectively and efficiently stimulate its pro-sustainability endeavors.

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ESG FACTORS IN SUSTAINABILITY REPORTING AS A COMPETITIVE ADVANTAGE

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Abstract: *Along with integrated reporting, sustainability reports have been an essential part of corporate reporting for many years; however, the modern form of publishing this information is delineated by 2016. The information contained therein is an indispensable guide for investors in particular. At the same time, sustainability reports are part of the corporate image, covering relevant and comprehensible topics to various stakeholder groups. This paper aims to assess the potential of ESG factors and related indicators to influence the perception of companies in terms of their competitiveness by analysing a selected sample of sustainability reports of business entities operating in different sectors. The findings from a conceptual content analysis of a research sample of sustainability reports will provide topical data for assessing congruence with expected preconditions for successful corporate governance in this area. Consequently, in the context of the growing public interest in sustainability issues, the increasing frequency of keywords associated with ESG factors and indicators over time occurring in sustainability reports can be an indication that a company is on the right track to gaining a competitive advantage. The findings from the content analysis of the sustainability reports of selected companies show that companies increasingly use ESG factors and relevant indicators. Using standardised indicators over a longer time contributes to the easier comprehension and higher value of these reports for the needs of investors and other stakeholders. Therefore, companies' engagement in this area is a positive signal for successful sustainable entrepreneurship with a significant competitive advantage.*

Keywords: *competitive advantage, CSR – Corporate Social Responsibility, ESG factors, integrated reporting, sustainability reports*

1. INTRODUCTION

Sustainability in all its manifestations has become a differentiator and is now part of the brand promise and customer expectation. There is an increasing discussion in connection with sustainable business, and companies are under pressure to demonstrate how they contribute to society or national sustainability goals. Therefore, this paper seeks to substantiate how a strong environmental, social, and governance (ESG) proposition and sustainability reporting can create added value for the business, and can be seen as a competitive advantage in the business area. In addition, ESG propositions and opportunities must be part of the management's mental checklist. The number of entities filing CSR – Corporate Social Responsibility reporting through voluntary and legal means has increased in the past two decades.

2. THEORETICAL BACKGROUND

Corporate Responsibility (CR), Corporate Social Responsibility (CSR), and Sustainability are all terms that started to be very popular in the 2000s. CSR was defined by Bowen (1953) as the

business people's obligation to make decisions regarding our society's values. Drucker (1954) added that decisions contribute to the public good's stability, strength and harmony. CSR has transformed its substance from haphazard company philanthropy to regulated activities and, later, CSR initiatives. According to Logan et al. (1997) and Waddock (2004), the CR involves the company's business model, company strategies, nature and societies. Porter and Kramer (2011) discuss that business has been increasingly viewed as a cause of economic, social, and environmental problems. CSR can improve the corporate's reputation and cause positive externalities. These authors demonstrate that shared value is not only about 'personal values'. The corporate shared value concept (CSV) focuses on expanding the connection between economic progress and societal aspects using value principles. CSR gradually includes human resource diversity indicators, as this aspect of corporate responsibility characterizes the potential of invention and competitiveness (Dvorakova, 2017).

What is more, companies can create economic value by creating societal value. They have started by investigating factors supporting the company's productivity (for example, environmental impact, supplier access and viability, employee skills, worker safety, employee health, water use, and energy use). According to Bednarikova et al. (2014), Bažantová & Charvatová (2018) safety and healthy working conditions and environment are the basic aspects of social welfare of a company. There are a lot of factors affecting employee motivation in the company. Some of them are supported by law, while others result from voluntary activities of the company, and the way to some of them still have not been found (Vavra et al., 2021). Finally, the article "Creating Shared Value" (Porter & Kramer, 2011) represents the idea that current opportunities are not static, societal priorities change, economies develop, and technologies improve everyday life. Currently, CSR is shifting in line with social and environmental changes, and incorporating it into the company's business model can generate economic value.

A sustainability report as a sustainability reporting tool demonstrates an organization's strategy and commitment to a sustainable global economy and generally accepted objectives related to sustainable development. Sustainability reporting offers transparent communication, specific measures and a deep understanding of the connection among economic, environmental, social and governance goals. The preferred international framework for reporting based on the "triple bottom line" was defined by the Global Reporting Initiative – GRI (2014). This initiative is one of the leading frameworks in the sustainability area. The GRI Standards enable any organization to report their impacts on the economy, environment and people, and their contribution to sustainable development. The triple bottom line means three pillars of sustainable development. They are economic, social and environmental pillars.

On the other hand, many companies opt for their reporting to include sustainability indicators. In 2014, companies were reporting on a voluntary basis. Under the Non-financial Reporting Directive (NFRD), 2014/95/EU, selected companies (especially banks, insurance companies and publicly traded companies) with 500 or more employees, were *"required to publish reports on the policies they implement in relation to social responsibility and treatment of employees; respect for human rights; anti-corruption and bribery; and diversity on company boards (in terms of age, gender, educational and professional background)"* (Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 Amending Directive 2013/34/EU as Regards Disclosure of Non-Financial and Diversity Information by Certain Large Undertakings and Groups Text with EEA Relevance, 2014)

In October 2022, the EU will adopt the Corporate Sustainability Reporting Directive (CSRD), amending the previously applicable Non-Financial Reporting Directive (NFRD), while extending the scope of entities to whom it is applicable (Proposal for a Directive of the European Parliament and the Council Amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as Regards Corporate

Sustainability Reporting, 2021). The CSRD represents a new mandatory standard and specifies amended rules. According to the CSRD directive, companies and institutions will publish information about their environment-related activities and attitudes, social areas (e.g., employee care) and company management (governance). The CSRD will be obligatory to all entities, meeting at least two of the following criteria: they have more than 250 employees, their annual net turnover exceeds 40 million euros, or their annual balance sheet total is more than 20 million euros. Also, CSRD will be mandatory for publicly traded companies with the exception of micro-enterprises. The CSRD directive will enter into force in 2025 but will already apply to the fiscal year 2024, affecting many companies that will be obliged to report worldwide.

There are several reasons why the EU joined CSRD, but the main one is the effort to cope with climate change and other adverse effects on the environment and society. This effort is nothing new; for example, in the financial world, it is increasingly common to consider the company's approach to sustainability, i.e., the so-called ESG (environmental, social, governance) point of view and the company's ESG score. It takes into account, among other things, the impact of the given company on the environment and society in general or its overall transparency. For example, how a company has incorporated ESG principles into its strategy and day-to-day operations is an essential metric for some investors, which is why many companies already routinely report their results in this area.

Environmental, Social, and Governance (ESG) standards are based on the principle that companies could perform better in the stock market.

Therefore, non-financial reporting complying with the CSRD will be necessary for companies applying for investments or loans to obtain capital. It will be assumed that companies providing the required non-financial reporting and having a positive attitude towards sustainability issues will be seen as more competitive, reputable and trustworthy. However, so far, non-financial reporting has been defined in general terms only, and individual indicators according to which companies should report have not been established yet.

Along with the rules mentioned above, the CSRD takes into consideration the needs of the European Green Deal.

The European Green Deal (EGD) was adopted on December 11 2019. The action plan on sustainable finance is the key pillar of this document. The main aim of the EGD was to transform the Union into a modern, resource-efficient and competitive economy. According to the EDG, the EU is supposed to become climate-neutral, achieving a net-zero emissions balance by 2050 while respecting the priority of protecting human life, animals and plants. Another goal is to help companies become world leaders in producing clean products and adopting new technologies. The European Commission committed to reviewing the non-financial reporting provisions of Directive 2013/34/EU of the European Parliament and the Council. Another essential document is the Biodiversity Strategy for 2030, specifying the steps to be taken concerning Europe's biodiversity on a path to recovery by 2030. Last but not least, it is essential to mention that in November 2021, the International Sustainability Standards Board (ISSB) was established.

Along with these, in June 2021, Value Reporting Foundation (VRF) was formed, representing the merger of the International Integrated Reporting Council (IIRC) and the Sustainability Accounting Standards Board (SASB) (*IFRS Foundation and Value Reporting Foundation Complete Consolidation*, 2021). The IFRS Foundation completed the consolidation process with Value Reporting Foundation in August 2022. The VRF will work with SASB Standards in the process of the development of the IFRS Sustainability Disclosure Standards. In addition, developing European Sustainability Standards, which are expected to integrate key elements of existing voluntary initiatives like TCFD (The Task Force on Climate-related Financial Disclosure) and GRI (The Global Reporting Initiative) standards, will help streamline the reporting process.

3. SUSTAINABILITY STRATEGY AND ESG FACTORS IN SUSTAINABILITY REPORTING

The fundamental principles of the establishment of a framework to facilitate sustainable investment is anchored in the Regulation (EU) 2020/852 of the European Parliament and of the Council (Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the Establishment of a Framework to Facilitate Sustainable Investment, and Amending Regulation (EU) 2019/2088 (Text with EEA Relevance), 2020). In Article 4 of this EU Regulation, acting in accordance with the legislative procedure involves the following areas if competitiveness should be achieved in the long run: *“Sustainability and the transition to a safe, climate-neutral, climate-resilient, more resource-efficient and circular economy are crucial to ensuring the long-term competitiveness of the Union economy”*. Along with other stipulations, the ESG goals can be achieved through the increase of private sector funding of sustainable business activities and also by channelling of capital flows towards sustainable investments (Article 9).

The current situation in sustainability reporting can be viewed as a transformation process. The reasons are twofold. Firstly, incorporating CSR activities at strategic and operational levels affects every company department. Secondly, apart from reported quantifiable outcomes, disclosures and reporting are of qualitative and descriptive character. It is also given by incorporating the ESG factors (as well as related indicators) into the concept of newly established sustainability reporting. For example, if you are supposed to report on water management, welfare initiatives and business ethics or corruption, you are more likely to report in writing, describing in detail your company’s particular activities. If companies aim at reporting quantitative data, then the format of infographics is recommended to make the numbers and their visual representation easier to understand and remember.

In scientific literature, researchers focus on different aspects of the sustainability reporting during the transformation process. In their article published in 2022 concerning ESG indicators, Sahin et al. write about a Missing “M” pillar, highlighting the opinion that *“to explicitly capture the not yet published information on ESG category scores, a new pillar, the so-called Missing (M) pillar, is proposed and added to the new definition of the Environmental, Social, Governance, and Missing (ESGM) scores”* (Sahin et al., 2022). They argue that by introducing a new ESG and Missing (M) pillar score, they impact the risks and support investment decisions. A lack of commonality concerning the characteristics, attributes and standards in defining ESG indicators is often the subject of criticism in some research papers (Billio et al., 2021).

Another aspect is the impact on corporate profitability and economic results. In their study with focus on understanding the impact of ESG practices in corporate finance, the authors bring evidence that there is a positive effect of ESG factors on corporate profitability and credit rating (Kim & Li, 2021).

Regarding ESG, we know that sustainability has become an essential obligatory part of non-financial reporting obligations for many companies. Representing the opinion of business practice, the authors of the comprehensive whitepaper *“ESG: Align your corporate strategy with the future”* highlight that *“the pressure to demonstrate sustainability in the context of ESG performance is growing”* (Brauweiler & Horsch, 2022). This educational whitepaper on sustainability presents ESG criteria as a foundation for competitiveness.

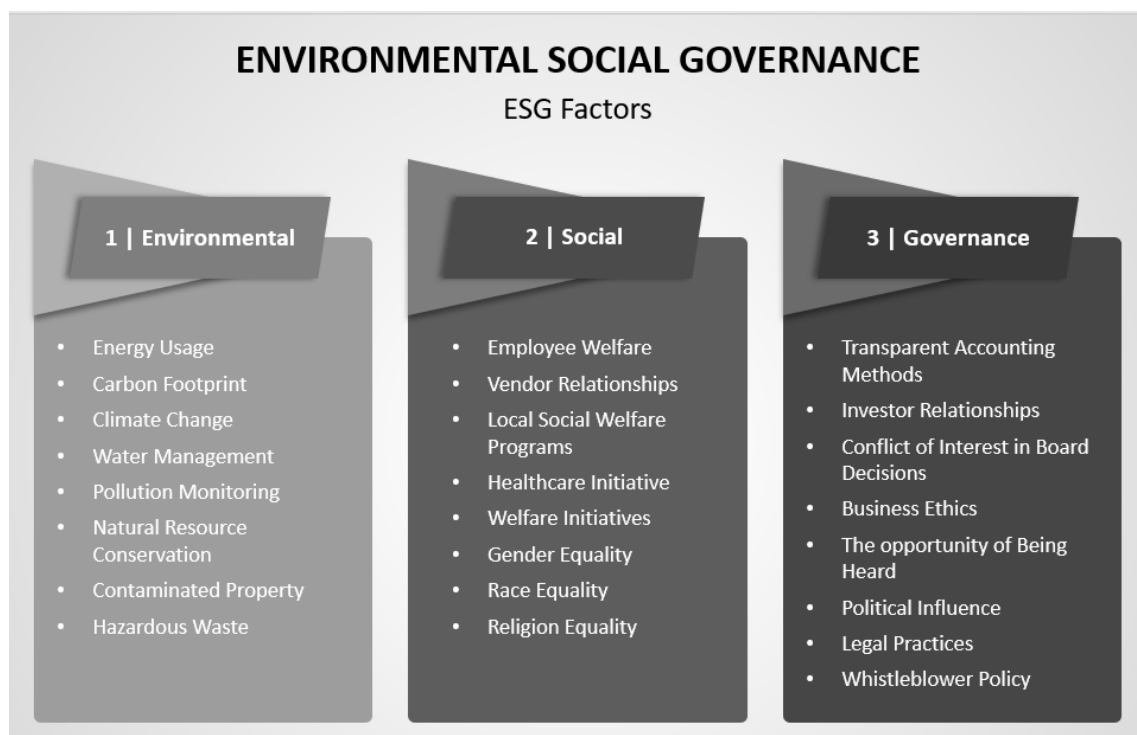
According to European Commission (2020), Science, research, and innovation performance of the EU 2020 – A fair, green and digital Europe: *“consumers are increasingly putting pressure on companies to become more environmentally friendly, with millennials leading this push for change in organisations”*. The survey conducted by the Confederation of

Industry of the Czech Republic (Průzkum_SPCR_udržitelnost_vysledky_25072022, 2022 / Sustainability – The Survey SP ČR, 2022) among 100 industrial enterprises in the Czech Republic, showed that 87% of respondents are actively involved in sustainability. For 60% of respondents, sustainability is important for the company's competitiveness. More than 70% of the companies interviewed are aware of the upcoming legislation by the European Commission.

As mentioned above, so far, there is no unifying specification of indicators, set of standards or metrics to be reported within the ESG factors. In sustainable reporting, the ESG (environment, social, governance) concept complements the existing CSR (corporate social responsibility) reporting. Both concepts co-exist, fulfilling slightly different roles. *“The EU taxonomy and corresponding legal requirements has specified a classification system for sustainable business activities, aiming to guide capital flows in a way that supports sustainable development, climate-neutrality, a circular economy and biodiversity. The upcoming revisions to sustainability reporting will also extend non-financial reporting obligations to a far wider range of companies”* (Brauweiler & Horsch, 2022).

According to Brown et al. (1987), sustainability comprises three factors: economic, environmental, and social. There are many approaches, but common indicators are: *“i) human life on earth; ii) a long-term maintenance of the stock of biological resources; iii) stable human populations; and iv) the quality of the environment and ecosystems”*. The ESG criteria are important in creating value for both company and society. Sustainable Development Report (Sachs et al., 2022) defined the SDG Index from the macro perspective. It assesses each country's overall performance on the 17 SDGs, giving equal weight to each Goal. There are six core transformations in connection with: *“i) education and skills, ii) health and well-being, iii) clean energy and industry, iv) sustainable land use, v) sustainable cities, and vi) digital technologies”*. Sassen et al. (2016) calculated ESG pillar scores. The environmental score (ENS) measures and represents: *“a company's impact on its natural living and non-living environment (including air, land, and water)”*. The social pillar score (SOS) measures and represents: *“a company's capacity to generate trust and loyalty with its workforce, customers, and society”*. The corporate governance pillar score (SOS) measures and represents: *“a company's systems and processes that aim to ensure that its board members and executives act in the best interests of a company's long-term shareholders”*. Fig. 1 represents a sample of such indicators.

Figure 1. ESG factors and indicators



Source: own elaboration using the visual from SketchBubble

Based on the literature search and numerous expert sources (specifically sustainable and annual reports), it is obvious that the dispersion of indicators is considerable, and each reporting company prefers its own set of indicators. Therefore, it is logical to assume that companies use the indicators that are more relevant to their operations and represent areas where the reporting company is more engaged, committed and active.

4. METHODOLOGY AND RESULTS

In their publication *Bryman's Social Research Methods*, Clark et al. define the research method of content analysis as “an approach to the analysis of documents and texts that seeks to quantify their content in terms of predetermined categories and in a systematic and replicable manner” (Clark et al., 2021, p. 606). The research was carried out by using conceptual content analysis. Christie (2007) defined conceptual content analysis as a research tool that helps quantify the number of times a text or word appears in a particular text. It is also known as text data mining, the process of transforming unstructured text into a structured format (IBM, 2022).

“Content analysis is one of the most important research techniques in the social sciences. It acknowledges that society is enacted in talk, texts, and other modalities of communication and that understanding social phenomena cannot be achieved without understanding how language operates in the social world. [...] Interpreting communications as texts in the contexts of their social uses distinguishes content analysis from other empirical method of inquiry” (Krippendorff, 2018).

While evaluating the results of content analysis, there are some advantages and disadvantages. Namely, it is very transparent, it can be longitudinal, it is very flexible, and it is unobtrusive. The main disadvantage is the fact that it depends on the quality of the analysed documents (Clark et al., 2021, pp. 290–291).

As a tool helping to quantify the number of times a certain word or phrase appears in a documents, it serves well for the purpose, i.e. to carry out conceptual content analysis of selected sustainable reports. The main reasons for selecting this research method is objectivity and the fact that it is systematic.

The research questions were formulated as follows:

- RQ1 Do the analysed companies use the keywords associated with ESG factors and indicators with an increased frequency over time in their sustainable reports?
- RQ2 Is there any evidence testifying to the fact that the increased frequency of keywords associated with ESG factors and indicators can serve as an indicator of gaining a competitive advantage?

The sample of analysed documents, i.e., sustainability reports of selected companies, consisted of 10 companies, 20 sustainability reports, 9 indicators specified in the total of $\Sigma=180$ entries.

The conceptual content analysis was carried out manually and the data obtained were synoptically arranged in the table below.

Table 1 Conceptual content analysis of Sustainability Reports 2017 and 2021

	Environ- mental		Social		Govern- ance		Carbon footprint + Emissions		Climate change		Local commu- nity		Working conditions + workplace		Educatio n		Business ethics	
	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1	201 7	202 1
1	121	236	5	31	1	110	172	168	13	22	0	1	0	32	1	90	3	13
2	110	37	1	0	0	0	170	153	10	3	1	0	0	0	0	0	0	0
3	x	163	x	25	x	132	x	352	x	20	x	7	x	9	x	23	x	3
4	47	130	29	10	10	7	20	541	10	16	0	2	4	0	1	8	2	0
5	47	192	33	87	24	284	20	178	1	36	0	0	2	10	10	41	0	102
6	71	56	22	37	15	14	59	88	29	29	3	1	16	38	27	46	0	1
7	24	42	6	27	20	39	28	42	12	10	2	1	6	7	18	23	0	0
8	x	72	x	37	x	138	x	223	x	65	x	1	x	19	x	13	x	1
9	57	185	132	190	29	162	15	101	0	10	0	1	0	8	57	32	0	2
10	22	122	113	134	4	8	0	53	0	13	2	1	78	15	32	24	1	2
Σ	499	1235	341	578	103	2915	894	1899	75	224	8	15	106	138	146	300	6	124

Source: own elaboration

Legend: The below-stated list of 10 analyzed companies is based on the Kantar BrandZ Most Valuable Global Brands 2022 (Discover the Kantar BrandZ Most Valuable Global Brands, 2022).

1 – Apple	6 – McDonald's
2 – Google	7 – Visa
3 – Amazon	8 – Facebook (Meta)
4 – Microsoft	9 – Alibaba Group
5 – Tencent	10 – Louis Vuitton

The set of selected indicators is based on the literature review complemented by the results of the authors' non-participant observation of corporate practice. Their selection is compiled based on the most frequently recurring indicators.

The data obtained from the content analysis of the sustainability reports of selected companies, representing the most valuable global brands, show that ESG factors and indicators are increasingly used by companies. In all cases, i.e., the calculated total frequency of all keywords representing factors and indicators, in 2021, the occurrence is higher, sometimes even

considerably higher, than in 2017. The time interval of 5 years between 2017 and 2021 is long enough to identify trends observable in sustainability reporting. It can be concluded that companies are fully aware of the importance of CSR and they ever more incorporate related CSR activities into their business strategies.

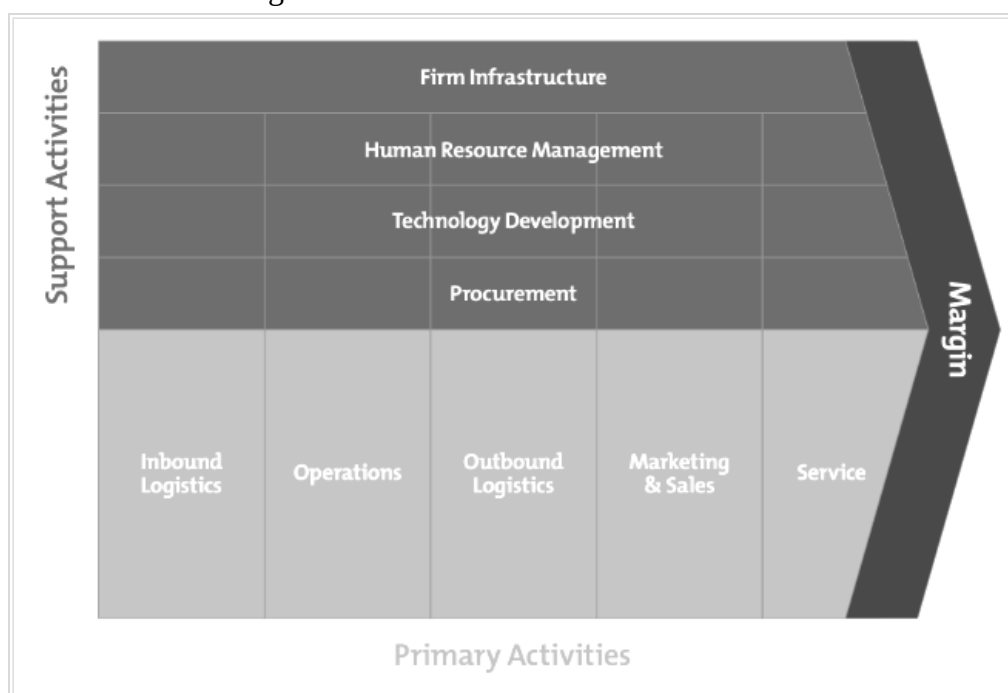
5. TURNING ESG INTO COMPETITIVE ADVANTAGE

The company's activities and possible consequences are carefully monitored, examined, and evaluated by its stakeholders. However, it is the investors who have an intelligible interest in progressive companies and their operations. While analyzing their investment opportunities, socially concerned investors need fast, reliable, and well-arranged information. For them, therefore, a systematic approach to sustainable reporting using ESG factors provides a rapid orientation through the jumble of data and often disparate findings.

In their Harvard Business Review article, Porter and Millar (1985) wrote about how information gives you competitive advantage the following: *“A business is profitable if the value it creates exceeds the cost of performing the value activities. To gain competitive advantage over its rivals, a company must either perform these activities at a lower cost or perform them in a way that leads to differentiation and a premium price (more value)”*.

From the viewpoint of customer behaviour, especially in hypercompetitive business sectors, it is crucial to provide higher value than your competitors. We can do it in many different ways. In their article, Mind Tools Content Team describes Porter's Value Chain (Porter's Value Chain, 2018). According to their explanation, Porter considers the organization's value chain a strategic management tool, and he suggests finding a link between typical primary and support activities of businesses. In his opinion, the connection between both types of activities is a key to competitive advantage. It can be exemplified by the impact of HR concern about employee training and its impact on business performance. Figure 2 shows the division between primary and support activities common to all businesses.

Figure 2. Elements in Porter's Value Chain



Source: (Porter's Value Chain, 2018)

Sustainable reporting using ESG factors is rising on the corporate agenda. It is part of modern marketing communication focused on internal and external publics. The higher the communication standards, the stronger the impact on the recipients of such structured information. In their recent article for Fortune, Schear et al. write about the "old ways of thinking" in relation to performing sustainable reporting as 'compliance and box-checking approach' only. The authors explain their current understanding of the role of ESG factors in sustainable reporting as follows: *"The companies that will lead in this context go beyond a generic, box-checking approach. They pursue what we call Authentic ESG—a commitment to environmental and social impact that is driven by a deep sense of purpose, embodied within the organization, woven into the business, and integral to their brand story. They go beyond a compliance or contribution mindset and instead view ESG as a competitive advantage"* (Schear et al., 2022).

The data obtained through the conceptual content analysis of sustainability reports with a 5-year interval (2017 and 2021) has provided evidence of the increasing importance of ESG factors in sustainability reporting as it is practiced in corporations today. For most of the indicators analyzed, there was an increased occurrence of selected keywords (factors and metrics), which can be equated with the increased interest of organizations in sustainability.

If companies aim at achieving and enjoying the benefits of a competitive market position achieved through well-designed marketing communication in the long run, then the integration of clearly defined and understood ESG factors and related indicators used in sustainable reporting seems to be a step in the right direction. Thus, ESG factors and their integration into the structure of sustainable reports can be viewed as a source of competitive advantage.

6. CONCLUSION

This paper's objective was to *assess the potential of ESG factors and related indicators to influence the perception of companies in terms of their competitiveness*. Two research questions were formulated and a representative sample of companies was compiled with the highest care, based on the Kantar BrandZ Most Valuable Global Brands 2022. Simultaneously, a set of the most frequent keywords related to sustainability and the ESG factors was compiled. The conceptual content analysis of a sustainability reports' sample of business entities operating in different sectors was carried out. It has provided persuasive evidence testifying to an ever-higher occurrence of the analyzed keywords representing ESG factors and indicators. The research was designed as a cross-section analysis, covering the years 2017 and 2021. The 5-year time interval is long enough to consider the results to be *an evident trend in non-financial reporting*.

The research questions were answered positively:

RQ1	Do the analysed companies use the keywords associated with ESG factors and indicators with an increased frequency over time in their sustainable reports?	YES (based on the content analysis findings)
RQ2	Is there any evidence testifying to the fact that the increased frequency of keywords associated with ESG factors and indicators can serve as an indicator of gaining a competitive advantage?	YES (literature review and corporate practice evidence)

Early recognition and accurate understanding of market signals is of major influence and significance in determining a competitive strategy. In relation to sustainability, it is doubly true.

Timely recognized market signals and stakeholders' interest in sustainability issues impact the brand perception, brand preference and brand value in a positive way. For investors, this information is an essential guide to their investment decisions.

The year 2024 is quickly approaching, and it is a significant milestone for implementing the new ESG and CSR concepts. The absence of a consistent ESG definition and the delineation of the relevant indicators is an obstacle to the timely familiarisation with the latest concepts and their consequent implementation into the corporate practice. Corporations and other business entities need sufficient time to prepare the relevant guidelines and internal processes. If all requirements are not clarified and defined in time, there is a real risk of not fulfilling the socially critical sustainability mission.

The authors of this study are fully aware of some research limitations consisting mainly in the limited extent of the research sample. On the other hand, the findings of the conceptual content analysis are objective, structured and unbiased.

In terms of further research suggestions, the researchers should focus on addressing the questions related to causality, i.e., whether a thoughtful investment in sustainability translates into economic performance, to what extent and over what time horizon. Also, the research focus on Gen Z as an especially sustainability-conscious market segment would provide valuable insights.

Using standardized indicators over a longer time contributes to the easier comprehension and higher added value of these reports for the needs of investors and other stakeholders. Reliable information in this respect is of great importance to corporate management. As a long-term business strategy, corporate commitment to sustainability-related issues is the alpha and omega of their future success and, indeed, a significant benefit to society. Therefore, companies' sincere engagement in this area is a positive signal for successful sustainable entrepreneurship with a significant competitive advantage.

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A CASE STUDY IN FAILURE OF GERMAN AND EU CAPITAL MARKET SUPERVISORY SYSTEMS – THE WIRECARD CASE

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Abstract: *This article discusses the consequences of the failures in one of the biggest fraud cases in Europe – Wirecard AG. Wirecard was a German company, an electronic payment provider. The firm was founded under a different name in the end of the nineties and a couple of years later acquired a failing company called Wirecard and then an almost bankrupt small bank which after the merger enabled them to have a banking license. From Wirecard the new firm took over the then CEO Markus Braun, who later hired the high-school drop-out Jan Maršalek as his personal assistant. Maršalek later took on the position of COO. Thus, the stage was set for one of the most ingenious and effective frauds ever seen in Europe.*

What makes this case so remarkable is not that fraud was at the core of the business right from the beginning. But despite numerous red flags, all supervisory authorities failed to investigate what was going on in the firm. The auditors EY signed the reports without checking the truthfulness of the company's declarations for more than a decade, politicians enthusiastically endorsed Wirecard as the start of a German Silicon Valley, the BaFin (The German Federal Financial Supervisory Authority) instead of follow up reports about not-existing customers and non-existing cash in Asian trust accounts even issued a warrant against the FT journalist Dan McCrum accusing him of market manipulation and collaborating with short sellers. The German law enforcement didn't investigate the allegations against the firm but focused on the journalists, bloggers, and some short sellers.

The case is open, litigation is ongoing. Prosecution just charged Markus Braun with balance sheet manipulation, fraud, and other crimes. Maršalek was let go and was recently seen in Moscow. Even though he probably was the mastermind of the fraud, German law enforcement only released an international warrant when he was already gone, and it was too late.

Keywords: *fraud, auditors, Wirecard, law enforcement, political responsibility*

INTRODUCTION

The Wirecard scandal shook not only the whole political class in Germany but the country. Especially the many small investors who lost their savings were distressed. Nobody could imagine that a solid country like Germany could produce an ENRON-like financial fraud scandal. Nobody anticipated in all the enthusiasm to finally be able to compete against the all-mighty Silicon Valley with a German FinTech firm that when something is too good to be true it probably isn't. The public discourse in Germany has still not decided if this was mainly owed to malicious lobbying by a company which acted like a mafia organization or if it was just naivete or stupidity in the case of the many public supporters of the firm and its management.

The story however is surprising in many areas. Looking back into the publishing of the Panama Papers of the International Consortium of Investigative Journalists (ICIJ) a couple of years ago when the illicit hiding of money in tax havens and shell companies was revealed, people were quite sure that you can't trust the wealthy and that there are two rules for the rich and the "normal" people. When you ask people in the streets (what journalists and media sometimes do) if they would trust companies, the majority says that they don't. So how was it possible that the company could without publishing any hard facts about its businesses could deceive so many people into not only believing into the lies but also investing in them? And

why did people invest money into a company and an industry they basically knew nothing much about?

There were indeed many players in the field of supporting Wirecard. A special role played the auditors – in this case EY. Furthermore, the company was strongly supported by all sorts of politicians, and it is known that the CEO, Dr. Markus Braun, spent his days in his office watching the stock prices on his smart phone and sending out numerous press releases. The management, especially the vanished COO, Jan Maršalek, was known for its aggressive lobbying. The only aim was to generate trust and thus investors.

The main disappointment certainly was the negligence of the auditor company EY which testified the financial reports for more than 10 years without asking many questions. However, the German Government, especially the BaFin seemed to have also closed its eyes and acted almost as an enforcer for Wirecard. Many politicians in Berlin and especially in Munich endorsed Wirecard over and over again, and even the Munich prosecution played a very dark role in this drama.

The question this article deals with is: Are there any sustainable lessons learnt from that scandal? What happens next – and is it enough to prevent cases like that in the future? Which role should auditors and government control bodies play in the future? What needs to change?

WIRECARD AG – THE COMPANY

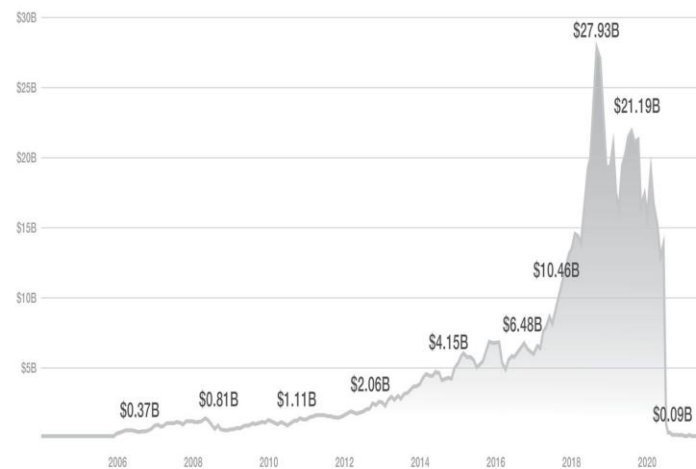
Wirecard was initial founded under name Electronic Billing Systems in 1999 in a small town near Munich by the entrepreneur Paul Bauer-Schlichtegroll. The firm's business was stated as electronic payment provider. It was the beginning of online purchase, and so enabling payments for these online businesses seemed to be a good idea.

The company's name was changed into "Wirecard" after an acquisition of a small almost insolvent firm of that name. With this acquisition Markus Braun came into the firm. Later the founder bought a small almost insolvent bank which enabled Wirecard to get a banking license, which it otherwise never would be entitled to get. Thus, the firm could start into big business. Or so the managers of the firm thought. They were not wrong, but the business started already in shady grounds. The main online markets were gambling and pornography. Not that the company had any problems with that. But the legislators had, and around 2000 online gambling was not allowed anymore, and many lucrative porn sites moved into advertising based free-of-charge platforms. The result was that Credit Card firms didn't process payments from these businesses anymore. Wirecard became creative.

Nevertheless, Wirecard was listed in 2005 in the Deutsche Börse's Prime Standard market segment. It became a leading fintech company in Germany, focusing on payment and risk management services in the debit and credit card business in Europe, Asia and America. It moved up to the Tec Dax in 2006 and, in 2018, to the DAX, the top index segment of the German market. (Langenbucher et al., 2020, p. 8)

Markus Braun took over as CEO in when Paul Bauer decided to get out. He hired the Austrian self-proclaimed Wizz-kid Jan Maršalek. Maršalek was a high school dropout, telling everybody how proud he was not having a proper school education. He pretended to be a computer genius. It soon turned out that he was not. He was however a great communicator, and as we know now, he had endless criminal creativity and energy. It was all a matter of opportunity. And the proclaimed profits, cash flow and customer numbers seemed to grow constantly.

Market cap history of Wirecard from 2003 to 2021



(McCrum, 2022, p. xiii)

CORPORATE GOVERNANCE

There were a lot of issues which should have raised concerns in the financial markets. Some employees still give today tearful TV interviews in Germany claiming that it was such a great company. However, the corporate culture and governance was more than shady.

The management spent money like water, on themselves (the CEO Braun had a Maybach with chauffeur as CEO and a separate garage in the office building with a direct elevator to his office) and on expensive parties for some employees and a lot of people somehow connected to Maršalek. Maršalek was travelling almost all the time. When he became COO he was responsible for the Asian business. It seems that nobody questions his behavior or looked closer into his business deals.

When we consider Corporate Governance, it should be extremely unusual when in management and especially board meetings nobody ever took any minutes. Communication between Marsalek and his partners and internally was done on his private phone and on the platform Telegram. Even his proclaimed software developments which in the end didn't exist were done on his private notebook.

In German TV statements former employees report that in the company a complete lack of transparency was usual. This is supported by business journalists and market analysts. It is a mystery why so many investors stayed with the firm even when they were warned. One small investor said in a German TV interview that one of his friends warned him, saying that he shouldn't pour money in something he knew nothing about. He wouldn't listen. ("Wirecard – Game Over," 2021)

Maršalek had lots of shady contacts. While keeping his extensive office in the Wirecard building, he moved into a villa in the center of Munich for negotiating his more clandestine deals. Today it is no surprise anymore that this villa was just across the street from the Russian General Consulate. Maršalek had lots of connections to several Secret Service organizations, especially in Austria but also in Libya. These contacts and the reluctant German law enforcement helped him to get away. Today he lives the good life in Moscow. ("From Munich to Moscow", 2022)

EARLY RED FLAGS – A COMPLEX AND COMPLICATED BUSINESS MODEL

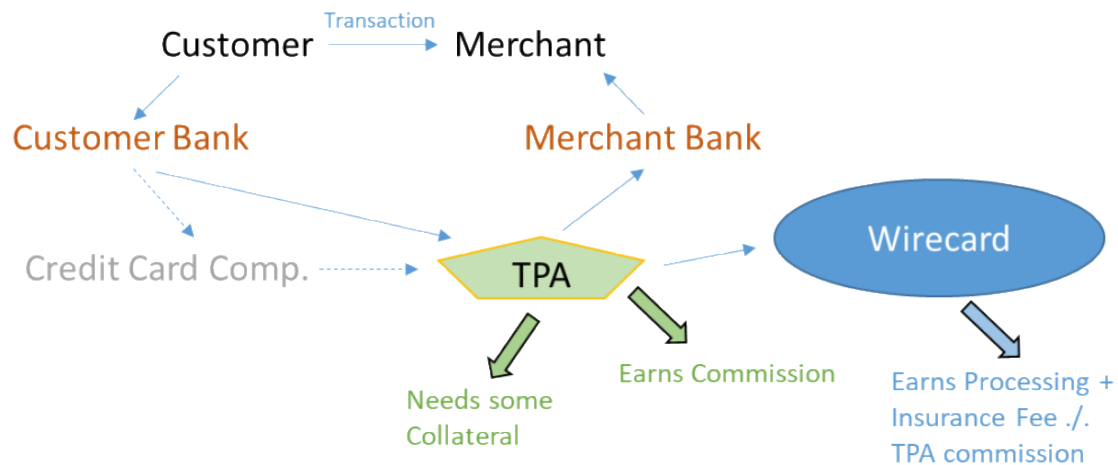
Right from the beginning in the late 90's the company was operating at the threshold of legality. The then popular “dialers” were meant to enable payments from online purchases – the infamous 0190 numbers which customers paid via their phone-invoices. Main customers in those days were porn-site users and online gamblers. The prices were extremely high. The founder of the company, Paul Bauer, had a license from the US Hustler magazine which he took online. And he wasn't much concerned if what the firm did was legal or not. When the US government banned online gambling, he moved the operation to Gibraltar where the controls were not very strict and tricked the credit card companies by creating “e-wallets” for gambling customers which had a neutral identification number so that the payments couldn't be traced anymore. So illegal business procedures started quite early.(Haseborg & Bergermann, 2020, p.15ff)

After having acquired the firm WireCard, Dr. Markus Braun, former KPMG consultant, became the new CEO of the company. The firm still did its main business with gambling and pornography. And the business was successful. To process the payments, it needed a bank. As it was impossible for such a new and small company to get a banking license, Braun bought the German branch of an American private bank XCom. The Americans were pulling out of Europe, their business was failing, but the German branch had a banking license.(Haseborg & Bergermann, 2020, p. 52f) This opened the opportunity to issue credit cards, mainly a Principal Membership of Mastercard and Visa. The bank was renamed Wirecard Bank. The firm went public, but again not with a regular IPO. They acquired a failing online-legal consultancy Infogenie, which was listed at the stock exchange and transferred their business into this organization. The name of the now public company became WireCard AG. The firm denied that its success was mainly based on online gambling and pornography, but they needed some “normal” customers to polish its image.

Markus Braun was the CEO and Paul Bauer became the head of the supervisory board. Braun later left the firm; he sold his shares completely. Braun needed a new partner, and he hired the high school drop-out Jan Maršalek. Braun and Maršalek were both from Austria. The stage was set for the big game.

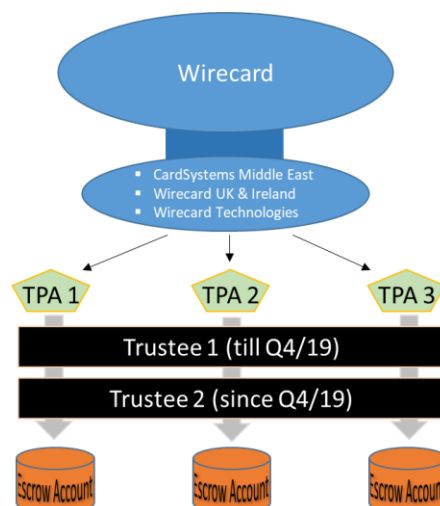
Maršalek became the mastermind behind the fraud. He was soon promoted COO and took over the responsibility for the developing Asian business. As WireCard didn't have any bank licenses in Asia, the business model was based on partnerships and escrow accounts. Maršalek also acquired several companies, especially in India which turned out to have no experience in WireCard's business. After the collapse of the firm, it turned out that what the investigations mainly of the Financial Times revealed were correct: the firms were bought to a much higher price than the value of the firm justified, and the surplus was shifted to anonymous shell company accounts on the Maldives. In the end Maršalek only cooperated with three partners, and they were all fake. The supposed \$1.9 billion in the escrow accounts didn't exist.

The business model looked like this:



“The Third-Party-Acquirer (TPA) business model. Here, Wirecard makes use of partners in the respective region (and which hold a banking license), pays a commission fee to them and provides security deposits so that the TPA is not running into danger to stand in for any problems that arise in the customer-merchant transaction. ... Wirecard also offers a so-called merchant cash advances (MCA) or digital lending. This is not a business model per se but rather an additional value-adding service. Here Wirecard or TPAs offer some sort of early settlement of the transaction to the merchant, i.e. they do not go for the delayed payments as explained above. This service can be understood as some sort of working capital financing to the merchants. Of course, it needs a quite deep risk assessment of the merchants to optimize this business. And if it is performed by TPAs higher security deposit payments are necessary than in transactions without MCA as the financial impact of transactions problems is now bigger for the acquirer.”(Meitner, 2020)

In the end the firm only had three partners which were operating from Dubai, Singapore, and Manila:



“The business flows in the TPA business are mainly as follows: Cash comes in from the customer (or the credit card company), a part of it is kept as a commission fee (1), a part is used to feed the escrow accounts (2) – these amounts were quite material as the growing business required a growing deposit (see also KPMG report, section 1.3.1.1.3). And some parts flow to Wirecard (3).”(Meitner, 2020)

The whole set-up was extremely complex and a group of employees under a special Asian CFO Edo Kurniawan was installed whose only task was to produce fake invoices from customers which didn't exist. Also, the escrow accounts didn't exist.

WireCard AG managed to enter the prestigious German DAX, and Braun and Maršalek were at the peak of their activities. Braun was meanwhile the largest shareholder of the firm. But when the company became member of the DAX, lots of people and professional investors started to buy shares. As the case is still open, many lawsuits are to follow.

THE INVESTIGATORS

The company was under scrutiny almost right from the beginning. A German blogger got so frustrated that the family of his nephew had to pay a huge amount of money by using a website which was connected to a hidden dialer, that he started to investigate. He started to check the available numbers and published his result in a blog.(Haseborg, n.d.) He called himself JigaJig. Another early investigator was the finance consultant Thomas Borgwerth. He also doubted the numbers WireCard was reporting, and he questioned the business model. 2016 a German journalist Heinz-Roger Dohms asked WireCard about Borgwerth's findings and got the standard PR answer, that WireCard had to cooperate in Asia with partners and local banks as it needed a banking license for its business.

WireCard immediately started to put a lot of pressure on any critics. The company even sent some heavy weight boxers to threaten some people.

The story gained momentum when the Financial Times journalist Dan McCrum started to get interested in the firm. He also realized that the numbers didn't add up. And the FT now went deeper into the investigation. FT journalists traveled to Asia and tried to find the partners and customers. It was soon clear that they didn't seem to exist. The journalists found just a glamorous façade, but nothing could be substantiated. However, Maršalek started to feel threatened. WireCard spent almost half a million Euro for following not only McCrum but also some short sellers who equally doubted that WireCard was "real". 2016 the Zatarra Report was published anonymously. It later turned out that the authors were some short sellers. Unfortunately, some information in the report were false. (Research, 2020)But it gave WireCard the opportunity to go after Dan McCrum, accusing him of collaborating with short sellers and thus criminalizing him. The company even managed to obtain a warrant against McCrum, a PR coup aiming to "shoot the messenger". Furthermore, McCrum and his family started to get threats, as did the FT editor. Attempts were made to bribe the newspaper out of the investigation. Whatever FT published was scrutinized by lawyers, as WireCard immediately threatened with litigation.

While the FT had already a lot of insider information, the breakthrough came when 2017 a whistleblower from Singapore got in touch. Pav Gill is a lawyer who was hired to supposedly make sure that the WireCard Asian business was following compliance rules and regulations. He was contacted by an employee from the secret group of Edo Kurniawan who forwarded a set of documents proving the fake invoice scheme. When he gave this information to WireCard HQ, Maršalek immediately took over. He was soon after that incident fired. He finally got in touch with FT and submitted the proof the investigation team was looking for.(McCrum, 2022, p. 152ff) McCrum as agreed on with Gill sent all the documents anonymously to German supervisory and prosecution authorities. Unfortunately, nothing happened. Instead, the pressure on any critic, especially the FT, increased.

It took another 3 years until the house of card finally collapsed.

Interestingly, the German media, including the finance media took the side of WireCard without question. This included the renowned German "Handelsblatt". Only the business

magazine “Die Wirtschaftswoche”, in which an investigative journalist also started to follow up the hype around WireCard, was more reluctant to take a side.

THE SUPERVISORY AUTHORITIES

What makes this fraud case to exceptional is not the fraud as such – there are many fraudulent companies in the world. However, in this case all supervisory authorities failed spectacularly.

EY – THE AUDITORS

One of the most important failures was that EY for more than 10 years signed the annual reports without seeing any problems. Like in the ENRON case, EY had at the same time not only the auditing but also a lucrative consulting contract with WireCard. It seems they never questioned the Asian business, even though when they travelled there, they were met with a group of actors pretending to work in a bank office. They never asked the bank HQ if these escrow accounts existed. Instead, Maršalek took them to expensive restaurants and bars. EY has a certain track record testifying false records. For example they signed the reports for a Canadian company Sino Forest, which was so obvious fraudulent, that a short seller had no problem proving it.(McCrum, 2022, p. 36f) The company has announced to spend \$2bn in the next 3 years to improve the quality of its audits.(Ghouri, 2021) However, EY in June 22 had to pay a record fine of \$100 Million after audit employees cheated on CPA ethics exams. (Robinson, 2022) So some doubts may remain. An investigation about EY in this case was conducted by a German law firm, but EY managed to prevent it from being officially published and added as Appendix to the Investigation Committee Report of the Bundestag based on a technicality. The so-called Wambach Report was later leaked and published by the German newspaper “Handelsblatt”. It was devastating for EY.(magazin, n.d.)

THE GERMAN GOVERNMENT

German politicians played a quite dubious role in the scandal. Many of them relentlessly promoted WireCard, believing that Germany finally had a global player in the tech market. It is doubtful that they had any clue about the business model or the history of the company, and it is safe to assume that they couldn't care less. They fell for the professional PR Braun and Maršalek were showering them with. Germany has an image of being a paradise for money launderers, tax evaders and fraudsters. A German blogger on the website whistleblowersblog.org even talked about Germany as a failed state.(Winters, 2021) The German Government is still trying to stonewall questions about the connections of Maršalek to Russian Secret Services. It was the opposition in the German Bundestag which initiated an Investigation Committee in which member of the government only very reluctantly testified. Chancellor Merkel even promoted the company in China. The report of the Committee has more than 2000 pages and is publicly available. (*Deutscher Bundestag - Schlussbericht Des Wirecard Untersuchungsausschusses.Pdf*, n.d.)

THE GERMAN FEDERAL FINANCIAL SUPERVISORY AUTHORITY (BAFIN)

“In early 2019, BaFin issued a two-month ban prohibiting the short selling of Wirecard shares, and it also launched a criminal complaint against the FT journalist McCrum. But BaFin also sought cooperation with several foreign authorities and, in February 2019, commissioned the German Financial Reporting Enforcement Panel (DPR) to audit the Wirecard 2018 financial statements. After all, pursuant to Section 319a of the German Commercial Code (HGB) there is an Auditor Oversight Body (APAS) in the Federal Office for Economic Affairs and Export Control (BAFA). The latter is still investigating whether there were any errors on the part of the auditors. There was an exuberantly euphoric mood about Wirecard across almost the entire financial sector.”(Möllers, 2021)

That the BaFin took the side of WireCard is one of the worst scandals. McCrum sent the documents he received from the whistleblower Gill also to the BaFin. Nobody reacted. Instead, McCrum was criminalized and accused to cooperate with short sellers.

As the lawyer Möllers concludes: “It appears that BaFin, the German supervisory authority, unilaterally protected Wirecard against attacks by short sellers, and did not take the FT's accusations seriously. The BMF report already indicates that the two-stage control procedure only works to a limited extent, as FREP needs to be involved before BaFin can act. However, only one person at FREP works on the Wirecard case, and has not been able to contribute anything to the clarification since the report was filed on 15 February 2019. If BaFin had been able to immediately initiate a special audit, the scandal would have been uncovered much earlier. Meanwhile, the European Securities and Markets Authority (ESMA) has criticised BaFin's conduct.” (Möllers, 2021)

KPMG

When a new head of the WireCard supervisory board was installed, he hired KPMG to follow up on the allegations and to re-check the EY auditing. Meanwhile, the former WireCard head of accounting, Stefan von Erffa, has admitted that he forged documents for KPMG. However, in the end KPMG had to postpone its report several times which made it impossible for EY to testify the annual report. The house of cards finally collapsed.

GERMAN LAW ENFORCEMENT

German Law Enforcement, namely the prosecutors in Munich, Bavaria, played an infamous role. They relentlessly tried to investigate short sellers, bloggers and journalists, in the end without much success. The close relationship between Braun, Maršalek and the Bavarian Government prevented any real investigation. The WireCard Bank even issued special credit cards to the BKA (Bundeskriminalamt / German Federal Police) and BND (Bundesnachrichtendienst / German Secret Police), which enabled them to follow private and business expenses of police officers. (Storbeck, 2021) Dan McCrum, the FT journalist who was asked to testify in the Investigation Committee of the Bundestag, checked before he dared to travel to Berlin if the warrant, German prosecutors had issued against him, was lifted before he went to Germany. (McCrumb, 2022, p. 302)

THE INVESTIGATION COMMITTEE OF THE GERMAN FEDERAL PARLIAMENT (BUNDESTAG)

Initiated by the opposition in the German Federal Parliament (Bundestag) an Investigation Committee was installed. The Final Report of 2220 pages is publicly available and can be downloaded on the website of the Bundestag. (*Deutscher Bundestag - Schlussbericht Des Wirecard Untersuchungsausschusses.Pdf*, n.d.) Several reforms have been recommended.

THE CONSEQUENCES

One of the immediate consequences were that the head of the BaFin and his deputy had to step down. Law enforcement finally started to investigate the fraud. However, it reacted so late that Maršalek managed to leave the country, supposedly with the help of an Austrian secret service officer. As mentioned above he is today supposed to be in Moscow. Braun turned himself in, was meanwhile charged on several accounts and is since more than a year in remand. He tries to present himself as victim of Maršalek, and it is open if he in the end gets away with it.

The BaFin has a new management and has now more competencies. However, a number of citizens and small investors have sued the BaFin. (“Wirecard’s Regulator Faces Criminal Probe as Scandal Expands,” 2021) It meanwhile turned out that BaFin employees were engaged in insider trading concerning WireCard until the day before the company collapsed. (Welle (www.dw.com), n.d.)

The new head of BaFin criticizes that auditors are too close to clients. (“Germany’s New Accounting Regulator Decries Auditors Who Are ‘Too Close’ to Clients,” 2022) The current government plans to re-structure the whole supervision of companies and the prosecution of white-collar crimes. It remains to be seen what exactly that means. In its latest report from August 22, the global money laundering and terrorist financing watchdog FATF doesn’t give Germany a very positive evaluation. The responsibilities in the country are divided, inter-state collaboration and information sharing is underdeveloped. (*Germany’s Measures to Combat Money Laundering and Terrorist Financing*, n.d.) The current government plans to install a new federal finance police force, which unfortunately doesn’t involve tax evasion. Currently, in Germany there are 320 organizations responsible for investigating and prosecuting white-collar crimes, but in these organizations only 280 employees are working. Many of them are only working part-time, and only very few are professionals. It is no surprise that Germany is considered a paradise for all sorts of criminals. (Reiermann, 2022)

CONCLUSION

The WireCard case illustrates how long criminals can get away with fraud when the supervisory authorities fail – deliberately or because of incompetence. It is true that white-collar crimes are mostly complex and difficult to investigate. However, the first step is to provide law enforcement with the necessary resources not only to investigate but also to prosecute. In Germany, it is still possible to pay even large investments i.e., real estate in cash. Many including the EU demand that cash payments should be limited to a certain low amount.

The surprising issue in the WireCard case is that even analysts and financial experts never seem to have checked the numbers. Nobody seem to have checked out the business model, which gave Braun always the opportunity to say, that their business model was so complex that it is difficult to understand. It was a typical case of the “emperor without clothes”.

The case is still wide open. Lawsuits will follow and it remains to be seen, how this will turn out. However, one lesson anybody who lost money in this case should now have learnt: nobody should invest money in something s/he doesn't understand.

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Interdisciplinary

WHY SHOULD REGULATORS CARE ABOUT CULTURE? THE CASE OF ANTICORRUPTION POLICIES

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Abstract: *This paper focuses on the reasons behind the success and failure of anti-corruption policies. Reviewing several case studies it concludes that vast resources have been spent on this effort without achieving the expected results. Hence, the logical conclusion of suspecting issues with the identification of the problem, the methodology of studies, and the recommended policies. The paper discusses the shortcomings of the currently dominant economics of corruption and the resulting policy recommendations. It concludes that cultural differences—in the shared beliefs and ideas concerning concepts of property, rule of law, and the role of the state—are the missing part of the puzzle. We also propose a way for culture could be included in further research and conclude with a call for the necessity of paying attention to the cultural uniqueness of each society and for fewer generalizations in policy design.*

Keywords: *corruption, culture, economic development.*

1. INTRODUCTION

With the growing influence of Institutionalism in academic and political circles, the enhancement of institutional quality became the priority of international organizations such as the World Bank, IMF, United Nations, and numerous governments. One of the most crucial problems facing governments—especially those of developing countries—and different other organizations of the private sector is corruption.

Corruption is perhaps the most evoked answer when it comes to questions regarding the causes of poverty, underdevelopment, unemployment, and economic inequality. And there are good reasons for the suspicion. Commonsense dictates that a corrupt official wastes public money when diverting it to private purposes, wastes talents and contributes to the brain drain of society when denying qualified individuals opportunities, and disturbs the economic wheel when putting barriers on businesses and entrepreneurs.

There is no denying that corruption is evil and that it just doesn't seem to go away. Despite the numerous anti-corruption strategies and visions, harsh penal codes, educational campaigns, and anti-corruption agencies, it doesn't look like we are making any significant steps in this war. According to the Corruption Perception Index data, except for the OECD countries and a few other exceptional cases, the rest of the countries—which make up around 70% of the global population—have high levels of corruption.

In this paper, we will try to advance a possible explanation for this problem and propose an alternative. The paper begins with a definition of corruption and an illustration of some of its adverse effects. The second section reviews the most important work done by economists on this topic and reviews some of the anti-corruption policies. The last section discusses the reasons behind the modest results of the fight against corruption.

2. WHAT IS CORRUPTION AND WHY SHOULD ECONOMISTS CARE?

For us not to deviate too much from the main purpose of this paper, we have decided to move straight to modern definitions and skip the old ones of Plato, Socrates, Machiavelli, Hobbes, and so forth. Herein, we will focus on political corruption, and we will take into consideration modern definitions. According to Heidenheimer & Johnston (2007, p. 7), the varieties of meanings and definitions of corruption that are of interest to us could be divided into three major groups.

- a) Public-office-centered definitions: corruption is a deviation from the norms defining the responsibilities and obligations of a public servant in a certain public office for the sake of private gains.
- b) Market-centered definitions: for authors of this group, norms or morality mean little if nothing at all. The public servant views his office as a profit-maximizing unit in the same way an entrepreneur views her business.
- c) Public-interest-centered definitions: these authors define corruption in similarity to the first group, but they tend to focus more on the notion of the public interest. All acts and transactions may be labeled corrupted if they serve the interests of narrow groups (private interest groups) to the detriment of the larger public interest.

The most used definition is that of J.S. Nye (1967, p. 419) who wrote that “Corruption is behavior which deviates from the formal duties of a public role because of private-regarding (personal, close family, private clique) pecuniary or status gains; or violates rules against the exercise of certain types of private- regarding influence. This includes such behavior as bribery (use of a reward to pervert the judgment of a person in a position of trust); nepotism (bestowal of patronage by reason of ascriptive relationship rather than merit); and misappropriation (illegal appropriation of public resources for private-regarding uses)”. Simply, we could understand corruption as a phenomenon that lies in the intersection between power and wealth. In its comprehensive form, corruption involves the inappropriate or illegal misuse of political power for private gains (Jain, 2001).

It is interesting to notice that the interest of economists in the phenomenon of corruption is timid and that most definitions were provided by political scientists and others interested in morality and ethics even though the link between corruption and development—an issue that concerns economists—is intuitive.

Government bodies and institutions are (supposedly) installed to ensure an environment suitable for economic growth and development. Douglass C. North and other neo-institutionalist economists helped us understand the relationship between the quality of institutions and economic performance. Schout & North (1991) defined institutions as the rules of the game, divided them into formal and informal and demonstrated that their choice determines the economic performance of a society. Institutions that protect property rights, limit predation and encourage work and entrepreneurship lead to economic growth, and vice versa. Hence, we should expect high levels of corruption to be one of the major culprits responsible for mediocre economic development.

In their study, Tanzi & Davoodi (2001) found that corruption affects negatively the growth of enterprises by increasing their costs and reducing their rates of return, the size and quality of investment, and other variables that determine the level of economic growth. Glaeser & Saks (2006) studied corruption in the U.S and found a negative connection between high levels of state corruption and levels of economic growth. Aidt (2009) concluded that high levels of corruption within a society endowed with high institutional quality have a significant impact on economic growth. And several other empirical studies have arrived at the same conclusion that increasing corruption affects economic growth negatively (Mo, 2001; Leite & Weidmann, 1999; Poirson, 1998; Knack & Keefer, 1995).

In addition to economic growth, the spread of corruption might also lower foreign direct investments and capital inflows by increasing the transaction costs investors face. Uncertainty about the rules, weak property rights protection, and the need to pay bribes to get business licenses and permits discourage investors as was empirically proven in the studies made by Campos et al (1999), Busse & Hefeker (2007), Barassi & Zhou (2012), and Mathur & Singh (2013). In similarity to FDI and capital inflows, high levels of corruption were also found to have a negative impact on international trade as was proven in the case of developing African economies by Musila & Sigué (2010). Anderson & Marcouiller (2002) confirmed the existence of a negative relationship between international trade and corruption and concluded that the latter has the effect of a hidden tax or tariff. Additionally, in an environment characterized by higher transaction costs for trade and investment, bureaucratic barriers to business and entrepreneurship, and weak or absent public services, we naturally presume poverty rates to be high. Gupta et al (2002) and Gyimah-Brempong & De Camacho (2006) found robust evidence that high or increasing levels of corruption increase levels of poverty and income inequality. The empirical evidence on the adverse effects of corruption is growing day by day, we could also think of possible effects on social trust, political legitimacy and stability, happiness and quality of life, and so forth.

What is striking, however, is the modest contribution of economists in the study of corruption—especially on the theoretical level. The ample empirical evidence leaves no doubt that this phenomenon significantly matters to the research on economic growth and development. Furthermore, and aside from the obvious macroeconomic picture, corrupt transactions fall within the legitimate scope of those interested purely in the problem of economic choice. For instance, if one considers the economic definition that corrupt public administration constitutes a profit-maximizing unit, he/she could use the economist's classic toolbox to draw corruption curves of supply and demand and find equilibrium. Similarly, other economists might be interested in the question of why some public servants refrain from abusing their political powers for private gains if they are modeled as profit-maximizing agents.

3. THE ECONOMICS OF CORRUPTION

The use of economic reasoning in the analysis of criminal/illegal behavior is associated with the economists Gary Becker and George Stigler. In their work, they argued that criminal behavior, like any other human behavior, results from an economic calculation in which profits and costs are evaluated (Becker, 1968; Becker & Stigler, 1974). And with regards to the topic of corruption, it was Susan Rose-Ackerman who first attempted a systemic economic analysis of the problem. We could refer to her work as the “old economics of corruption” (OEC) since it relies on the classic economist toolbox.

As any economist would say, incentives matter! In a dictatorship where the mechanisms of checks and balances are either weak or absent, the public decision maker is more likely to use his power for self-enrichment. However, according to Rose-Ackerman (1978, 2010), this distinction is way too simplistic. Democracy is not ex-ante less corrupt, what influences the levels of corruption is the nature of the political organization structures and the incentives they produce.

Old economics of corruption relies essentially on the agency theory. In a democracy, the voters constitute the principal who delegates the power of decision-making to the legislators who represent the agent. The principal could also be represented by the legislators while the agent by the bureaucrats, or it can be that the agent is a king, or a dictator, and the rest of society represents the principal. The core idea is that the costs of monitoring for the principal are too high which gives the agent the freedom to deviate from the specified objectives and follow his

interest. Money comes into play where the agent-principal relationship is characterized by high monitoring costs and asymmetric information. The level of corruption is thus determined by the incentives and costs produced within a certain political organization. For example, Rose-Ackerman (Jain, 2001, p. 35) analyzed different democratic structures and concluded that party-centered parliamentary democracies might be better than US presidential-style democracies in the provision of public goods and avoidance of corruption.

To conclude, corrupt transactions occur when the institutional structure produces incentives that lower their opportunity costs and increase their potential returns. Hence, the solution is to increase the costs of engaging in corrupt behavior, this could be done by introducing significant penalties or increasing the wages of state officials. Another approach is to reform the bureaucratic apparatus, more openness and accountability, measures of checks and balances, and so forth.

Most of the recent research that is being conducted on the problem of corruption falls within the paradigm of neo-institutional economics that we prefer to describe as the new economics of corruption (NEC), though it does not differ much from the old one in my opinion. The main objective of the new economics of corruption is to understand the emergence and persistence of the institutions that support corruption. Previously, the institutions and incentives that affect levels of corruption were taken as given data. NEC relies as well on the principal-agent model, the only difference is that it tries to go deeper on the individual level. The main idea here is that illegal transactions cannot rely on legal mechanisms for contract enforcement, conflict resolution, and property protection. Hence, the potential for opportunistic behavior increases corrupt transaction costs, such as research for information, bargaining, and contract enforcement (Graycar, 2013). Thus, to understand the persistence of corruption one must examine the tools used by corrupt actors to limit these transaction costs i.e., how corrupt actors design new institutions or rely on already existing institutions to transact. For instance, Johann Graf Lambsdorff et al. (2006) illustrate the role of middlemen and corrupt networks in solving knowledge and trust problems.

4. TESTING THE THEORY

The fight against corruption is as old and evolving as the societal life of humans. There is no doubt that corruption—whether it was a deviation from divine norms of social order or laws and constitutions—has always existed and was always regarded as evil. Let us recall for instance the story of Harpalos, the treasurer of Alexander the Great, who defected to Athens in 323 BCE with considerable wealth. While the Athenians, advised by Demosthenes, were discussing the proper reaction, Harpalos managed to escape. Later, an inquiry was commissioned and Demosthenes with seven other men was found guilty of taking bribes. The death penalty was demanded by the members but the latter was fined and managed to flee into exile. Anticorruption laws covering bribery, embezzlement of public funds, the misconduct of state officials, and so forth have existed in Antiquity, and the medieval ages, and continued to evolve until nowadays (Kroeze et al., 2018).

The classic tool of combatting corruption is that of the stick and carrot. The idea is that higher salaries for public servants and harsher penalties should render them less willing to accept bribes or engage in corrupt transactions. In 1991, the Uganda Revenue Authority (URA) was created as a Tax administration that is independent of the intervention of the ministry of finances and was endowed with a great degree of autonomy in its internal organization. Despite the high wages paid to the URA employees and the attractive bonuses, the levels of corruption didn't decrease. In fact, the monetary rewards were considered a bonus on top of the collected bribes. In addition, the threat of losing their jobs did not seem to bother the URA's employees

who were often re-employed as tax experts in the private sector (Rose-Ackerman & Soreide, 2006, p. 484). Similarly, Kiser & Tong (1992) showed that the introduction of sanctions by the rulers during the eras of Ming and Qing in China resulted in a higher level of corruption.

The same results were also observed in the case of the Tanzanian Revenue Authority where the increase in wages, bonuses, and firing of staff produced a highly paid Tax administration and increased the sophistication of corrupt transactions between the private sector and public administrations (Fjeldstad, 2003). Additionally, Gong & Wu (2012) studied the case of China and argued strongly that the positive relationship between the decent or high remuneration of civil servants and low levels of corruption is a myth. Furthermore, if we accept that the low remuneration of civil servants is the cause of their propensity to opt for corruption, how can we explain corruption among legislators, judges, ministers, and other well-paid officials? An example that supports the invalidity of this claim is the study of Haller & Shore (2005, p. 131) on the corruption scandals within the European Commission.

There exist other indirect ways to manipulate the incentives that state officials face such as the design of new institutional settings. The common tools for this purpose consist mainly of bureaucratic reforms and the introduction of anticorruption laws and legislation.

Decentralization is often the first solution to be invoked in any discussion of corruption. Lord Acton famously said that “power tends to corrupt and absolute power corrupts absolutely”. Nonetheless, decentralization does not always reduce corruption levels. Shleifer & Vishny (1993) presented a theoretical model of a private agent in need of several (complementary) government goods to conduct a business. They argued that the different governmental agencies might collude or compete in the provision of permits or goods. In other words, a decentralized bureaucracy might lead to a lack of coordination among corrupt bureaucrats which will in turn lead to higher amounts paid in total by firms or individuals. The idea that corruption is higher in decentralized bureaucratic structures is also supported by the empirical studies of Diaby & Sylwester (2015) and Olken & Barron (2009).

Another interesting case of study is that of Zambia during the period of the “Third Republic”. Common wisdom holds that liberal democracies are less prone to corruption than other forms of dictatorship. The passage from a one-party political order to a multiparty order and the liberalization of the economy was thought to be the cure for the elite's corruption. Sadly, in this case, the opposite happened. It is in this period that corruption spread to all levels and became a systemic problem. A similar scenario occurred in Ethiopia as well. In fact, during the 80's and '90s, many African countries enacted varieties of harsh anti-corruption laws and legislation with few of them going to the point of execution such as the case of the “house cleaning” operations in Ghana, codes of conduct for public officers, long pages of decrees in Sierra Leone, Cameroon, and South Africa, etc. Unfortunately, all these measures failed miserably. And in most cases, corruption spread even more (Hope & Chikulo, 2000).

Obviously, these are not the only methods available for the fight against corruption, we could think of educational campaigns, E-governance, audits, etc. Also, we do not claim that all anti-corruption policies are doomed to fail. However, what we assert is that the classic tools do not seem to be effective and that, globally, we haven't made any significant progress in reducing corruption levels. If we look at the corruption perception index over the past ten years, we will notice that very few countries made it to the club of the least corrupt. Most countries seem to be either advancing very timidly or going backward.

5. WHAT CAN WE LEARN FROM THE SUCCESS STORIES?

The story of the fight against corruption is not completely dismal. There exist many success cases in curbing corruption and stories of countries that have managed to make a radical change. Among these countries are Hong Kong, Singapore, Rwanda, and Botswana.

Before the establishment of the Independent Commission Against Corruption, ICAC, corruption in Hong Kong was rampant. In the 50s and 60s, Hong Kong was not much different from the rest of the developing world where corruption is the unspoken secret and simply the way things work. Law enforcement agencies had their own syndicates to collect money, the simplest things such as installing a phone line or applying for a passport required a bribe to speed up the paperwork process. Hong Kong relied mainly on the royal Hong Kong police force and its Anti-Corruption Office to curb corruption. However, in 1973, the incident of the escape of a suspected corrupt police officer, Peter Godber, to Britain proved the need for a more reliable and efficient mechanism which led to the birth of the ICAC in 1974. Unlike its predecessor, the ICAC was given full political support by the government and a larger budget. In addition to investigating complaints, the ICAC was also involved in educational campaigns and had the mandate to scrutinize any organization's internal structure and propose bureaucratic reforms (Hui, 2014). Today, Hong Kong is amongst the least corrupt countries in the world. According to the Corruption Perceptions Index of 2021, Hong Kong is the twelfth least corrupt country out of 180 countries listed in the Index.

The story of the fight against corruption in Rwanda is phenomenal if we consider the fact that: (a) the country is surrounded by some of the most corrupt countries according to the CPI, such as the Democratic Republic of Congo (rank 169/180), Tanzania (87/180), Uganda (rank 144/180), and Burundi (rank 169/180) while having a ranking of 52 out of 180 countries according to the 2021 CPI. Needless to mention that these countries share many cultural features, social structures, colonial heritage, and so forth. (b) the genocide of more than 800,000 of the Tutsi people by the government of the Hutu majority and the following years of widespread corruption that was due to the favoring of the Hutu in government positions led many to the conclusion that the situation was irremediable. Surprisingly, Rwanda stands nowadays as a unique success case in the middle of a corruption oasis. The success of the Rwandan experience is attributed to the government's "zero tolerance policy" which is being implemented by the Office of Ombudsman, the office of the Auditor General, and the National Tender Board. Many observers believe that the firing of high-ranking officials such as the Minister for Social Affairs, the Minister at the Presidency, and the State Secretary for Agriculture in 1999 sent strong signals of serious commitment and helped shift the social norms and expectations about corruption (World Bank, 2020).

Other celebrated success stories in the fight against corruption include Singapore, Botswana, and New Zealand. These countries managed to effectively curb the spread of corruption by introducing strict laws and relying on independent anti-corruption agencies for their implementation. The problem that arises now is how can we explain the stagnation of the other corrupt countries, knowing that they also have enacted harsh anti-corruption laws and established one or several anti-corruption agencies? The common answer that we find in most policy recommendations is to have a single independent anti-corruption agency dedicated solely to the fight against corruption and that it should not be used as an attack dog on political rivals, nor should it be a paper dragon. In addition to an ACA, the ruling parties or regime should have a strong political will to endow the ACA with sufficient means and to enact impartial laws without fear or favor (Quah, 2017). Last, it is essential to have the public's support (Hui, 2014).

6. TOWARDS NEW ECONOMICS OF CORRUPTION

The persistence of corruption and the failure of many countries to mimic the successful experiences of others such as Singapore or Rwanda should encourage us to reconsider the way we approach this phenomenon. We argue that the real reasons behind the modest results of the currently adopted policies lie in the choice of an incomplete definition for the problem and inappropriate methodology.

First, let us begin with the definition of corruption as the misuse of political (or bureaucratic) power for private gains. A corrupt transaction requires two parties. However, this definition shifts the focus solely to one party, the one with the power giving the favors. By adopting a such definition, we find ourselves at the wrong starting point. This definition does not allow us to ask the questions: why do citizens disobey laws and why do they offer bribes? The danger with this definition is that it moves the emphasis from the cause of the problem to its effects. It is true that in many cases bureaucrats and politicians willingly put barriers to extort private gains. But in many cases as well individuals willingly seek to influence the lawmaker or bureaucrat for their benefit. In societies where corruption is rampant, individuals know that there is a price if they wish to avoid punishment for each illegal act. This in turn could only mean that individuals hold a unique set of shared concepts (beliefs and ideas) regarding the rule of law, the role of the state, and property.

Second, the choice of an incomplete definition also means the choice of an inadequate methodology. The principal-agent model does not allow us to include qualitative variables such as culture. On the other hand, the Austrian approach is more capable of including culture as it insists on the importance of the meaning in human action, which can only be grasped through the understanding of the inter-subjective set, that is culture (Boettke, 2010, p. 30). Austrian economists emphasized the necessity of comprehending the meaning individuals assign to their actions as a key to the understanding of human action and social phenomena (Mises, 1963; Hayek, 1952). Storr (2013) argues that economists ought to include culture in their scope of analysis and that ignoring culture may be possible but avoiding culture is impossible. One way to do so is by using experiments, ethnography, and other qualitative methods (Voigt, 2016), or as Storr & Grube (Coyne & Storr, 2015, p. 33) wrote: “Arguably, the only way to fully grasp the meanings that individuals attach to their circumstances, their relationships, and their interactions is to look to the social stock of knowledge (i.e., the set of shared beliefs and values) from which their meanings are drawn. Examining the social stock of knowledge, in turn, requires that we rely on ethnography and other qualitative approaches”.

Another problem with the principal-agent model is that it does not consider the possibility of conflict between the newly introduced institutions and the incumbent ones. For instance, Consider the case of Morocco where there is a general unspoken agreement that if one wishes to apply for a job position, he needs to have a “Piston” (a person who has the authority to secure that position regardless of the applicant's qualifications). Would the introduction of transparent methods of selection limit corruption, or would it increase the required bribe amount? Boettke et al. (2008) warned us not to neglect the potential of conflict between an exogenously introduced institution and an endogenously introduced one, the former might not be accepted by the local agents. For instance, in the case of the MENA region, the institutional set of Arab societies contains elements of the Islamic law that have been evolving for fourteen centuries—with specific property rules, norms of behavior, political doctrine, customary laws, and formal post-colonialist state Law that was heavily influenced by foreign doctrines (Schacht, 1983; Hallaq, 2005). The natural outcome of such a mixture is a Façade democracy in which constitutions, elections, power separation, and other democratic elements exist but function with a different logic (Milton-Edwards, 1993).

7. CONCLUDING REMARKS

For the past two decades, curbing corruption has been a priority for many developing nations and other international actors such as the World Bank and the United Nations. A vast number of resources were spent in the fight against corruption; however, the results were mediocre, and very few countries managed to escape the systemic corruption trap. We argued that the main problem resides in the misidentification of the problem which led to the experts asking the wrong questions and recommending inadequate policies.

The identification of corruption as an incentive problem obscured the most relevant issue, culture. It is unrealistic and unfair to have the same definition of this complex phenomenon, knowing that societies differ in their political and economic organization, history, religion, and so forth. If taking a bribe in Norway to get away with a traffic ticket is considered illegal, it is socially and morally acceptable in India or Jordan.

In most developing countries, there exist an institutional gap between the exogenously and recently introduced formal law and the deeply rooted endogenous institutions. That is why we propose to view corrupt behavior as a process of institutional (and cultural) entrepreneurship where individuals seek efficient ways to transact. Additionally, this entrepreneurial process is driven by cultural variables such as the specific shared beliefs of individuals regarding the role of the state, concepts of law and property, and the specific norms of interaction.

The emphasis on cultural variables entails more specialization and division of labor among scholars and experts. If each society views notions of corruption, rule of law, authority, and property differently, then each society should make a unique study case. There should be no such thing as a general theory of corruption or a universal recipe to eradicate it. Instead, researchers should focus on the institutional and cultural uniqueness of the given case and try to arrive at policy recommendations that fit the endogenous institutional environment.

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HOMOGENITY OF INDUSTRY AGGREGATES AND AGGREGATORS BASED ON BUSINESS MODELS

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Abstract: *The purpose of this paper is to examine the homogeneity of industry aggregates and aggregates based on business model classification. The homogeneity is tested using the first-order industry aggregates of the Global Industry Classification Standard (GICS), which was developed in 1999 by MSCI and Standard & Poor's with a classification based on business models developed by Budsky and Dvorak in 2019. The paper explores the extent to which the underlying data (categories) are homogeneous and highlights the potential imprecision the data may suffer from. The descriptive statistics methods have been used to investigate the homogeneity of each of the 11 sectors that GICS recognizes at the first level and 10 defined groups of business models. Then the classifications are compared. The test was performed on the components of the S&P 500 index using market capitalization. The results confirm that the highest degree of sectoral aggregation does not form homogeneous groups of firms. At least in terms of comparisons based on market value. The business model classification exhibits a lower number of outliers, but at the expense of higher variability. However, all research is likely to be biased by the type of market in which companies operate. Some markets do not allow companies to grow beyond a certain market capitalization size due to market saturation.*

Keywords: *Categorization, Sectors, Business Models, Sample Homogeneity*

1. INTRODUCTION

Currently, the most widely used company classifications are based on industry affiliation. For instance, the GICS (Global Industry Classification Standard) classification, which was developed in 1999 by MSCI and Standard & Poor's, is widely used. GICS divides companies into 11 sectors, 24 industry groups, 69 industries and 158 sub-industries. GICS is used as the basic company breakdown for the indices produced by S&P and MSCI. The GICS breakdown is used by all S&P Global indices. Probably the best known is S&P 500 index. Another classification based on industry affiliation is the Industry Classification Benchmark (ICB), created by Dow Jones and FTSE in 2005, is a similar breakdown of companies based on industry sectors. The breakdown uses 11 industry sectors, 20 supersectors, which it further breaks down into 45 sectors and 173 subsectors. This breakdown is used, for example, on the NASDAQ and NYSE exchanges. In the Czech Republic, the Statistical Classification of Economic Activities in the European Community, better known by its abbreviation NACE, is widely used. All these breakdowns aim to aggregate companies into defined categories based on sectoral affiliation.

An alternative approach to classifying companies is categorization based on business models. Categorization based on business models has already been used by Malone et al. (2006), Ribaud (2016) or Budsky and Dvorak (2019). The fewest categories were identified by Ribaud, who worked with only four categories. The author based his categorization on the scalability of the business model. Malone et al. (2006) and Weill, Malone, and Apel (2011) relied on two classification criteria. The first criterion was the method of transfer of rights and the second was the physical nature of the product itself. Budsky and Dvorak combined both mentioned methods. Initially 9 types of business models were proposed. Later, Budsky expanded this division to ten categories.

These categories can be used as sorting criteria in quantitative studies, statistical surveys or used to create various sectoral indicators that can be further used, for example, in valuation. The aim of this paper is to explore how homogeneous the underlying data (categories) are and thus to highlight the potential imprecision that may be present in the data.

2. THEORETICAL BACKGROUND

The sectoral breakdown is based on comparability criteria. For example, according to Marik (2007), there are four basic comparability criteria. These are profitability, risk, tradability, and growth. If all the comparability criteria are met, then all companies in the sample should also have similar market values. This would mean that if publicly traded companies are examined, companies in the same industry should have at least an order of magnitude similar market capitalization. Otherwise, they cannot be considered similar. This consideration may be distorted by companies at other stages of the life cycle. This is either in the decline or growth phase. However, these companies are likely to have different growth potential. They may also differ in the profitability they achieve, as high-growth companies tend to prioritize market share and growth over profitability. Similarly, companies in the decline phase tend to have lower profitability than companies in the maturity phase. This should be reflected in their market value, and, because of that, the basic comparability criterion is not met. The author is aware of this fact and has therefore tried to test this hypothesis on a sample of companies, which should be in the same life cycle phase.

3. DATA SOURCE AND CALCULATION METHODOLOGY

The source of the data is the S&P 500 index, whose components are the largest companies traded on the US exchanges NYSE, Nasdaq or Cboe. These companies have to meet a certain degree of liquidity and report earnings for at least four quarters (S&P Global, 2022). Using data from this index should remove at least basic discrepancies in the life cycles of the companies included in the study.

As the name of the index suggests, there should be 500 companies, but there are usually slightly more components in the index because the index tracks traded equity securities. For example, some companies in the index have two categories of stocks and then both are included in the index. These duplications were eliminated and the stock category with the higher market value was always retained in the index.

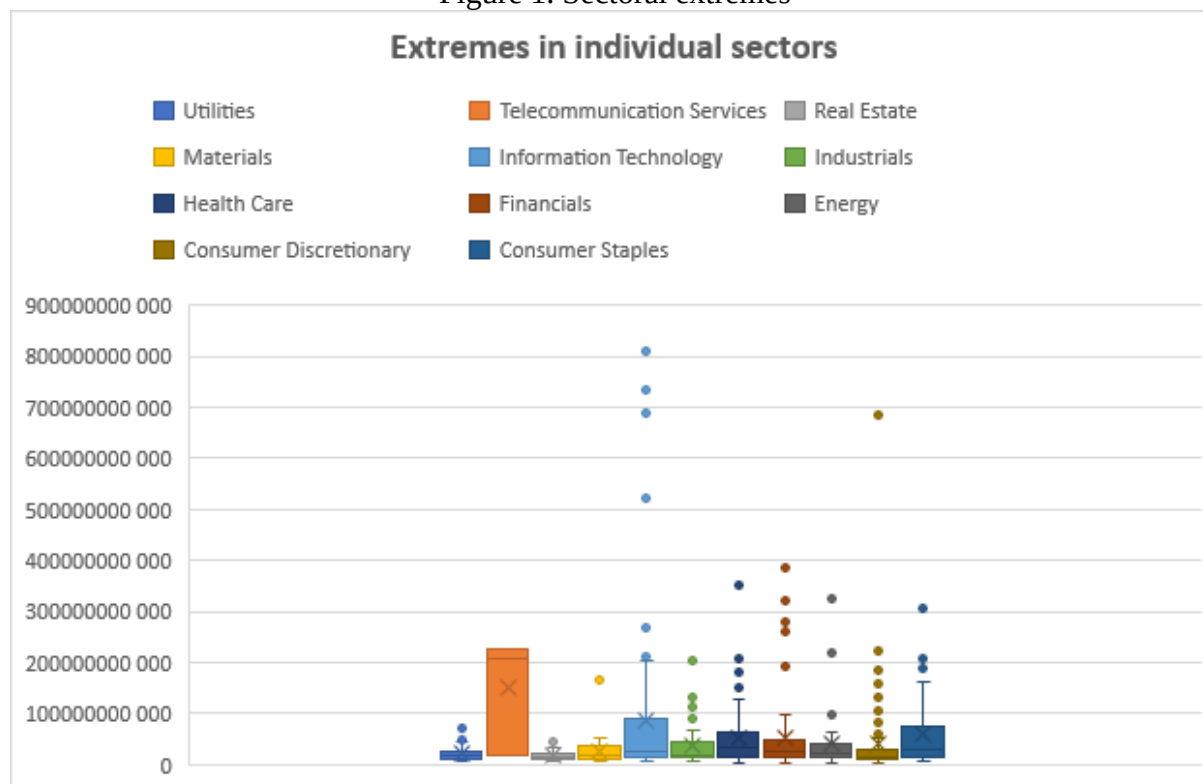
The market values of the companies are obtained as of February 9, 2018. The dataset is available from GitHub (2018). For the industry classification, the first order GICS (Global Industry Classification Standard) breakdown was used. This recognizes 11 industries. A total of 28 companies were identified in the utilities sector. Telecommunication Services were represented by three companies, Real Estate Development had 33 companies in the sample, Materials had 25, Information Technology had 69, Industrials had 67, Healthcare had 61, Financials had 68, Energy had 32, Consumer Discretionary had 80, and Consumer Staples had 34. For the breakdown based on business models, the classification of Budsky and Dvorak (2019) in later modifications was used. The business model based on financial services consisted of 58 companies, producers of products with low value added 152, producers of products with high value added 87, intangible asset producers 32, infrastructure providers 86, platforms 7, network orchestrators 18, service providers 32, retailers 24 and diversified 4. In total, the author worked with a sample of 500 companies.

Standard indicators of descriptive statistics were used for the test. Specifically, the location and variability indicators. In the quantitative part of the paper, the mean, median, 25% quartile, 75% quartile and standard deviation were calculated. The total market capitalization of each industry was also calculated. A box plot was used to visualize the data.

4. RESULTS

Figure 1 shows a box plot of each sector. In particular, the measured extremes for the information technology and consumer goods sectors are evident in the graph. However, extremes are also evident in other sectors. It is only the telecommunication services sector that does not show an extreme. For this sector, however, the sample had only three representatives, which then distorts the presented result. Low extremes are evident in the utilities and real estate development sectors. Even with the outliers not visible in Figure 1, a total of 49 outliers were identified.

Figure 1. Sectoral extremes



Source: (own work)

Figure 1 is further clarified in table 1, which shows the average market capitalization of the industry along with the industry median, 25% quartile and 75% quartile. The table shows that for the financial services, energy, and consumer goods industries, the observed average is outside the slice bounded by the bottom and top quartiles. The information services and consumer staples sectors also have a very skewed average towards the upper quartile.

Table 1. Position indicators in millions \$

Industry	Average	25% quartile	Median	75% quartile
Utilities	21 844	11 746	18 459	24 645
Telecommunication Services	151 014	113 165	208 092	217 403
Real Estate	18 949	9 858	14 395	21 401
Materials	27 692	11 274	16 964	34 638
Information Technology	86 936	14 175	26 919	90 708
Industrials	35 993	12 924	19 363	42 292
Health Care	53 186	16 421	32 295	61 222
Financials	50 627	13 520	26 622	47 898
Energy	42 416	13 118	22 005	40 323
Consumer Discretionary	39 331	9 915	14 496	28 015
Consumer Staples	61 385	16 740	30 772	74 208

Source: (own work)

Table 2 extends the position indicators from Table 1 to include variability. The table shows that the highest variability is observed for the information technology sector. This sector also shows the highest share of market capitalization in the total capitalization of the sample. The health care, consumer discretionary, financial services and energy sectors also exhibit a high degree of variability. Conversely, the lowest variability is found in the utilities, real estate development and materials sectors, when the telecommunication services sector, which has only three representatives in the sample, is not considered.

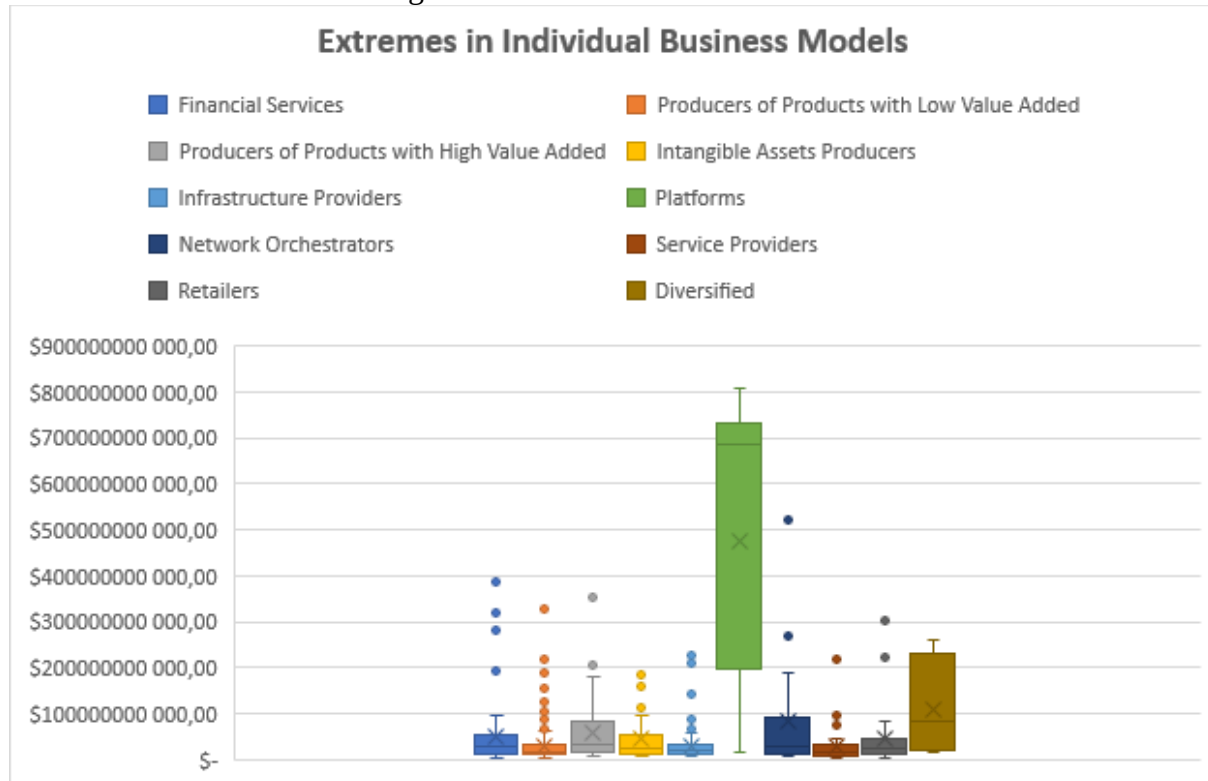
Table 2. Variability indicators in millions \$

Industry	min	max	Sum	Standard deviation
Utilities	5 229	69 661	611 633	15 124
Telecommunication Services	18 237	226 713	453 043	94 195
Real Estate	6 157	59 214	625 316	12 516
Materials	8 002	165 203	692 300	30 778
Information Technology	5 135	809 508	5 998 586	161 654
Industrials	5 330	205 617	2 411 541	38 503
Health Care	3 210	353 062	3 244 359	61 630
Financials	3 693	386 614	3 442 649	73 045
Energy	2 626	326 149	1 357 314	64 236
Consumer Discretionary	3 034	685 873	3 146 492	83 192
Consumer Staples	5 498	304 681	2 087 076	67 850

Source: (own work)

Figure 2 shows a box plot of each business model. In particular, the measured extremes of producers of products with low value added are evident in the graph. Extremes are also evident for the other business models. It is only the platforms and diversified business model categories that do not show extremes. This is mainly due to the lower number of firms in the sample, which then distorts the presented result. The lower number of outliers are observed for the business models of producers of products with high value added, network orchestrators and retailers. Even with the outliers not visible in Figure 2, a total of 38 outliers were identified.

Figure 2. Business Models extremes



Source: (own work)

Figure 2 is further clarified in Table 3, which shows the average market capitalization of each business model group along with the industry median, 25% quartile and 75% quartile. The table shows that only retail has an average outside the slice bounded by the bottom and top quartiles. The business models of financial services, producers of products with low value added, infrastructure providers, network orchestrators and service providers have a very skewed average towards the top quartile.

Table 3. Position indicators in millions \$

Business Models	Average	25% quartile	Median	75% quartile
Financial Services	51 456	14 293	27 637	52 940
Producers of Products with Low Value Added	30 573	10 991	15 154	31 249
Producers of Products with High Value Added	57 381	17 102	34 895	83 851
Intangible Assets Producers	43 900	13 935	23 801	52 995
Infrastructure Providers	30 921	12 817	19 603	33 074
Platforms	476 791	200 864	685 873	711 901
Network Orchestrators	83 050	14 240	29 614	88 134
Service Providers	30 625	9 317	15 837	34 618
Retailers	47 037	11 513	23 292	41 908
Diversified	110 324	27 679	81 892	164 537

Source: (own work)

Table 4 again extends the position indicators from Table 3 to include variability. The table shows that the highest variability is observed for the platform business model. This is due to

the market capitalization of Apple Inc. (\$809.5 billion) and Motorola Solutions Inc. (\$16.6 billion) Motorola Solutions Inc. operates in a nice market and thus has limited growth potential. However, the business model of producers of products with high value added producers shows the highest market capitalization share of the total sample capitalization, followed by the business model of producers of products with low value added.

Table 4. Variability indicators in millions \$

Business Models	Min	Max	Sum	Standard deviation
Financial Services	4 654	386 614	2 984 465	72 852
Producers of Products with Low Value Added	2 626	326 149	4 647 115	43 515
Producers of Products with High Value Added	6 707	353 062	4 992 131	59 440
Intangible Assets Producers	8 764	186 477	1 404 803	42 581
Infrastructure Providers	6 157	226 713	2 659 193	36 576
Platforms	16 626	809 508	3 337 538	299 990
Network Orchestrators	5 701	523 423	1 494 905	126 461
Service Providers	3 693	218 835	979 985	41 521
Retailers	3 210	304 681	1 128 878	70 035
Diversified	16 111	261 401	441 297	97 965

Source: (own work)

In terms of extremes, more extremes were identified for the breakdown based on sectoral affiliation (49 versus 38). In contrast, the breakdown based on business models has a higher average standard deviation (89,093,599,459 versus 63,884,099,445). The median standard deviations are about the same (64 737 504 574 and 64 236 383 938). The average ranges are also very similar (352 261 460 166 and 320 558 648 976). On the other hand, the average variance margins are already very different (96 245 546 824 versus 39 990 569 722).

5. DISCUSSION

Standard descriptive statistics tools were used to examine the homogeneity of the categories based on industry classification and business models. The results indicate that despite comparing the market capitalization of companies in the same sector, homogeneity is not maintained at the highest level of aggregation. Similar results were found in the research based on the Stock Exchange industrial Classification system (SEIC) from authors Sudarsanam and Taffler already in 1985. Although Seong and Nam (2018) state that a premise of homogeneity is still used in research. However, Elliott, Greenaway and Hine (2000) found out that two-digit UK SIC level is relatively homogenous. At least based on the physical capital intensity and human capital intensity. But this study is older and does not consider new business models. The use of classification based on industry affiliation may be particularly problematic in data-constrained studies where lower-order industry classifications cannot be used due to the low number of representatives in each industry. This deficiency was also demonstrated in this study for the telecommunication services sector, in which only three actors were identified. This sector could not then be properly compared with other sectors where a larger number of representatives were already identified. (The second sector in order with the lowest number of representatives had 25 companies in the sample.) This is even though this study worked with 500 companies. If quantitative studies worked with several companies in the high teens or low hundreds, the lower level of industry classification would be unusable in some cases. The

business models based breakdown shows a lower number of outliers than the industry (sector) based breakdown. On the other hand, a higher degree of variability was observed for the business models based breakdown. However, the variability indicators may be distorted by the significant range of maximum and minimum values for the 'Platforms' business model. Without this business model, the aggregated variability indicators are very similar to the aggregated indicators of the industry based breakdown.

6. CONCLUSION

The results confirm that the highest degree of sectoral aggregation does not form homogeneous groups of firms. At least in terms of comparisons based on market value. This is most evident in the information technology and consumer goods sectors, where extremes are evident in Figure 1, which strongly distort the homogeneity of the group. The extreme visualization results are also consistent with the observed standard deviations and industry averages, which are strongly skewed towards the 75% quartile. The industry average even exceeds the 75% quartile in three industries (financial services, energy, and consumer goods). Utilities, telecommunications services, but only three companies are in this sector, and real estate development show the greatest homogeneity.

The business models do exhibit a lower number of outliers, but at the expense of higher variability. This is mainly due to the Platforms business model, where a large spread of minimum and maximum values is evident. The high number of firms in the business model of low value-added producers may also be an incentive to define more types of business models based on the production of a physical product.

However, this research is likely to be biased by the type of market in which companies operate. Some markets do not allow companies to grow beyond a certain market capitalization size due to market saturation. Therefore, even companies with the same identified type of business model may have a radically different market value, as is the case with Apple inc. and Motorola Solutions Inc. While Apple inc. focuses primarily on consumers, which number up to 7 billion, Motorola Solutions Inc. focuses its products and services on emergency responders, which severely limits its potential growth. Therefore, future research should focus on verifying homogeneity based on the sub-indicators that underlie the market capitalization calculation. These indicators are profitability, growth, market liquidity and risk. For example, it would be possible to test for homogeneity based on reported profitability using margins or riskiness using beta coefficients or weighted average cost of capital (WACC).

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DARK FINANCES: BOOKKEEPING ON THE DARK WEB

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Abstract: *Finance on the Dark Web is not chaotic, but it has order, even though it is not under the power of government-enforced rules. In 2017 and 2022 we communicated with total of 57 sellers on the Dark Web and asked them questions about accounting. We aim to show that the emergence of spontaneous rules on the Dark Web makes transactions possible even between people who do not want to know each other and that accounting is an example of one of these rules. First, four sets of rules were identified that allow anonymous sellers and buyers to make successful transactions. In addition to ethical rules, the Dark Web's selling points known as Dark Markets operate on a set of rules that allow alternative disputes between users to be adjudicated, because people need to resolve disputes between equals even in an anonymous setting. The third set are technological innovations due to the profit motive that allow Dark Markets to survive and finally there is a fourth set of voluntary rules, including accounting, that improve users' use of services on the Dark Web. It turns out that accounting principles are used by virtually all sellers on the Dark Web, mainly to control their own profits and to better track volatile Bitcoin prices. Accounting is used without government coercion, but in the case of the Dark Web it is exclusively single-entry accounting.*

Keywords: *Accounting, black market, bookkeeping, Dark Web, Dark Markets*

1. INTRODUCTION

Accounting exists even at the absolute margins of society. This paper locates basic accounting principles on a part of the Internet associated mainly with illegal activity, the so-called Dark Web. It turns out that sellers of illegal goods on Dark Markets make accounting entries even in the absence of any regulation or government coercion. This is not a surprising conclusion, bookkeeping is a phenomenon that has been operating since the beginning of written records and exists in a fully free market or even anarchist environment. We asked Dark Web vendors directly if, how, and why they approach bookkeeping, and this paper presents their answers and puts them in a theoretical context. The Dark Web is a fascinating experiment in the workings of an unregulated free market.

What we see on the Web is only about few tenths of one percent of its true size. What is not easily seen, the Deep Web, is what search engine crawlers cannot index and thus provides to its users desired privacy. Our e-mails, messengers, parts of social networks and cloud storages are part of the Deep Web.

And so is the Dark Web, frequently illegal, sometimes prohibited and always mysterious corner of the Web where you can buy drugs, fake passports and other illicit goods, but also things that are legal. It usually requires peer to peer connection, use of cryptocurrencies, special browser, invitations and also information where to find what one is looking for. Estimates of how large is this part of the Web are very different. It is hard to do so by definition because these pages want to stay hidden.

The Surface Web, indexed by search engines, is well known and documented. However, the dark side of the Web got only a little awareness even though it grows larger every year.

The main goal of this paper is to show if, why and how people outside of the legal system keep books. This paper shows how a specific and most known part of the Dark Web, namely Dark Markets works. How it is possible that it works. It focuses on Dark Markets and

analyzes institutions used to create an order without a presence of any government-enforced law. It argues that it is possible mostly because of four things: 1) ethical foundations, 2) innovations in institutions of alternative dispute mechanisms 3) technological innovations and 4) using institutions known from the traditional world. We specifically look into the last part and ask 500 sellers on the Dark Web a set of questions about accounting.

2. RULES WITHOUT LAW ON THE DARK WEB

The Web is usually divided to the Surface Web and the Deep Web. The Deep web is much larger because it consists of anything hidden from indexing services. Even though it is hard to estimate how large Deep Web is, Bergman (2001) estimated it to be between 400 to 550 times larger than the Surface Web. Although this estimate is more than two decades old, it is still used to show the scale.

The largest parts of the Deep Web are webmailing services, internal forums and significant parts of social networks such as Facebook. Here we will discuss smaller part of the Deep Web, the Dark Web. The Dark Web exists only on darknets, special network accessible only through special software and in fact form an overlaying network for a specific purpose. One form of darknet are F2F (friend-to-friend) networks for sharing private files or information between people who know each other. The other are privacy networks for public sharing of information between anonymous users. We will talk about the later.

The most common form of the later form of darknet can be seen only with specialized software such as Tor. Tor allows its users to anonymously access webpages outside the Surface Web. Without this software, these pages remain invisible. Once Tor is installed, users can browse content with close to zero probability of being recognized by the anyone else (Jardine, 2015).

Although there are many uses for the Dark Web (such as anonymous blogging in authoritarian regimes), the most visible and for our purposes interesting is anonymous shopping on Dark Markets. This is the most common place on the Dark Web where buyers and sellers need to deal with finances.

Dark Market is a place in the Dark Web where sellers are anonymously listing goods and services for potential anonymous buyers (Rudesill, Cavarlee & Sui, 2015). Judging from the look at the biggest Dark Markets, most of the listings are drugs and mostly marijuana. It have been the same with all the previous leaders on the market, namely T•chka, Wall Street Market, Dream Market, Hansa, AlphaBay, Sheep Marketplace and Silk Road. Beside the drugs vendors offer pharmaceuticals, guides (lockpicking, hacking), fake products, fake IDs etc. More than 15% of British drug users were buying from the Dark Web in 2014 (Global Drug Survey, 2016). It is argued that Dark Markets can provide harm-reducing information and benefits for customer (Aldridge, Stevens, & Barratt, 2018).

To ensure the privacy, Dark Markets from the very first one, the Silk Road, use few anonymization methods. First, as it was mentioned, is Tor, to hide IP addresses of users. Vendors send their products using postal services which do not require identification of senders. Sellers use cryptocurrencies, mostly bitcoin (Kaplanov, 2012), to hide the flow of money usually visible to commercial banks and in turn to governments. Both buyers and sellers use encryption such as PGP to encrypt their messages.

Today, we argue, Dark Markets form an experiment in polycentric law (Bell, 1992). At another place, Bell (1998) argued, that we can expect to see polycentric law in the new millennium in three areas: Alternative dispute resolutions, private communities and Internet. His predictions combined form the basis of the Dark Markets and are thus confirmed. But it was not so at the very beginning. This order emerged through competition, seeking of new and

better rules and as a reaction to repression from authorities. This can be also applied to finances. It is an experiment with institutions such as private money and private bookkeeping in a place without any government enforcement.

The first among Dark Markets, Silk Road, was founded in February 2011 by an anonymous developer Dread Pirate Roberts later to be identified as Robert “Ross” Ulbricht. Silk Road was the first popular Dark Market with \$1.2 billion in revenues and \$79.8 million in commission. However, it was closed by authorities in October 2013 and Ross Ulbricht was two years later sentenced to a life imprisonment without possibility of parole.

Silk Road was not very secure. It was a single server with no decentralization. The server was later found and seized. It had a potentially vulnerable PHP application and arguably sooner or later one would find his way in. Silk Road had no multi-factor authentication and did not supported other and more anonymous cryptocurrencies than bitcoin. The most vulnerable part was however the dispute mechanism where only the site-operator had a possibility to resolve a dispute. Simply put, a buyer first sent money to the operator and waited for a delivery. After a confirmation the operator sent money to the seller. These funds thus were stored in Ulbricht’s server and were eventually seized. However, the biggest threat was not the seizure by authorities but by the operator himself because he had a full access to them. Many other Dark Markets were robbed by their founders (for example – at least partly – Sheep Marketplace).

Despite these facts it took more than 2 years for FBI to track down and identify this server and its administrators who definitely underestimated protection of their digital privacy. Even though Silk Road listed plenty of illegal goods and services, it did not list anything which is created only for a purpose of harming another person or his property. We offer two possible explanations.

First, as Ross Ulbricht wrote on his LinkedIn (2009) profile: “Now, my goals have shifted. I want to use economic theory as a means to abolish the use of coercion and aggression amongst mankind... The most widespread and systemic use of force is amongst institutions and governments, so this is my current point of effort. The best way to change a government is to change the minds of the governed, however. To that end, I am creating an economic simulation to give people a first-hand experience of what it would be like to live in a world without the systemic use of force.” The founder of Silk Road was a self-described libertarian with a clear intent not to allow trade in goods intended to harm others or their property. He was an admirer of Ludwig von Mises (wired.com, 2015). With such ideas behind the Dark Markets it can be so that the reason lies on the supply side. However, it is hard to imagine that other Dark Markets would follow the ideal of the first founder at their expenses. Second, if the limit is not on the supply side, the motivation thus has to lie in demand. There may be a demand for ethical Dark Markets as there is a demand for ethical markets outside the Dark Web (Benson, 1993). Although it cannot be proven to be a majority, from our experiences there are people who would not buy or sell on Dark Markets where it is possible to buy child porn or hire hitmen. So, in turn it may be a profit maximizing strategy not to allow to sell these goods and services. Possibly, both explanations go hand in hand. This *laissez-fair*, liberal ethics behind Dark Markets is important. Without it users would tend not to join the market even for legal goods or goods which are subject to a crime without a victim. It is hard to prove this thesis and sociological analysis would prove more, but at least we can see that Dark Markets offering this kind of goods and services (anthrax, hitmen) do not exist or are proven scams. Of course, the Dark Web in general is flooded with extremely violent content, the argument here is not to say that that “ethical” means good, legal or legitimate. By ethics we mean that there are different sets of principles that try to distinguish between moral and immoral behaviour, in other words, that the space is not chaotic. We do not judge the principles, even though we of course strictly disagree with violence, especially on children. But Dark Markets have some rules, they try to

eliminate or even punish some behaviour and substitute for the absence of government-enforced rules.

After Silk Road was closed, many others emerged. According to the Digital Citizens Alliance (2015), sellers increased the number of products offered. Silk Road at the end of 2013 provided more than 13 000 listings and together with other Dark Markets listed over 18 000 products. It took only a year to increase this number to 65 000 products. After Silk Road Dark Markets grew bigger, not the opposite.

Gwern (2019) calculated, that in two years after Silk Road a total of 85 Dark Markets were established. Six of them were closed by the government (Silk Road, Silk Road 2.0, Blue Sky, TorBazaar, Cloud Nine and Hydra), ten were closed by hackers, twenty-two Dark Markets were closed voluntarily with a possibility to withdraw deposited cryptocurrency. Twenty-one Dark Markets were robbed by the site operators. The last twenty-six Dark Markets has been in online.

Today the numbers are harder to calculate because on of the ways how markets reacted to repression was to spread and hide and specialize only to deliver to known buyers. However, Gwern (2019) makes it clear that the number of large and known Dark Markets is sharply decreasing. The number can decrease even further because the innovation process does not exist only in the Dark Web, of course also the government is developing innovative tools how to access and close Dark Markets (Ghappour, 2017).

There is a long list of historical evidence and theoretical studies about a possibility of law without the government (Ellicskon, 1991). The law on Dark Markets is produced by multiple providers who try to compete for their customers. One can argue, that the rules on Dark Markets cannot be called law, however, this solely depends on a definition of law and is beyond the scope of this paper. Nevertheless, rules emerged, and moreover, working rules which are evolving over time in reaction to previous failures. This emerging order (Hayek, 1973) is more interesting in the fact that Dark markets are by definition extralegal and have to rely solely on their own rules. Indeed, these rules can be viewed as top-down from the site operators, but if we do not look at one Dark Market alone but at the whole Dark Web, the rules emerge from a competition of different systems of rules and evolve over time. In this part, we cover the latest developments which are not random innovations but deliberate answers to more or less common problems and possible threats on the market. In addition, these rules are not only technical, but sometimes draw from history and ethics.

AlphaBay Dark Market introduced as first a system that should allow practically any type of deal to be linked to a user's reputation through the use of "digital contracts" verified by AlphaBay itself. Each contract costed \$5 to be initiated.

This amount is paid to the market administrators in cryptocurrencies and it's entirely up to the users what they put in the contract. Buyers and vendors can already make custom agreements. For example, a typical contract can be a weekly purchase or a special treatment. For this involves deliberate handling with specific contracts, marketplace or a custom mediator can solve a possible dispute. Similar process was implemented by OpenBazaar, where buyer and vendor can agree on a third party to be a mediator of a possible dispute. This mediator is selected together and both parties have to agree with the choice. To facilitate the choice of a mediator OpenBazaar offers a marketplace with mediators. They are then selected based on their reputation from public references of past mediations. This is basically the same private legal system as Stringham (2003) and other authors describe on historical examples. The arbitration mechanism emerged in unhampered free market as it did in history. Moreover, the ethical background still holds and authors of these marketplaces do not want to allow services that are targeted against property or lives of others. "Hitmen will never be allowed, as we don't want this kind of attention. We don't allow services that are here only to hurt people, like hitmen," said alpha02, the anonymous founder and owner of AlphaBay in his announcement of

these “digital contracts” (Vice, 2015). It is a question why not to offer also these services if the market is illegal anyway and if alpha02 would be found guilty and not hung himself in custody he would possibly be jailed for lifetimes as it was in the case of Ross Ulbricht of Silk Road. We argue, that it is the first set of institutions – the laissez-faire ethics of both operators and buyers. Second is a way how to deal with violations of the rules imposed by the Dark Markets. If it is a dispute between the operator and a user, the solution is simple. More important is how to deal with disputes among users. We argue that one of the most important innovations in reaction to Silk Road closure is wide use of multisignature. Multisignature addresses are addresses controlled by more than one person. They are created with a set of requirements, that dictate how the funds in the address can be moved. A common example is 2-of-3 signature address. These addresses are jointly controlled by 3 people, for example the site operator, the buyer, and the seller, but funds can only be moved if two people authorize and sign a transaction. No single individual can move the money without at least one more person.

How the system works can be explained again for example on AlphaBay, but today sites using multisig have a similar system. Both the buyer and the seller must have set their public multisig key in their profile. The buyer deposits (e.g. 4%) of the item value in his marketplace wallet to cover market fees. The buyer then purchases the item, then a multisig bitcoin address is generated using the buyer’s key, seller’s key, and a market-generated public key (2/3). The buyer sends money to this address, and the seller ships the goods. If the buyer is happy, he finalizes the exchange, and the seller received the market private key.

In case of dispute or refund, the buyer (or the seller) will receive the private key from the mediator. Whoever got the private key will use it, along with his own private key, to claim the coins. Again, here OpenBazaar offers a marketplace for mediators, but even without the market it is a significant improvement in security measures compared to Silk Road, Sheep Marketplace and other early Dark Markets. What is important, is not only that it can easily solve disputes without any legislature, but it can prevent the mediator from stealing the funds. Historically, these mediators were (and still are) the Dark Markets themselves. Because the operators are because of illegality of their business usually virtually untraceable, they have a high incentive to steal the deposited funds. And as it has been shown, historically they did a lot.

We can conclude, that the second set of institutions on which Dark Markets exist is a historically and currently working alternative dispute system outside of the government legal rules and enforcement.

Third and possibly the most important is competition. Free market incentives of profit and loss lead to a high degree of competition which in turn leads to a fast pace of innovation both to compete against competitors in delivering better services to customers but also to compete in surviving the attacks of the government law enforcement.

For example tracing of Silk Road users led to another innovations in anonymizations of transactions. Bitcoin blockchain is by definition a transparent ledger where all the transactions can be traced back to the origin of the particular bitcoin. This led to statistical tracing of transactions and eventually some vendors at Silk Road were caught by authorities. From the very first years of bitcoin some entrepreneurs offer mixing services where a depositor can for a fee mix his bitcoins with other people and get back a different mix of funds from various sources. However, these mixing services had a problem with the demand side. Simply put, users could mix their bitcoins usually only with bitcoins from other illicit use. It can be modeled as a textbook example of the market for lemons (Akerlof, 1970). Because there are “light” and “dark” coins in the mix, “light” users do not want to mix their coins because they can expect “dark” coins in return. In turn, this leads to a market only with “dark” coins mixing with other “dark” coins.

However, solutions to this problem appeared. BitBlender started as a simple bitcoin blender that uses a randomized fee and offers automatic withdrawing to your clean addresses. They have shown reliability over time and are in for the long run. Grams Helix was a tumbler and Darknet content indexer. They were called the Google of the Darknet and also have a tumbling service. The admins have shown extreme care for their users and their support is prompt to help. As said Deepdotweb.com (2016): “Helix is the definitive darknet bitcoin cleaner. Grams’ helix doesn’t just clean your bitcoins it gives you brand new ones which have never been to the darknet before. The helix system is more than a bitcoin tumbler, it is privacy and security wrapped in one.” There are also services already integrated into Dark Markets, for example Outlaw market uses a mixing service through BitMessage. These services are often paid with a fee (1%).

Last and recent solution to traceability of the money flows are anonymous cryptocurrencies. First of them, monero, offers an easy way how to anonymize funds. At online exchanges users can trade bitcoin for anonymous monero and back. Some Dark Markets support monero directly. Monero uses a cryptographically sound system that allows users to send and receive funds without your transactions being publicly visible on the blockchain (the distributed ledger of transactions). This ensures that their purchases, receipts, and other transfers remain private by default. By taking advantage of ring signatures, a special property of certain types of cryptography, Monero enables untraceable transactions. This means it’s ambiguous which funds have been spent, and thus extremely unlikely that a transaction could be linked to particular user. There are other competing cryptocurrencies trying to anonymize transactions, for example zcash, launched at the end of October 2016.

Some users do not like to use cryptocurrencies such as bitcoin because of their high volatility. Although the volatility is decreasing, the argument is valid. Dark Markets adapted even for this and for example Outlaw market offered currency-accounts. These accounts are hedged, they do not change their value when the bitcoin becomes cheaper or more expensive. Users can fund their currency-accounts through the account-page. As for a service, there is a 5% fee for hedged accounts.

Most of the modern Dark Markets now use two-factor authentication (2FA). In some markets, it is even mandatory to use 2FA. Usually 2FA is implemented as PGP private key owner verification. Users are allowed to upload to their profile information their public PGP key. Whenever they log in, the system encrypts just for them (owners of the private PGP key) a message (for example 16-digit code nested in a message) which can be decrypted only by genuine users (or anyone with the knowledge of the private PGP key). AlphaBay was the first to made 2FA mandatory for vendors and optional for buyers. Synchronous one-time passwords (OTP) where users have to for example enter code sent to their cell phone are not used. It would require trust in 3rd party and secure cell phones. It is possible that Dark Markets do not trust users to have cell phones clean of spyware or other malicious programs. However, it is possible to set up “OTP” using 2FA.

One of the vulnerabilities used to be a simple lost password. Because sending password reset e-mail is not considered to be a good security practice, Dark Markets started to use a mnemonic phrase generated with the first login. Now users just have to remember 8 English words to be able to retrieve their forgotten password. At some markets you can let another user access a part of your account. This is useful if you part of a team and allow many people to login and ship orders without giving your password. This is not a security feature, but we can imagine what would happen if someone implement crypto-market e-shop aggregator.

In past Dark Markets were and to some extent still are vulnerable to the distributed denial of service attacks (DDoS attacks). These attacks are considered to be critical for Tor hidden services. If the attacker has access to multiple Tor nodes, using DDoS attacks he can perform statistical measures and compromise Tor security. In other words, attackers can with

a certain probability identify otherwise hidden users. Many Dark Markets implemented a special anti-DDoS protection. The simplest way to prevent DDoS attacks is using CAPTCHA, but it was proven that it can be cracked and server attacked. Theoretically the best prevention is to encapsulate one Tor in another Tor with public and private Tor gateways. However, these gateways are available only to trusted Dark Market users which is a serious risk to anonymity. With this regard, some Dark Markets use public onion, which is slower, but provides more anonymity, because anyone can join in. Some use private onion gateways. These are much faster and immune against DDoS attacks, but because they are just for specific users, they are more vulnerable to tracing identity of users. Some Dark Markets even use double-tor-security system for extra stealth, not to expose the connections to evil exit Tor nodes.

Moreover, because all crypto markets have access to your public PGP key, your storage (Dark Market mailbox) can be fully encrypted with Automatic Message Encryption. It is even possible to have integrated PGP webmail client, but you need to provide your PGP private key to the browser, e.g. HTML5 storage, which is not a recommendable.

Dark Markets today usually offer users to manage their API keys, and to set / revoke appropriate permissions for each key, using the API requires 2FA and Purchase PIN to be enabled on a user account. This is useful, if anyone have ever been phished, because he will not be able to use this system. The limit is 10 keys.

Not only Dark Markets, but also users innovate. Websites pioneered by deetdotweb.com (which was closed by FBI in May 2019) allow users anonymously rate and review Dark Markets. Deetdotweb.com also sort Dark Markets not only according to their rating but also to the time they are offline etc.

Users also use anonymous VPN (virtual private networks), also paid with bitcoin. Connection through VPN and Tor can be much more secure than using Tor only. Users also know that good Dark Markets do not use Javascript and know that it is recommended for them too to disable Javascript. Historically there were 0-day exploits against Firefox Javascript functionality that was used by the governments to attack Dark Market users. Moreover, users can use anonymous operating systems such as Tails, which can be mounted on any computer just from a DVD, flash disk or SD card, possibly even from a secure wireless network. To find one today is easy, for example with Router Keygen YoloSec Android app through which anyone can exploit a substantial amount of UPC private wireless networks and securely use them.

Users also use random MAC addresses and not only all servers but even users' hard disks can use full disk encryption, ideally with hidden volumes. Usually servers are virtualized in multiple server housing centers paid by bitcoins in a completely anonymous way. Because of that there is no association between the servers and Dark Market admins. They always use Tor to access their virtual anonymous servers Any bitcoins/moneros are stored on a completely different server, Dark markets ideally use cold wallets.

With the fall of Silk Road some Dark Markets saw the vulnerability in centralized servers which can be located, seized or stolen from the operators themselves. OpenBazaar was the first fully decentralized Dark Market but it is not as popular as the centralized solutions, mainly because of the network effect of earlier markets. Other markets such as Axis Mundi, Bit Markets. Shadow Market (Umbra projects) or OpenBazaar version 2 with IPFS (InterPlanetary File System, peer-to-peer hypermedia distribution protocol) over Tor.

There is an ongoing debate about whether Tor is a good way how to access the Dark Web. Some Dark Markets tried alternative solution, the Invisible Internet Project (I2P), but had no success among users. Theoretically, I2P protocol is more secure than Tor, but practically there are too few nodes to matter. DDoS is more complicated for I2P but some I2P implementations issues exist and the I2P client is less user-friendly. Probably I2P is less

interesting for governments and thus it makes it more secure and anonymous, but this security may be only security by obscurity.

Some Dark Markets such as T•chka allows users to buy and sell your stuff instantly without any need to communicate with the other party at all. Users only buy or sell coordinates of their buried goods in a real word. They finalize the trade only if they are satisfied with the purchase. All buyers and sellers are rated and everything depends solely on their rating.

T•chka is just a version of a service called Dead Drops. Dead Drops use no delivery-address. The buyer does not need to transmit any 'delivery address' and can stay fully anonymous to the vendor. The dropman is the anonymous delivery boy. The dropman places the item into a Dead Drop he searches for and finds himself, creates a short video-clip showing exactly where the item is placed, in detail, and panorama-view. He adds the geo-co-ordinates and uploads the data to our upload-server. The buyer of the placed item does not need to enter any personal data, but immediately after payment receives the data uploaded by the dropman. He uses the geo-co-ordinates to find the place and then watches the video-clip to exactly find the item.

The third pillar of the institutions on which Dark Markets build their strength is a free market competition and resulting profit-oriented technological innovation. Dark Markets quickly and explicitly answer to most of the past threats and flexibly innovate. Would they be still technologically at the level of Silk Road, arguably, none of them would exist. Indeed, there are not so many of primary innovations, most of them are combinations of technologies used elsewhere.

A specific example of user-initiated innovation is the use of institutions that we normally think of as state-enforced, and we might assume that no one on the Dark Web would use them without coercion. In this paper, we further discuss the most obvious of these examples, namely accounting. In order to understand how exactly are sellers keeping their books we had to ask them.

3. METHOD AND DATA

During one day in 2017 and one day in 2022, we sent a total of 250 and 250 requests to complete the anonymous questionnaire, respectively, for a total of 500 messages. From experience, we expected the return rate of the questionnaires to be around 10 percent, which we slightly exceeded with a return rate of 11.4 percent (57 responses). Users were selected who had at least one level higher than the base level on the given marketplaces. This means that they had a few successful trades under their belt, thus eliminating fraudulent accounts and users with no experience.

In order to ensure respondents' anonymity and thus the least biased results, respondents could not only answer via encrypted direct messages, but also upload their answers via the fully anonymous Securedrop or send them to a Protonmail address. In addition to basic demographic questions such as age and gender, other questions could not be used without increasing the likelihood of revealing the true identity of the salespeople, which could discourage them from completing the questionnaire or encourage them to provide false information. Thus, only age and gender were chosen, but without having firm criteria for which characteristics to choose and which not to choose. In this part, the methodology is relatively weak because we followed our instinct rather than hard data, however, we believe that with the addition of any other demographic variable, the return rate of the questionnaires would decrease. It is difficult to put oneself in the shoes of a Dark Web salesperson and imagine what questions they would still answer and which they would not, so we believe that as research progresses it will become clearer what else can be gained for data from people beyond the law.

Figure 1. Questions used in this study

Question	Note
How old are you?	Limited to numeric answer
How do you identify yourself?	Man/Women/Other/I do not want to answer
Do you have any formal (higher or university) economic education?	Yes/No
Do you keep a book (record of sales) outside of Dark Market, where you record, summarize and analyze your business and financial transactions?	Yes/No
How do you keep record of your sales?	MS Excel/Numbers (iOS)/Text editor (i.e. MS Word)/Cloud editors (i.e. Google Docs or Sheets), Pen and paper (physical recording)
What type of records do you use?	Single entry/Double entry/Other (specify)
What is the main reason why you keep a record of sales?	Open question

Source: Own research

In addition to a range of other questions addressed elsewhere, in relation to this work we asked in particular whether they keep accounts and, if so, in what form. We were interested in whether they kept double or simple accounts and what software they used to do so. For double or simple, we chose to select these two options and the option that the vendor does not keep accounts at all. If they answered yes, we offered respondents the options of Excel, Word or other word processor, Numbers on Mac, paper or other to specify. We did not expect to see Google Docs/Sheets in the list, but there were sellers who did bookkeeping in the cloud. This is obviously a big risk and we therefore assumed that no one would do that.

It is difficult to verify how close our sample is to the general population because it is inherently unknown to us. However, it can be assumed that it is more likely to be younger men who have formal or informal technical education. In addition to the above questions, we had to ask them why they keep accounts and they supplemented their answers in an open-ended question. This is a risky strategy that may bias the results, as it would be easy to at least determine from the answers to the open-ended questions whether or not they are native English speakers, or to use text analysis to link a known text to an answer in the future. We first wanted to ask the respondents to have the text changed by one of the online synonym search tools, which would have partially obscured the text, but we did not find any clean solution and rather decided not to even point out this possibility in order not to lose respondents unnecessarily, moreover with an already small response rate.

A specific question for which we expected at least some variability in responses was the type of accounting used by vendors. In retrospect, however, we were not surprised that 100% of respondents using accounting used single-entry and none used double-entry or possibly other. We therefore do not even show this question in the following section, however relevant it was to this research. Single-entry accounting is clearly simple and useful.

Because the questionnaire was sent out in two different years, it could be that one respondent answered in both years; because of that the very first question on the questionnaire asked whether the respondent had answered this questionnaire in the past on another of his or her accounts. None of the respondents answered in the affirmative, so we assume that all responses are unique.

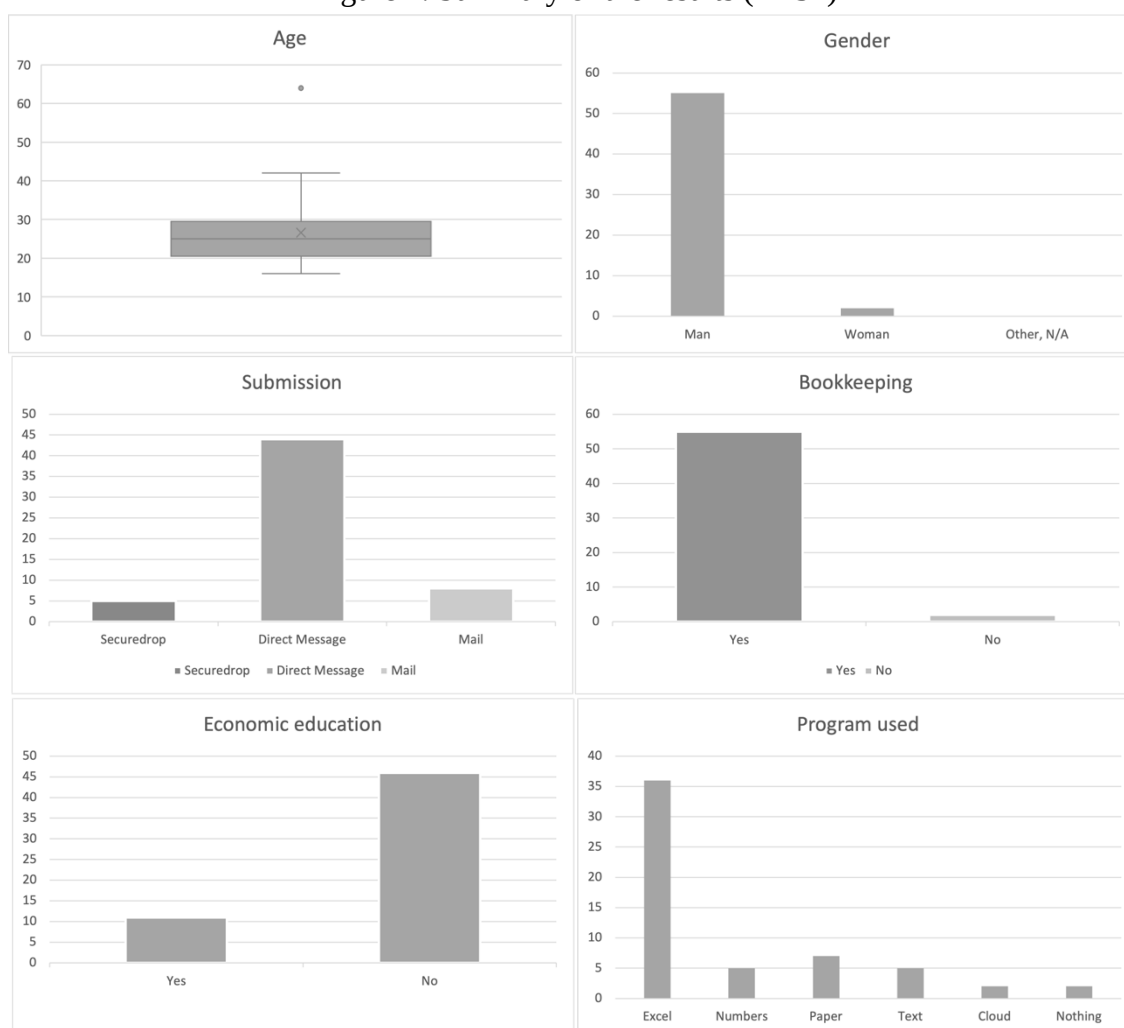
4. RESULTS AND DISCUSSION

We received a total of 57 responses, 26 in 2017 and 31 in 2022. In 2017, the average age of respondents was 25.1, five years later it was 27.8. Unsurprisingly, there were only two women among the respondents, both among the 2022 responses. Neither responded to the survey in 2017. None of the respondents subscribed to the “other” or “I don't want to report” responses. Dark Markets are overwhelmingly a male phenomenon.

11 out of 57 respondents reported having formal economic education (either higher or university). Our effort was to show whether such education is related to the use of accounting, but the correlation is inconclusive, especially given that only a minimum of sellers do not keep any accounts. Most of the answers were sent through direct messages directly at the Dark Market, only a minimum of the answers were submitted through our securedrop and mail.

The results of the survey are presented in below:

Figure 2. Summary of the results (N=57)



Source: Own research

Only 2 people out of a total of 57 respondents answered that they do not do any accounting. Both were males from the 2017 questionnaire, with one being 16 and the other 19 years old at the time. In the 2022 questionnaire, all respondents said they kept accounts. Unfortunately, apart from age, the statistical models could not detect any causal relationship on demographic and other variables and could not be considered significant with two observations.

It is difficult to describe this interesting result in detail. In the introductory text to the questionnaire, we did not ask about the term “bookkeeping”, but we did ask whether they “keep a book, records of sales”; moreover, it was important to mention that they must keep them “outside the Dark Market” because the markets automatically keep some simple records of previous sales. We assumed that the respondents might imagine the term “bookkeeping” to mean something different from the researchers, so even without using this word we described book-keeping according to Merriam-Webster as “recording, summarizing and analyzing business and financial transactions”. We removed the terms “verifying” and “reporting” from the definition because there is no need for reporting and verifying in the accounting sense on the Dark Web.

It was interesting to see what kind of program users were using. Again, there was no association with age or gender, but some of the results were still surprising. The clear winner, MS Excel, remained without surprise (63.2% of respondents). This is understandable as it is the most used spreadsheet editor in the world and it is not difficult not to use shared cloud services in it. Second place went to paper accounting (12.3%). 8.8% of respondents cited Apple’s alternative, Numbers. A surprising 3.5% (or 2 respondents) used cloud services like Google Docs or Google Sheets. The remaining two are those who did not do accounting.

It is also understandably difficult to trust the dates obtained in a fully anonymous questionnaire, but efforts were made to ensure that respondents had no reason to misrepresent information. The gender and age composition matched our expectations and the questionnaire was not overly long, although we asked more questions than we report here.

Although the table does not show the answer to the question of whether sellers use single-entry or double-entry or a completely different type of accounting, the result needs to be commented on. Indeed, the 100% use of single-entry is in stark contrast to what we know from the traditional market, where double-entry is very much used. The Dark Web experiment points in an interesting direction for research into the origins of double-entry accounting. We know that free-market double-entry accounting has been used without coercion from the state (Yamey, 1947), whether it was for religious reasons (Aho, 2005) or by importation from places where it originated under government supervision (Aiken & Lu, 1993a, 1993b, 1998). The free-market experiment in the Dark Web setting may provide an interesting clue to how and why it makes sense to use double-entry accounting and return us to the perhaps trivial (Nobes, 2001) question of the origins of double-entry accounting. It may also be specific to the anonymous nature of the Dark Web, where the advantage of double-entry accounting in relationships between clearly identifiable counterparties is suppressed. We believe there could be room for further interesting research here, but unfortunately it is not possible to conclude anything with the data we have available at the moment.

The most interesting answers came from a single open-ended question, where we asked vendors to elaborate on their reasons for using accounting. Our selection of the most interesting questions is necessarily subjective, but there were some recurring patterns. The majority of forms (71.9%) included the answer that salespeople want to keep a record of how much they buy and sell for, i.e. if they are in profit. The profit motive clearly prevailed and shows that Dark Markets can indeed be considered a free-market experiment. Perhaps surprisingly, the second most frequent (36.8%) response was the various variations on the Bitcoin exchange rate, which can easily make today's gains a tomorrow's loss and thus makes it necessary to keep a running record of trades. Fear of a given Dark Market closing, a kind of “backing up” of data, was also a very common (28.1%) motive. Smaller percentages then revolved around “habit” or “enjoyment of visualization”, but of course the answer “I don't know why I do it” also appeared. Primarily, then, it's a question of profit.

Due to the small amount of data and the form of the data, it is not possible to apply any more advanced statistical analysis on top of it, on the other hand, this is the first paper that deals

with finance on the Dark Web and we hope to get better data and come up with stronger conclusions and analysis of relationships in the future.

One major bias of the questionnaire is the natural absence of users who are just starting out in sales. It is possible that sellers do not yet use accounting when they first make sales, or do not use it when sales are temporary and with very limited quantities of goods. In the questionnaire we approached large retailers because we wanted to know their experience and by definition new retailers had none or very limited experience. Unfortunately, we cannot claim to have selected the 250 largest sellers in any given year, as they cannot be ranked on Dark Markets by number of reviews or sales. The selection was limited to users with at least minimal experience, which means at least a certain number of sales. This varied from marketplace to marketplace, but for example Dream Market, which we mostly reached out to in 2017, had different Vendor Levels (based on reviews) and additionally Trust Levels (based on amount shipped). The Vendor Level was the same across all products for the same Vendor, rating individual products was not possible.

5. CONCLUSION

In this paper, we argue that Dark Markets rely on four sets of institutions. First is a set of moral institutions, specifically free-market, laissez-faire, no crime without a victim ethics. Second set consist of extralegal institutions such as reputation and alternative dispute resolutions, mostly arbitration. Third set is a set of free-market principles such as profit and loss which lead to use of technological innovations, most notably decentralized solutions and anonymization tools. Last is a set of institutions known from the traditional, legal world, which users use not because they have to but because it helps them to operate. We specifically looked at bookkeeping.

The first set ensures that there is a tendency not to offer initiations of violence such as murders, rapes, child porn or strong poisons. It creates an environment for trade to happen. The second set is the way how contracts are enforced, so trade may happen even without the presence of government enforcing. The third set is necessary for innovations to happen, so transactions can be untraceable and identities of both parties of the trade remain secret, if they want them to. The last improves the trade itself. With all of these Dark Markets can become places where demands and supplies meet and people successfully and profitable exchange goods and services.

Our main finding is that these rules of the game are changing and evolving. From the first Dark Market called Silk Road to current projects like OpenBazaar there was and still is ongoing process of successes and failures and corresponding development of the markets in need to adapt. Technologically, Dark Markets were usually one step ahead to the governments.

Looking more closely at Dark Markets we can identify different settings in each particular set. This is essential for evolution of the markets because these sets are competing against each other. As such we see that a Dark Market with a setting of Silk Road would tend to be replaced today, if it would not have been seized by US authorities. Silk Road and few other Dark Markets were based on centralized dispute resolving, mostly escrow service by the market owner. This is a possible way how to resolve disputes but pose a threat from outside in form of seizing the money by governments or from within if an owner steal the funds himself. And it happened many times.

In order to prevent these frauds and seizures Dark Markets developed alternative dispute resolving mechanism. Most stay centralized but voluntarily limit their access to the funds. Some such as OpenBazaar went even further by fully decentralizing the dispute resolving process with arbitration and introducing a free-entry market with private arbiters.

Same development can be seen in decentralization of servers which can be compromised, in anonymization of payment systems from bitcoin to more anonymous cryptocurrencies, in login processes, in encryption of messages and many other aspects.

The empirical part showed beyond doubt that users in an absolutely unregulated market use accounting. They differ in manner, but without exception they use single-entry accounting. It turns out that accounting is ubiquitous and not just a necessary condition in order to comply with governmental measures. Most users keep their accounts in MS Excel, but sellers enter transactions in other environments, including the cloud, which is obviously not secure, but it shows how important at least basic accounting is for sellers.

It raises some policy questions. With Dark Markets as described above it is questionable whether authorities can ever win the War on Drugs. Any government's intervention makes Dark Markets more resilient. Even if not, policy-makers should count with Dark Market. Even more, considering that which each new generation people are usually more likely to use a new technology like bitcoin or Tor.

Dark Markets can also change the behavior of citizens in response to tax increases. In words of economists, it can change the shape of the Laffer Curve towards lower tax revenues at any given tax rate. Presumably, because with Dark Markets it is easier to evade taxes and escape from the legal economy to the grey or even black one.

Also, there is a question of the possibility to ever shut down Dark Markets. Security of cryptomarkets has been significantly improved over last few years. AlphaBay, Dream Market, Outlaw Market, Valhalla, and many others were online for many years without shutdown by government agencies. Many still are, some are reviving. Both private failures and public seizures of Dark Markets only strengthen their security and incentives them and newcomers to innovate. Combination of today's technologies such as Tor, I2P, bitcoin with drones, car sharing and other sharing services, or 3D printing and other innovations can make Dark Markets even harder to stop. And it should be stressed here, that Dark Markets exist only from 2011.

By studying the development in this ongoing experiment in nearly absolutely free market, we can closely see emergence of an unplanned order, innovative combination of existing technology with old and new institutions and possibly even predict how the future (Dark) Markets may look like. While some social scientists make their cases for or against free market with hypothetical visions of how they would look like, we can show how they do look like and how they evolve.

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ANALYSIS OF THE IMPACT OF THE GAMBLING BAN IN PRAGUE

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Abstract: *The trend of the last few years regarding gambling in the Czech Republic is a rapid and significant decline in the supply of land-based gambling venues. In addition to the COVID-19 pandemic (and related lockdowns), legislative changes, the development of online gambling and public demand for restrictions on this business within municipalities are contributing to this trend. Municipalities are motivated on the one hand by the demand of their constituents and on the other hand by tax revenues from gambling in their territory, while these revenues can also offset some local impacts (negative externalities). This paper presents a prediction of lost tax revenues from gambling in the City of Prague, which banned technical games and, to a large extent, live gaming on 1st of January 2021, and an analysis of the impact of these policies.*

Keywords: *addiction, externalities, gambling, impact analysis, policy analysis*

1. INTRODUCTION

Gambling and its negative effects, especially in the form of addiction and risky pathological gambling, is an important and relevant topic that has entered the social debate in recent years. Governments have sought to address the issue and eliminate these impacts both through legislative instruments at the social level and through local instruments, in particular in the form of generally binding ordinances restricting or prohibiting gambling in a given area. The Prague City Council decided to take this step as well, banning the operation of land-based technical gambling (slot machines, VLTs, etc.) throughout the city from 1st of January 2021, as well as the remaining forms of gambling within 41 of the city's 57 districts. This has led to a fairly extensive debate over the impact of these steps not only on the players themselves and the gambling industry, but also on municipal finances, as municipalities have an entitlement to a share of the national gross gambling revenue. The COVID-19 pandemic has also significantly impacted the situation, as the pandemic has resulted in casinos and gaming venues being closed for a portion of 2020 and 2021 due to lockdowns.

This paper will therefore first introduce the reader to the economic context of gambling as an economic activity and summarize the relevant legislation at national and municipal level. Subsequently, the fiscal impact of the above gambling regulation on the budget of the City of Prague will be estimated, both in terms of tax revenues from technical games and tax revenues from other games. The last part of the paper will summarize the most important findings.

This paper is based on the study by Žofčák and Rod (2021) and its methodology, but tackles this issue with updated data and in response to the impact of the COVID-19 pandemic and related policies.

2. SELECTED ASPECTS OF GAMBLING IN THE CONTEXT OF ECONOMICS

Since economics in its broad sense is a science dealing with human behavior, it is relevant and useful to study gambling, or pathological gambling, through its prism. However, the study of this phenomenon is to some extent 'monopolized' by addictionologists and is marked by a lack of an economic approach (see Eadington (2003)). The conclusions of addictionologists (and non-economists in general), nonetheless, are often at odds with fundamental economic knowledge. Interdisciplinary collaboration thus represents a huge potential in addressing this societal problem.

From the perspective of economic science, gambling is seen as a standard economic activity like any other (albeit burdened with a certain probability of addiction and associated externalities). Thus, economics researchers have the potential to approach research on this issue without preconceptions and with a clearly stated methodology and assumptions when assessing the benefits and costs of an activity (Eadington, 2003).

On the contrary, some widely cited non-economic authors consider gambling to be an automatically sinful good (*sin good*, see Gross (1998)) or an *a priori* unhealthy activity (e.g., Nešpor and Csémy (2014)). In contrast, economics sees gambling as an activity that, in the vast majority of cases, benefits the (satisfies the demand of) gambler in the form of excitement, relaxation, leisure, etc. and, conversely, offers the gambling house or casino opportunities to maximize profit. One important difference is the concept of the rationality of the gambler – economists make extensive use of the concept of *homo oeconomicus*, i.e. the model of a rational economic actor who maximizes his utility¹. Liberal economists argue that the rationality of the individual cannot even be denied under any circumstances, as there is no external insight into the decision-making process of the economic agent (Mises, 2006). In contrast, many popularly cited authors (e.g., Productivity Commission (1999; 2010)) reject, for example, Becker and Murphy's (1988) modern theory of rational addiction as unconvincing. The Australian authors of the Productivity Commission (1999; 2010) consider gamblers to be unable to truly perceive the costs and benefits of their own activities and, for example, question whether they spend money voluntarily. This argument has opened the way for other researchers to deviate from the clearly stated methodology and e.g. further increase the social costs of gambling, see below. The Czech authors Winkler et al. (2014) from the Prague Psychiatric Centre, whose study served as the explanatory memorandum for the Lottery Act (Act No. 186/2016 Coll.) use the same approach.

However, these arguments are debatable from an economic point of view – the decision to participate in a risky activity is not in itself irrational, even despite later regretting the decision as some risk is associated with everyday activities. As Walker and Barnett (1999) state, the decision to engage in gambling is a rational one, as it is usually made in the knowledge of the expected utility of the various possible outcomes of the activity. An individual does not start gambling to become addicted, but to make a certain use of his free time and optimize the use of his scarce resources, as for the vast majority of people, gambling is really just a leisure activity. In the context of policy making, Mises (2006) also points out the risk of *a priori* viewing pathological gamblers as irrational. This argument is complemented by Eadington

¹ However, it would be a mistake to assume that economic science is uniform in its conception of rationality – behavioral economics, for example, is based on the concept of bounded rationality (see e.g. Gigerenzer and Selten, 2002).

(2003) in the context of gambling – if the politician's goal in making policy decisions is to maximize freedom of choice, the rationality of the gambler is a good starting point.

The rationality debate is followed by the often-used quantification of the harmfulness of gambling by calculating the social costs of gambling. The prominent position of this tool is also demonstrated by the fact that the calculation of social costs is the main content of the study by Winkler et al. (2014) and the amount of these costs was one of the main arguments for the introduction of the above-mentioned Lottery Act.

The sum of the social costs of gambling provides an easily presentable output for policy-makers, which helps to quantify the scale of the problems that the activity causes in society, and which will also help to convince the general public of the need for intervention. Unfortunately, the calculation itself suffers from very significant problems that cannot be ignored and must be discussed by every researcher. The first problem is the huge variability in the resulting social costs. Estimates of the social cost per pathological gambler in the US range from \$9,469 (Thompson, Gazel and Rickman, 1997), \$13,200 (Goodman, 1995), \$15,000–33,500 (Grinols and Omorov, 1996) to \$53,000 (Kindt, 1995). In the Czech context, the aforementioned study by Winkler et al. (2014) estimated the annual social costs at CZK 14.2–16.1 billion, while the study by Nešpor and Csémy (2016) estimated even CZK 26.5 billion. Behind such different results is a very vague and inconsistent methodology of their calculation, which is not based on fixed assumptions, but rather on the whims and approach of a particular author to gambling as such.

The problem with these studies is the inconsistent definition of the social costs of gambling, the different study designs (cost-of-illness studies and cost-benefit studies), the non-inclusion of the social benefits of gambling, and the different items that different studies include in the final total. The rare exceptions that come up with critiques of the aforementioned studies and revisions of their social costs are articles by Walker and Barnett (1999), Walker (2007), or Walker and Sobel (2016).

These critiques use several basic principles when calculating (or revising) social costs of gambling. The first principle is the non-inclusion of transfers in the sum of social costs (this transfer principle was illustrated on an example of theft by Tullock (1967)). The value of the forfeited money and bad debts are themselves transfers, as this money has not gone anywhere, it has merely been redistributed from gamblers to gambling venue and casino owners. Newly incurred social costs could be, for example, the cost of collecting these debts, the harm to the family, etc. Related to this is the issue of internalized costs, i.e. costs that fall on the gambler himself and which may not be counted as social costs. Apart from the debts mentioned, this is a very popular item, e.g. loss of work productivity (or loss of employment), money for addiction treatment, etc. The employer is in a voluntary contract with the employee-gambler and compensates the lower productivity with, for example, reduced wages. The second principle is the distinction between *technological* and *pecuniary externalities*. It is relevant to perceive for example the noise of the casino as a social cost, as this noise affects e.g. the adjacent restaurant, which has to have its windows soundproofed in order to continue to receive guests – this is therefore a technological externality. However, it is not relevant to view it in the same light if the casino lures guests away from the restaurant to its own restaurant, as this is a natural manifestation of market forces and voluntary interaction on the market, and thus a monetary externality.

The third major problem Walker highlights is the issue of comorbidities. For example, it is extremely difficult to determine whether individual depression or job loss is a consequence or a cause of gambling. This problem can be illustrated, for example, by the research of Thompson et al. (1996) – of the 98 Gamblers Anonymous members surveyed, 30 admitted to alcoholism, 25 admitted to compulsive shopping, 22 admitted to binge eating, 14 admitted to drug problems, and 4 admitted to depression. Follow-up research by WEFA (1997) in

Connecticut found similar results for a sample of 112 local anonymous gamblers. Few studies take this problem into account, and if they do, it is often by simply reducing the amount of social costs by a fixed percentage, see e.g. Productivity Commission (1999; 2010).

Walker illustrated this critique with the reduction in social costs mentioned above by various authors. For example, for the study by Thompson et al. (1997), Walker and Barnett (1999) reduced the \$9,469 figure to \$2,974, and in the case of the paper by Schwer et al. (2003), the calculated total social cost was reduced from \$302–470 million to only \$12–32 million. Moreover, as Eadington (2003) adds, it is not possible to simply quantify a negative phenomenon and declare it a social cost – it is necessary to compare the situation before and after regulation (which in itself may impose social costs). As far as the Czech environment is concerned, Schwarz et al. (2015) revised the study by Winkler et al. (2014) and with the help of these tools managed to reduce the calculated costs from 14.2–16.1 billion CZK to 5.5–5.7 billion CZK. Schwarz et al. (2015) thus drew attention to the dangerous situation where the conclusions of a study with inconsistent methodology stand as one of the main arguments in the explanatory memorandum of such an extensive law as the aforementioned Act No. 186/2016 Coll.

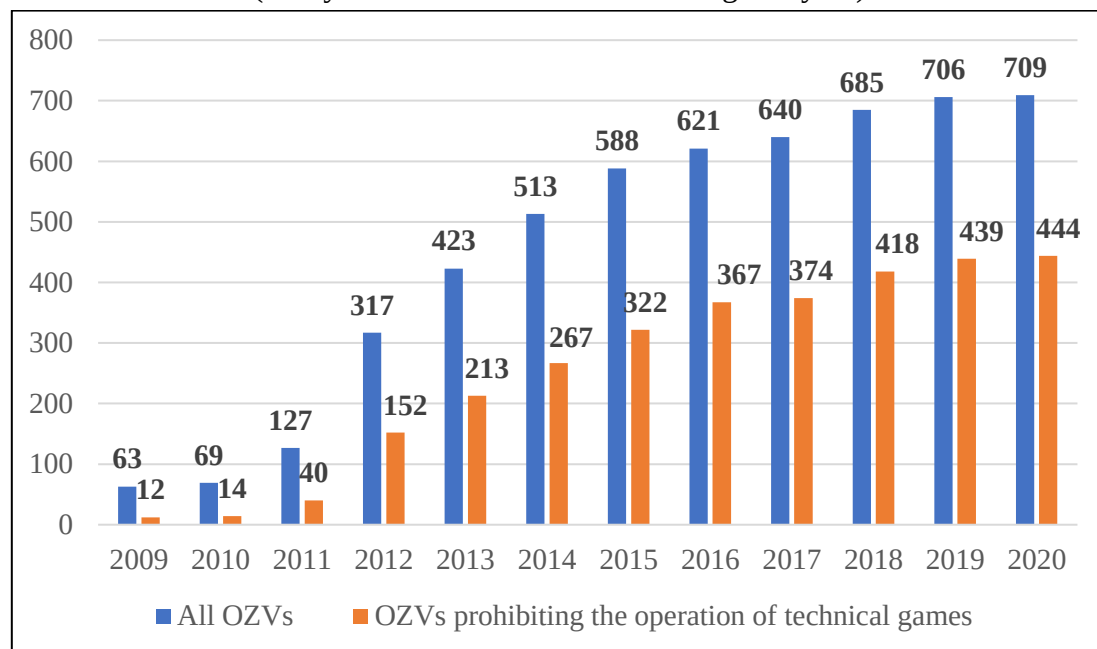
3. A BRIEF SUMMARY OF RELEVANT TAX AND MUNICIPAL LEGISLATION AND METHODOLOGY

In general, the main and most important law in this context is Act No. 186/2016 Coll. (the Lottery Act), on gambling, which in 2017 replaced the more than quarter-century-old Act No. 202/1990 Coll. This act defines various types of games, determines the format of casinos and gambling halls, regulates the offer of gambling, online gambling, introduces self-regulatory measures, etc. Regarding the tax rate, the original Act No. 186/2016 Coll. imposed a tax of 23% on all gambling games, with the exception of technical games (35%). As of 1st of January 2020, the tax rate for lotteries was also increased to 35% (Act No. 364/2019 Coll.) and all winnings above 1 million CZK are taxed at 15%.

What is key to this paper is that the law allows municipalities to regulate gambling in their territory – specifically, municipalities can restrict or completely prohibit the operation of bingo, technical games, live games or small-scale tournaments through a general binding ordinance (*obecně závazné vyhlášky* – OZV). More and more municipalities are taking advantage of this option – in 2020, a total of 709 municipalities introduced OZV in their territory. 444 (62.6%) of these municipalities banned technical games on their territory altogether. Among these municipalities there are also large cities, such as Brno, České Budějovice or Jihlava, other major cities are Frýdek-Místek, Havířov, Kolín and others (Mravčík et al., 2021).

The evolution of the number of cities with OZVs restricting gambling is summarized in Figure 1.

Figure 1. Development of the number of municipalities with a generally binding ordinance regulating gambling in the Czech Republic between 2009 and 2020 (always as of 31st of December of a given year)



Source: Mravčík et al. (2021, p. 22)

An important fact is that 30% of the national gross gambling revenue goes to the municipalities and 70% to the state – the exception is the tax on technical games, where 65% of the tax revenue goes to the municipalities and 35% to the state. However, this redistributed part of the tax does not go evenly to the municipalities – in simplified terms, the more a municipality contributes to the national gross gambling tax revenue, the higher its entitlement is. In the case of the tax on technical gaming, this is the ratio of the sum of the gaming positions of authorized terminal equipment (e.g. slot machines) to the total sum of the gaming positions of authorized terminal equipment. The municipal budget also receives money from online gambling – both from technical and non-technical games – but for technical games, this share is conditional on the municipality having land-based technical games on its territory, according to Act No. 187/2016 Coll. Simply put, if a municipality abolishes all "physical" technical games on its territory, it loses all entitlement to a share of the tax revenue from technical games, even though its residents may play technical games online. This is not the case for non-technical games (live games, odds betting, etc.), where the municipality's share of the statewide revenue is based on the municipality's share of the corporate income tax revenue, even if it bans land-based non-technical games in its territory. The Ministry of Finance publishes the specific shares of each municipality four times a year. (Finanční správa, 2017)

In general, for many municipalities, tax revenues from gambling (and in particular from technical gaming, which accounts for 65% of national tax revenues) are a significant budget item – especially during the COVID-19 pandemic and rising inflation. Councilors and municipal representatives must therefore optimize the social (or rather local) impact of gambling on the population on the one hand and their fiscal revenues on the other. The general binding ordinances give them some options in this respect and one can simplistically find two strategies – either to ban gambling (or certain forms of gambling) across the whole territory, or to try to cultivate this sector and keep the players in a controlled environment (thanks to regulation done by Lottery Act), taking into account the fact that pathological gamblers constitute a minority of visitors. In the case of the City of Prague, whose decision is the subject

of this study, it was the former option, i.e. a de facto blanket ban on land-based technical games and substantial regulation of land-based live games. It has to be also taken into account, that factors such as the impact of the COVID-19 pandemic or changes in tax legislation that reduce municipal revenues are putting significant pressure on municipal budgets.

Regarding methodology, it is first necessary to establish assumptions for estimating the potential tax revenues of the City of Prague (i.e. the revenues that the City of Prague would have if gambling were not banned) from all gambling and technical gambling in the years 2022–2025. These potential revenues will be extrapolated from the revenue data of the last few years. In the case of revenues from technical games, based on the above rules for redistribution of tax revenues from these games, it can be assumed that as the number of technical games decreases, the corresponding tax revenue of the City of Prague will also decrease proportionally. Although the city has banned technical games from the beginning of 2021, individual machines must first have their licenses expire. The difference between the potential tax revenue and the forecast realized tax revenue will then represent the foregone tax revenue. Lost revenue from other games (in particular live games) will be calculated in a similar way, where the percentage decrease in supply of these games after the ban described above will reflect the percentage decrease in tax revenue. The sum of these two items will represent the total lost tax revenue of the City of Prague.

4. QUANTIFICATION OF LOST REVENUES OF THE CITY OF PRAGUE

The following Figure 2 summarizes the available data on the City of Prague's gambling tax revenue (the aforementioned 30% of the national tax revenue from non-technical and 65% from technical gambling):

Figure 2. Revenues of the City of Prague from the share of gambling tax in 2016–2021
(in CZK million)

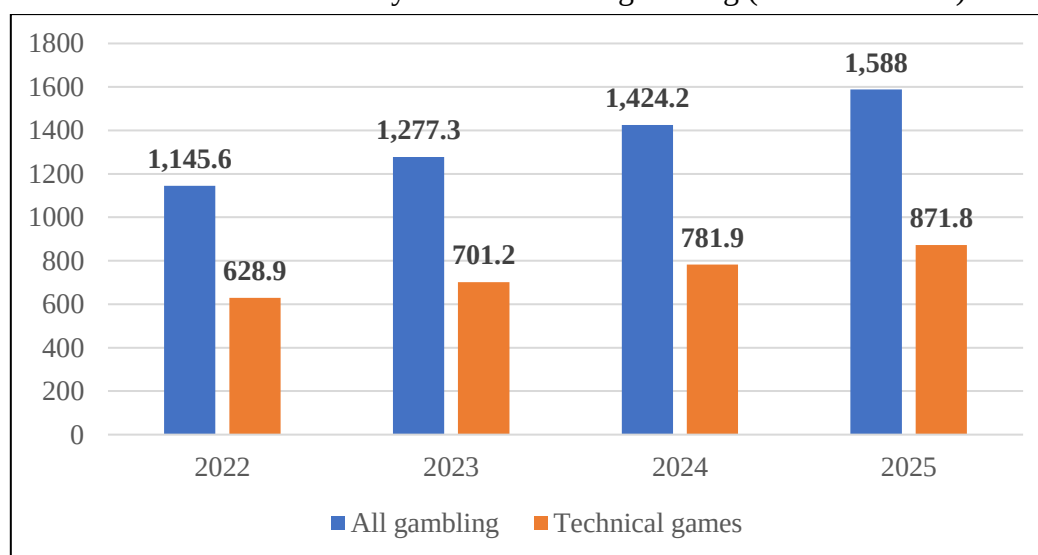


Source: Magistrát hl. m. Prahy (2016; 2017; 2018; 2019; 2020; 2021), own calculation

The chart shows a particular decline in 2020, when lockdowns hit the sector hardest. Tax revenue from technical games fell this year for the first time since 2017 (clearly due to closed gaming and casinos) and the rate of growth in tax revenue from all games slowed – while revenue grew by 11.5% between 2018 and 2019, it was only 5.9% in the following year. Revenue in 2021 grew by a record 26.1%.

It is not possible to predict with certainty what the growth of the gambling industry will be in the coming years, but as a conservative approach, let us assume that it will grow at least as fast as before the COVID-19 pandemic, i.e. at a rate of 11.5% per year (annual growth between 2019 and 2020). The growth rates between the years 2019 and 2020 and the years 2020 and 2021 can be considered as deviating from normal due to covid lockdowns, the online gambling boom, etc. (the geometric mean of these three growth rates is 14.2% per year). At the same time, during the years 2018–2021, the share of tax revenue from technical games in total tax revenue from gambling was 51–54.9%, let's use again the value from the pre-covid year 2019, i.e. 54.9%. The final assumption is that there will be no nationwide lockdowns during these years, which would close gambling halls and casinos nationwide – we assume so because of the fairly high vaccination rate of the population and especially because of the Czech government's bad experience with lockdowns and the discontent of the population. The extrapolated values are summarized in Figure 3:

Figure 3. Predicted potential revenues of the City of Prague from the share of gambling tax in 2022–2025 if the city had not banned gambling (in CZK million)



Source: own calculation

The authors of this paper have an internal document of gambling providers (which unfortunately they cannot fully disclose due to data sensitivity) that confirms these assumptions. The document shows that the reported GGR (gross gaming revenue) from technical gaming (land-based and online) for Q1 2022 is 2.5 times higher than the same period in 2021 (during which land-based gaming was closed) and 1.6 times higher than the same period in 2020. The document also shows the growing share of online technical games in the total GGR for technical games, while in 2020 the GGR from land-based technical games was roughly 1.5 times that of online technical games, in 2021 it was roughly half in favour of online technical games. This is further evidence that the COVID-19 pandemic has resulted in, among other things, a shift of players to the online environment (see also Mravčík et al. (2021)), but this trend seems to have been accelerated by the pandemic and would have occurred even without it.

4.1 Lost revenues from the tax on technical games

As mentioned above, the City of Prague has banned all land-based technical games on its territory from 1st of January 2020, except for those whose license has not yet expired. In the case of technical games, it is therefore first necessary to calculate how many technical gaming devices will gradually lose their permits (and thus their operation) between 2022 and 2024 – as

the share of the national tax revenue from technical games to which the city will be entitled will decrease.

Regarding technical games, there are quite comprehensive statistics available on the website of the Czech Ministry of Finance, which record every single permitted gambling game (or gambling position) under Act No. 186/2016 Coll. by live/technical games, by the municipality where it is located, and even indicate the end of its license. The most recent database available at the time of writing is dated 15th of August 2022 (see MFČR (2022a; 2022b)).

At the time of writing, a total of 34,205 technical games (gaming machines permitted under both the old and new law) are in operation, of which 3,644 (10.7%) are located in Prague. The license for each Prague machine will expire according to the following timetable:

- during the first quarter of 2023, the licenses of 276 devices will expire, so at the end of this period there will be 3,368 devices in operation,
- during the second quarter of 2023, the licenses of 30 devices will expire, so at the end of this period there will be 3,338 devices in operation,
- during the third quarter of 2023, the licenses of 104 devices will expire, so at the end of this period there will be 3,243 devices in operation,
- during the fourth quarter of 2023, the licenses of 2,196 devices will expire, so at the end of this period there will be 1,038 devices in operation,
- during the first quarter of 2024, the licenses of the remaining 1 038 devices will expire, the last one on 17th of March 2024.

The loss of tax revenue from technical games in the capital city of Prague will therefore not occur until the first quarter of 2023. If we assume that the operators of these games do not cease operations for any reason other than the expiration of their licenses, the City's revenue from the tax on technical games will be:

- 92.4% of the original amount without the ban in the first quarter of 2023,
- 91.6% of the original amount without the ban in the second quarter of 2023,
- 88.7% of the original amount without the ban in the third quarter of 2023,
- 28.5% of the original amount without the ban in the fourth quarter of 2023,
- 0% of the original amount without the ban starting from the end of the first quarter of 2024.

Let us now apply these estimates to the extrapolated potential tax revenues that the City of Prague would receive if gambling were not prohibited (see Figure 3). For the sake of simplicity, we will assume that gambling operators will acquire taxable income evenly throughout the year, and therefore the total annual amount will simply be divided by four when divided into quarters. For example, potential tax revenues in all quarters of 2023 amount to CZK 175.3 million. CZK (CZK 701.2 million divided by four). The resulting losses of the City of Prague on the tax on technical games are summarized in Table 1

Table 1. Potential tax revenues, estimated tax revenues and tax loss from technical games of the City of Prague in 2022–2025 (in CZK million)

	Potential tax revenues from technical games	Estimated tax revenues from technical games	Tax loss
Q1 2022	157.2	157.2	0.0
Q2 2022	157.2	157.2	0.0
Q3 2022	157.2	157.2	0.0
Q4 2022	157.2	157.2	0.0
Q1 2023	175.3	162.0	13.3
Q2 2023	175.3	160.6	14.7
Q3 2023	175.3	155.6	19.7
Q4 2023	175.3	49.9	125.4
Q1 2024	195.5	0.0	195.5
Q2 2024	195.5	0.0	195.5
Q3 2024	195.5	0.0	195.5
Q4 2024	195.5	0.0	195.5
Q1 2025	217.9	0.0	217.9
Q2 2025	217.9	0.0	217.9
Q3 2025	217.9	0.0	217.9
Q4 2025	217.9	0.0	217.9
TOTAL	2,354.9	528.1	1,826.8

Source: own calculation

Therefore, the Prague City will lose a total of CZK 1.8 billion between 2022 and 2025 due to a blanket ban on technical games in the entire territory. In each year thereafter, the City will lose the full amount of tax on technical games that it could have collected.

4.2 Lost revenues from the tax on other games

In addition to the above-mentioned ban on technical games, the City of Prague also approved a blanket ban on all gambling in 41 of the 57 districts of the city as of the same date (however, in some of them the ban was already in place before 1st of January 2021). The remaining 16 districts (e.g. Prague 1, Prague 3 and others) therefore only allow live games on their territory. As noted above, the City will continue to collect a share of statewide tax revenue from non-technical games played online, as the potentially declining number of gaming positions has no impact here.

The potential revenue from other non-technical games (land-based and online) that the City of Prague would receive in 2022–2025 (if it would not implement the above measures) can be obtained by simply subtracting the total estimated tax revenue and the tax revenue from technical games. In 2022, for example, this estimated revenue would amount to CZK 516.6 million (CZK 1,145.6 million minus CZK 628.9 million). We will now again for a sake of simplicity assume that the percentage decline in the percentage of non-technical games offered in Prague will reflect the reduced tax revenue that Prague will receive from these games. On 1st of January 2020, there were 842 live game positions in Prague out of a total of 4,474 positions (18.8%) in the whole Czech Republic (MFČR, 2020a). On 1st of January 2021, the day when the ban on live gambling started in 41 out of 57 districts, there were 824 such positions available in Prague out of a total of 4,724 (17.4% share) – however, 38 gaming positions were registered in districts that have enforced a complete ban on gambling, so subtracting these 38 positions brings us to 786 gaming positions out of a total of 4,686 (16.8%

share). (MFČR, 2020b) Compared to the previous year, the number of live gaming positions has therefore decreased by 6.7%, so in simplified terms it can be assumed that the City of Prague will always earn 6.7% less than the potential yearly tax revenue over the next few years. The results are summarized in Table 2.

Table 2. Potential tax revenues, estimated tax revenues and tax loss from non-technical games of the City of Prague in 2022–2025 (in CZK million)

	Potential tax revenues from non-technical games	Estimated tax revenues from non-technical games	Tax loss
2022	516.6	482.0	34.6
2023	576.1	537.5	38.6
2024	642.3	599.3	43.0
2025	716.2	668.2	48.0
TOTAL	2,451.2	2,286.9	164.2

Source: own calculation

Therefore, the Prague City will lose a total of CZK 164.2 million between 2022 and 2025 due to the ban on non-technical games in the said districts. The total sum of lost tax revenue for both types of gambling is illustrated in Table 3.

Table 3. Lost tax revenues for technical and non-technical games of the City of Prague in 2022–2025 (in CZK million)

	Lost tax revenue from technical games	Lost tax revenue from non-technical games	Total lost tax revenue
2022	0,0	34,6	34,6
2023	173,1	38,6	211,7
2024	781,9	43,0	824,9
2025	871,8	48,0	919,8
TOTAL	1 826,8	164,2	1 991,0

Source: own calculation

5. DISCUSSION

First of all, it should be noted again that this analysis is highly simplistic, is subject to some fairly strong assumptions, and is based on the data used. The extrapolation of potential tax revenues is based on only a few years of historical observation, while at the same time future developments are quite difficult to predict due to factors such as the further development of the COVID-19 pandemic, rising inflation rates, etc. Nevertheless, several general trends can be observed, e.g. a shift of gamblers towards the online environment or an overall increasing number of gamblers (see Mravčík et al. (2021)). This analysis is intended to serve more as a rough estimate of the opportunity cost that the City of Prague has lost by choosing the path of banning gambling on its territory – the question is whether the nearly CZK 2 billion could have been better spent on for example the prevention of pathological gambling or the removal of negative externalities. Another important factor is the substitution of land-based gambling by its online form. Banning land-based devices does not mean that (especially pathologically

addicted) gamblers will stop playing technical games. Substitutes may include not only technical online games, but also black-market gambling and other illegal forms of gambling (which do not generate any tax revenue for municipalities or the state). If technical gamblers move en masse to the online space (which is happening to some extent), it will increase revenue for online gambling operators, who will pay higher taxes, but as Prague gradually eliminates physical gaming positions, it will receive a smaller and smaller portion of this larger “pie”.

This calculation also assumes that the supply of technical games in other parts of the country will be approximately constant and therefore the ratio of technical games offered in Prague relative to technical games offered in the whole Czech Republic will decrease. If it were to decrease (or, conversely, increase) in the rest of the country, it would also mean a change in the ratio received.

Regarding non-technical gaming, there will be an open market in the 16 districts with permitted live gaming, so it is possible that these districts will attract live gaming providers from other cities to supply the rest of Prague with casinos. Again, we do not know in advance the development of the supply of live gaming in the rest of the country – if this supply grows, Prague's share of the national tax on non-technical gaming will decrease, if it decreases, it will increase. Overall, however, we can expect a continued trend of players moving to the online space, thanks in part to the ongoing coronavirus pandemic and related policies.

6. CONCLUSION

Based on the information and data available at the time of writing this study (August 2022), the current form of regulation (i.e. a ban on technical games throughout the City of Prague and a ban on all gambling in 41 out of 57 districts) and the available data, a simplified estimate of the fiscal impact of this regulation has been made. If the assumptions mentioned in the text are valid, the blanket ban on technical games on the territory of the city from 1 January 2021 should reduce the tax revenues of the city treasury already in 2023 by CZK 173.1 million. By 2025, the loss of tax revenue on technical games will total CZK 1,826.8 million. Prague will also lose tax revenue from non-technical games (mainly live games) starting already in the year 2022 (CZK 34.6 million) and by 2025 it is expected to lose a total of CZK 164.2 million from these games. The combined total loss of tax revenue from both types of games as a result of these measures is estimated at CZK 1,991 million.

This assumes an average annual growth of 11.5% in potential tax revenue from all types of gambling and a 54.9% share of this amount attributable to tax revenue from technical gambling. Although these are highly simplified calculations dependent on a large number of assumptions and a large number of unpredictable factors may modify these calculations, these results provide at least a rough estimate of the money that the City of Prague has forgone and that could have been used to prevent pathological phenomena, to eliminate negative externalities, etc. Budget optimization is an important issue today not only in the context of the COVID-19 pandemic, but also in view of rising inflation and other adverse macroeconomic factors. The COVID-19 pandemic and the associated lockdowns have hit the gambling industry particularly hard and accelerated, for example, the trend of players moving from land-based gaming and casinos to the online space. Even the closure of gambling halls and casinos for a total of 138 days in 2020 did not foreshadow the collapse of the industry, which was able to cope with this problem (especially through the aforementioned substitution of online gaming).

An important element that could be addressed in follow-up research is the decision-making process of decision-makers at municipal levels. They are faced with the decision to either ban (or severely restrict) gambling on their territory (through the OZV) or tolerate gambling and try to cultivate it through regulated gambling halls and casinos. This paper also

shows that the complete closure of land-based gambling for more than a third of the year did not eradicate pathological phenomena, but only "took the players out of sight". Moreover, the opportunity cost of the decision to ban gambling across the board is the lost tax revenue. At the same time, online gambling is quite risky in terms of developing pathological gambling addiction (Mravcik et al., 2021).

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Quantitative Studies

CREDIT LOSS MODELLING FROM A TOP-DOWN STRESS TESTING PERSPECTIVE FOR A SMALL OPEN ECONOMY¹

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Abstract: *IFRS 9 is a principle-based accounting, and bank have numerous implementation choices in terms of discretion. This brings significant modelling challenges, complexity, and therefore model risk. The objective of the paper is to present a loan-based model that captures the migration of individual exposures over time. This model is designed to suite to IFRS 9 compatible estimation in top-down solvency stress tests. In contrast to most European regulators, we apply “one-factor representation” of the transition matrix employing bank-level granular data. Furthermore, our model takes explicit account of model uncertainty to eliminate misreporting incentives, which focuses on point-in-time risk measurement. Although, the model is estimated for the Maltese economy, the key conclusions and methods are valid to any economy with the described features and data availability.*

Keywords: *expected credit loss, stress testing, transition matrix, IFRS 9, COVID-19*

JEL code: *G21, G01, G17, G18*

1. INTRODUCTION

The expected credit losses (ECL) regime brought a significant modelling complexity, challenges, and hence model risks. The ECL regime requires that the forward-looking information used in the estimated model is both reasonable and supportable. The ECL-based impairment model under IFRS 9 offers a certain degree of flexibility and does not dictate when a significant increase in credit risk has occurred. While each financial institution (FI) should make its own assumptions, in other words takes its own decisions on the level of provisions required in line with new accounting standards, financial regulators and supervisors expect financial institutions to consider their guidance when estimating the ECL. FIs supposed to assess the extent to which any sudden changes in the short-term economic outlook would result in impact over the entire life of the financial instrument.

This paper focuses on IFSR 9 accounting regime, while abstaining from discussion on national supervisory approaches to provisioning, and discussion on procyclicality. We aim to present an application of top-down solvency analysis for scenario conditional expected credit loss (ECL) estimation for a small open economy of Malta. The paper is organized in the following way. First, the next section provides the literature review to shed light on banks’

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credit rating behaviour, and model uncertainty in the context of ECL. Second, we elaborate on the methodology for IFRS 9 compatible estimation in top-down solvency stress tests that can be applicable for a small open economy during the high uncertainty triggered by the COVID-19 pandemic. Finally, we present the results and conclusion.

2. LITERATURE

Credit transition matrices are essential component of credit risk modelling. The transition matrices (TMs) characterise the expected changes in credit quality of obligors and have many practical applications, including portfolio risk assessment (Bangia et al., 2002). TMs are also used in bank stress testing, which took important role within the regulatory toolkit after the financial crisis in 2008 (Varotto 2012). Recently, TMs have gained attention among regulators and scholars due to modelling of lifetime credit losses required by IFRS 9 regulation in Europe. Numerous approaches exist to operationalize IFRS 9 modelling for a top-down stress testing. One of the most frequently discussed model approaches are the log-odds, logit-based or fractional probit modelling of the transitional probabilities in the individual cells of a TM. This approach, in modified form, is employed by ECB for euro-area-wide stress tests. Despite the convenience of this approach, the projected probabilities in each row of scenario-conditional TMs need to be re-scaled to sum to one (Gross et.al 2020). For this reason, a “one-factor representation” of TM that do not suffer from this technical drawback is typically employed by the financial industry (Belkin et al. 1998, Wei 2003).

Our research contributes to three literature streams. First, we contribute to banks’ credit rating behaviour patterns (Gomez-Gonzalez, et al., 2010; Lu, 2007). A modelling of specific sectors, industries, or regions individually (Nickell et al., 2000; Kavvathas 2001; Stepankova 2021) indicates the existence of industry and region-specific credit cycles. Furthermore, numerous studies have documented that the fact that rating TMs vary according to the industry of the obligor (Frydmann and Schuermann 2008). Additionally, our research contributes to the literature related to models based on data of individual borrowers, which in principle leads to more accurate results (Asberg and Shahnazarian 2008, Castren, et. al 2008).

Second, the procyclical dynamic of ECL models are highlighted by scholars and prudential policy makers (BIS 2021). ECL estimates are very sensitive to macroeconomic forecasts. The evidence provided by the ECB (Huizinga et al. 2019) suggests that a deterioration in the economic outlook could lead to a manifold increase in the probability of default, and transfer of financial exposures from Stage 1 to Stage 2. Furthermore, the outcomes of the recent IFRS 9 benchmarking exercise confirms that loan loss provisions are also calibrated based on a desired sensitivity towards future economic forecasts (SSM 2021). The sensitivity may tilt towards a point-in time (PIT) or through-the cycle (TTC) calibration. Hence, it rises the concern that high provisioning sensitivities exacerbate the lending cycle in both upturns and downturns. This suggests that the overall effect of the ECL on financial stability to certain extend depends on banks’ behaviour, and the extent to which ECL standards improve in terms of timeliness and accuracy of loss recognition and the transparency of banks’ balance sheets. In this context, BIS (2021) suggests that further research needs to be carried out to establish the link between loss recognition practices under ECL and banks’ lending behaviour. This issue became even more prominent in light of the COVID-19 outbreak and its potential consequences for banks’ loan loss provisions. The COVID-19 pandemic offers a unique opportunity to assess banks’ reaction to an unprecedented crisis and the associated high levels of uncertainty. Since the crisis outbreak, the financial regulators attempt to reduce inappropriate volatility in regulatory capital and financial statements and avoid procyclical tightening effect on bank lending in spite of the uncertainty. While each FI makes its own assumptions and take its own decisions on the level

of provisions in line with IFRS 9, the EU regulatory bodies expect them to comply with guidance when estimating the ECL² and use centralized macroeconomic scenarios for IFRS 9 modelling purposes. Furthermore, ESMA (2020) is of a view that the principle-based nature of IFRS 9 includes sufficient flexibility to faithfully reflect the specific circumstances of the COVID-19 pandemic and the associated public policy measures.

Generally, there is no consensus on the use of forecasting models among scholars or regulators. Sousa et al. (2013) suggest that even if a model is correctly specified, it is obvious that more structure can improve the performance. Furthermore, model uncertainty can outweigh parameter uncertainty (Sousa 2013, Avramov 2012). In recognition of the uncertainty associated with the ECL predictive model, Barbers (2000), Xia (2001), Sousa, J. et. al (2013), Gross and Población (2019) and Gross et.al (2020) use Bayesian methods to account for parameter uncertainty and find that predictability can be significantly improved.

Recently the concept of model uncertainty received some attention in the literature related to credit risk and stress tests (Sousa, J., et. al 2013, Gross and Población 2019, Gross et.al 2020, Budnik 2020), which refers to uncertainty about the number and the nature of covariates to include in the model. The methods propose to average the parameter values over all relevant alternative models using posterior model probabilities as the corresponding weights for estimating the relative importance of the difference predictors (Raftery 1995).

3. DATA

This research is based on anonymised data reported by credit institutions (banks) under the Central Bank of Malta Directive No. 14 that provides information on any existing debtor who has an end-of month balance of exposures exceeding €5,000. Data reported under the Credit Central Register are used to capture behavioural pattern on loans across economic sectors, in other words inform the model on frequency of each loan to be reclassified from one stage to another. Data from banks allow estimation of country and industry specific TM, which proves to lead to improvement in the accuracy of forward-looking credit risk models (Stepankova 2021). Furthermore, we applied our model on data reported under the MFSA Banking Rule No. 06 to estimate the exposure of individual IFRS 9 stages as per economic sector in Malta.

Two scenarios are considered: a baseline based on the Central Bank of Malta's Economic Projections and adverse scenario designed by the European banking Authorities (EBA). Additionally, to incorporate the assumptions of the dynamic balance sheet we applied the CBM's credit growth rate projections (Economic Update 2/2021, Central Bank of Malta).

4. METHODOLOGY

This section presents a top-down credit risk model framework for scenario-conditional expected credit loss (ECL) estimation. Assets are classified according to International Financial Reporting Standards (IFRS 9) stages: S1- performing with stable risk profile (days past due less than 30 days), S2- performing exposures with significant increase in credit risk (days past due between 30–90 days), and S3 – non-performing exposures (days past due more than 90 days).

² EU government established economic support programs for impacted businesses and industries. While the form of the support programs varies across the EU countries, they are designed to mitigate the adverse impact of COVID-19, FIs (especially Sis) are expected to consider the guidance related to the collective assessment of the significant increase in credit risk (SICR) (ESMA 2020). Furthermore, the application of public or private moratoria, aimed at addressing systemic economic impact of the COVID-19 pandemic, should not be automatically considered as a significant increase in credit risk (EBA 2020).

The evolution of the distribution of assets across stages from one quarter to the next can thus be described by the sector-specific transition probability matrix:

$$\begin{matrix} TR_{S_1, S_1, t}^v & TR_{S_1, S_2, t}^v & TR_{S_1, S_3, t}^v \\ TR_{S_2, S_1, t}^v & TR_{S_2, S_2, t}^v & TR_{S_2, S_3, t}^v \\ TR_{S_3, S_1, t}^v & TR_{S_3, S_2, t}^v & TR_{S_3, S_3, t}^v \end{matrix} \quad (1)$$

where $TR_{S_j, S_k, t}^v$ = Probability {Assets that are classified as S_j in time t will be classified as S_k in time $t+1$ }, v corresponds to the four segment (mortgages, resident non-financial corporations (NFCs), non-resident NFCs and consumer loans) and t represents time.

The transition matrix (TM) models are introduced to capture the migration of individual exposures between different risk categories over time and their dependence on macro-financial conditions. The TMs are modelled at the portfolio level, in line with IFRS 9 guidance. A split of the portfolios that is considered includes: mortgages, resident NFCs, non- resident NFCs and consumer loans.

A “one-factor representation” (later referred as a “Z-score”) of TMs is directly applicable to IFRS 9 TMs (Gross et.al 2020). This methodology has been long in use in the financial industry for TM modelling of ratings (Belkin et al. 1998). A “Z-score” is used to capture the evolution of time series of transition matrices in one number per point in time. It represents creditworthiness of the sector, where lower score means higher risk, in other words, the downward move of assets from S1 to S2 or defaults into S3 being more sizable than historically on average.

According to Belkin et al. (1998), an underlying random variable X measures the changes in creditworthiness, and these changes are caused by two factors: (1) a function of an idiosyncratic component Y , and (2) a systematic economy wide component W measuring credit cycle, being independent on Y .

$$X_t = \sqrt{1 - \rho} Y_t + \sqrt{\rho} W_t \quad (2)$$

Both Y and W are independent unit normal random variables, ρ captures the correlation between W and X and is computed as the percentage of the variance of X explained by W . Suppose that a borrower is initially at the rating grade G . If its creditworthiness X is located at the interval $(x_{g+1}^G, x_g^G]$, then this borrower will be at the grade g this year. Let $\Delta(x_{g+1}^G, x_g^G, w_t)$ be the transition probability from rating grade x_g^G to rating grade x_{g+1}^G , at time t conditional on the given systemic component $W_t = w_t$.

The fitted transition probabilities between different risk categories are defined as follows:

$$\Delta(x_{g+1}^G, x_g^G, w_t) = \varphi\left(\frac{x_{g+1}^G - \sqrt{\rho} w_t}{\sqrt{1-\rho}}\right) - \varphi\left(\frac{x_g^G - \sqrt{\rho} w_t}{\sqrt{1-\rho}}\right) \quad (3)$$

Where φ represents the cumulative distribution function of standard normal variable.

According to the law of large numbers, direct calculation under the assumption on the distribution of Z follows:

$$\frac{1}{N} \sum_{t=1}^N \Delta(x_{g+1}^G, x_g^G) \text{ converges almost surely to } \varphi(X_{g+1}^G) - \varphi(X_g^G) \text{ as } N \rightarrow +\infty.$$

Hence, the average rating transition probability $\Delta(\hat{x}_{g+1}^G, \hat{x}_g^G) = \frac{1}{N} \sum_{t=1}^N \Delta(x_{g+1}^G, x_g^G)$ is used to provide an estimation $\{\hat{X}_g^G; g = 1, \dots, K\}$ of the thresholds $\{X_g^G; g = 1, \dots, K\}$:

$$X_g^G = \varphi^{-1}\left(\sum_{g=1}^G \Delta(\hat{x}_{g+1}^G, \hat{x}_g^G)\right) \quad (4)$$

Replacing x_g^G by $\hat{x}_g^G$ in equation (3) and given w , we obtain the fitted rating transition probability

$$\Delta(\hat{x}_{g+1}^G, \hat{x}_g^G, w_t) = \varphi\left(\frac{\hat{x}_{g+1}^G - \sqrt{\rho}w_t}{\sqrt{1-\rho}}\right) - \varphi\left(\frac{\hat{x}_g^G - \sqrt{\rho}w_t}{\sqrt{1-\rho}}\right), G, g \in \{1, \dots, K\} \quad (5)$$

The historical deviation of fitted and observed transition matrix takes the following form, where ρ and t are fixed, $n_{t,g}$ is the number of borrowers from initial grade g observed in that time period (t).

$$\min_{w_t} \sum_G \sum_g \frac{n_{t,g} [P_t(G,g) - \Delta(\hat{x}_{g+1}^G, \hat{x}_g^G, w_t)]^2}{\Delta(\hat{x}_{g+1}^G, \hat{x}_g^G, w_t) [1 - \Delta(\hat{x}_{g+1}^G, \hat{x}_g^G, w_t)]} \quad (6)$$

Where the two sums in equation (6) indicate a summation over all elements in the 3x3 transition matrices between different risk categories (S1, S2, S3).

Furthermore, we establish the link between Z-score and macro and financial factors defined in a scenario to project the evolution of the bank dynamic balance sheet conditional on a scenario.

A wide set of predictor variables were considered for the estimation of Z-score development. For this purpose, the Bayesian model averaging approach with 2^K models is employed, where K is the number of explanatory variables. The model space is framed by considering all possible combinations of predictors from a set of K variables for each segment representing macroeconomic variables.

All equations in the model were individually estimated and aggregated in the posterior model space for each segment. Individual equations were formed based on the autoregressive distributed lag model (ARDL) structure, where the dependent variable Y_t is dependent variable of Z-score and a function of its own lags as well as contemporaneous, and possibly further lags of a set of predictor variables. The lag structures of ARDL are forced to be without gap, so call ‘closed’ (Gross and Población, 2019).

$$Y_t = \alpha + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \sum_{s=1}^{S_i} (\beta_0^k X_t^k + \dots + \beta_q^k X_{t-q}^k) + \varepsilon_t \quad (7)$$

The model selection for the model space follows several criteria to determine the best specification for each model: a relatively high R-square, the Durbin Watson statistics between 1.5 - 2.5, closed lag structure, number of significant variables, and a small root-mean-square-error. Additionally, sign restrictions are imposed with respect to long run multiplier, excluding the equations in the posterior model that do not correspond to the classical economic relations between the variables. Part of multimodal inference is to rank the fitted models based on the standard Bayesian information criterion (BIC).

Furthermore, we set the 85% threshold for superior model. In case none of the model is superior, we compute the posterior coefficient mean by weighting individual equations’ coefficients by $P(M_i|y)$, which is the BIC. The Bayesian model averaged predictor of y follows:

$$E(\beta|y) = \sum_{i=1}^I P(M_i|y) \hat{\beta}_i \quad (8)$$

where $\hat{\beta}_i$ being the posterior mean under model M_i .

Scenario conditional paths of the Z-score are translated back to the evolution of the TM, following equation (3), where W_t is replaced by $\widehat{W}_t$ that varies conditional on different scenarios.

As the final step, the implied stocks of S1, S2 and S3 are derived following the formulas (9), (10), (11), and account for loan growth in the formulas (12) and (13). The Central Bank of Malta’s credit growth rate projections (Economic Update 2/2021, Central Bank of Malta) are applied.

$$\begin{aligned} stock_{S1,t} = & stock_{S1,t-1} + TR_{S2,S1,t} stock_{S2,t-1} + TR_{S3,S1,t} stock_{S3,t-1} - \\ & TR_{S1,S2,t} stock_{S1,t-1} - TR_{S1,S3,t} stock_{S1,t-1} - M_t^1 stock_{S1,t-1} \end{aligned} \quad (9)$$

$$stock_{S2_t} = stock_{S2_{t-1}} + TR_{S1,S2,t} stock_{S1_{t-1}} + TR_{S3,S2,t} stock_{S3_{t-1}} - TR_{S2,S1,t} stock_{S2_{t-1}} - TR_{S2,S3,t} stock_{S2_{t-1}} - M_t^2 stock_{S2_{t-1}} \quad (10)$$

$$stock_{S3_t} = stock_{S3_{t-1}} + TR_{S1,S3,t} stock_{S1_{t-1}} + TR_{S2,S3,t} stock_{S2_{t-1}} - TR_{S3,S1,t} stock_{S3_{t-1}} - TR_{S3,S2,t} stock_{S3_{t-1}} - WO_t stock_{S3_{t-1}} \quad (11)$$

$$stock_t = stock_{S1_t} + stock_{S2_t} + stock_{S3_t} = (1 + v_t) stock_{t-1} \quad (12)$$

$$stock_{S1_t} = \max(0, stock_{S1_t} - stock_{S2_t} - stock_{S3_t}) \quad (13)$$

where $stock_{Si_t}$ corresponds to the exposure in the stage S_i at time t . Furthermore, max operator in the equation 13 is to account for the fact that it may happen that the desired gross loan growth is negative.

If we merge S1 and S2 stocks into performing loans, and call S3 as default exposure (DefExp), we get stock flow dynamics that have been specific by IAS 39³.

$$DefExp_t = DefExp_{t-1}(1 - WO_t) + DR_t(stock_{t-1} - stock_{S3_{t-1}}) - cure_t \quad (14)$$

where WO_t is write-offs rate, DR_t default rate, $cure_t = (stock_t - stock_{t-1})$ captures absolute flow of non-performing back to performing loan stocks, so called “cure”.

The default rate is based on portfolio-level data for performing and nonperforming loan stocks, NPL write-offs, and “cure flows”:

$$DR_t = \frac{DefExp_t - DefExp_{t-1}(1 - WO_t) + (stock_t - stock_{t-1})}{stock_{S1_{t-1}} + stock_{S2_{t-1}}} \quad (15)$$

We follow Gross et.al (2020) who structure lifetime expected credit loss (LT-ECL) as follows:

$$ECL_t^{LT} = \sum_{S=t+1}^M \frac{TR_{S3-S2,t}^* LGD_S * stock_{S2_{S-1}}}{(1+r)^s} \quad (16)$$

Where M stands for the average residual maturing of portfolio. The right side of the equation includes a point-in-time (PIT) LGD, and the relevant exposure, which is the $stock_{S2_{S-1}}$, r denotes effective loan interest rate for discounting the ECL along the lifetime of a loan portfolio; and the incremental PD, denoted $TR_{S3-S2,t}^*$ is calculated as

$$TR_{S3-S2,t}^* = TR_{S3-S2,t}^S * \prod_{t=1}^{S-1} (1 - TR_{S3-S2,t}^S),$$

where $TR_{S3-S2,t}^S$ is the unconditional transition probability for $stock_{S2_t}$, which is connected to the outcome of TM forecast path.

We define loss given default in percentage $LGD = ((1 - Probability\ of\ Cure) * LGL) + ALCosts$, where $ALCosts$ reflects administrative and legal expenses related to the workout of the loan and the collateral sales process. The lost given lost (LGL) is defined as follows:

$$LGL = \max\left(\frac{Loan - Cure}{Loan}, 0\right)$$

For $stock_{S1_t}$, the provision stocks are calculated following:

$$Prov_{t,stock_{S1_t}} = ECL_{t,stock_{S1_t}} = TR_{S1,S3,t+1|t}^S * LGD_{t+H|t} * stock_{S1_t}, \quad (17)$$

where $TR_{S1,S3,t+1|t}^S$ is the expected default rate for $stock_{S1_t}$ conditional on end of period-t information for the upcoming year. The $LGD_{t+H|t}$ term has a $t + H$ to denote the fact that LGD is meant to be forward-looking beyond a one-year horizon under condition what collateral can be sold in more than 1 year horizon.

³ The International Accounting Standard 39 (IAS 39) issued by the International Accounting Standards Board and has been replaced by IFRS 9.

For $stock_{S2,t}$, the LT-ECL is $Prov_{t,stock_{S2}} = ECL_{t,S2}^{LT} = \sum_{S=t+1}^M \frac{TR_{S2,S3,t}^S * LGD_{S+H|S} * stock_{S3,t}}{(1+r)^S}$.

For $stock_{S3,t}$, provision stocks cover part of the defaulted exposures that will likely be not recoverable, which is $Prov_{t,stock_{S3}} = ECL_{t,S3} = LGD_{t+H|t} * stock_{S3,t}$.

The total provision stock can be calculated as follow, $Prov_t = Prov_{t,stock_{S1}} + Prov_{t,stock_{S2}} + Prov_{t,stock_{S3}}$, and the loan loss provision is the change in the stock, adjusted for write-offs. $ProvFlow_t = \Delta Prov_t + WRO_t * LGD_t * stock_{S3,t-1}$.

5. RESULTS

Given that IFRS 9 is principles-based, it offers a certain degree of flexibility and does not prescribe when a significant increase in credit risk has occurred. While each financial institution should make its own assumptions, and hence take its own decisions on the level of provisions required in line with new accounting standards. Nonetheless, credit institutions are required to take utmost accounts of regulatory and supervisory guidelines estimating the ECL. This is more so given a high level of uncertainty and very limited availability of reasonable and supportable forward-looking information on the impact of COVID-19 on the economy.⁴

Based on the described framework, Z-score is forecasted per sector using CCR data (Figure 1). The quarterly drops of Z-scores between 2018 and 2019 for resident NFCs, mortgages and consumer loans correspond to revisions of loan portfolios resulted in loans classified from Stage 1 to Stage 2 (CBM FSR 2020, Chapter 2). The outbreak of COVID-19 pandemic had almost instant impact on creditworthiness of consumer loans (1Q 2020) followed by resident NFC loans, (2Q 2020), and non-resident NFC loans (3Q 2020). In contrast to other sectors, mortgage loans' credit quality has a relatively stable development during the lockdown of 2020.

One of the main issues identified with IAS 39 impairment regulation is that only current conditions and past events can be considered in measuring credit losses, which caused delayed in recognition of credit losses. This means that prior to the introduction of IFRS 9, there was no any explicit requirement for forward-looking information to be used for historical estimations of PDs. From the accounting perspective, the introduction of the IFRS 9 Stage 2 brought changes in calculations of risk of default. From the prudential point of view, following EBA NPE and SSM NPL Guidance, IFRS 9 Stage 3 is defined as non-performing exposure (NPE), which is 90 days past due (dpd). From the accounting perspective, the NPE is used for two purposes: (i) assessing changes in the risk of a default occurring and (ii) calculating an asset credit impaired.

Data available shows that Maltese banks have tendencies to reclassify more loans from Stage 1 to Stage 2 and further down during the economic upturn. This trend is especially prominent in mortgage sector (Figure 2). According to the adverse scenario, it is expected that the level of loans in Stage 3 (or NPE) will be higher (Figure 2, 3, 4, 5). This would corresponds to higher PD expect for mortgage loans where PD would be lower than in baseline scenario mainly driven by the lower projected level of Stage 2 (Equation 15).

⁴ EU government established economic support programs for impacted businesses and industries. While the form of the support programs varies across the EU countries, they are designed to mitigate the adverse impact of COVID-19, FIs (especially Sis) are expected to consider the guidance related to the collective assessment of the significant increase in credit risk (SICR) (ESMA 2020).

Furthermore, the application of public or private moratoria, aimed at addressing systemic economic impact of the COVID-19 pandemic, should not be automatically considered as a significant increase in credit risk (EBA 2020).

The COVID-19 outbreak hit Maltese economy during 2020Q1. While residential NFC' PD increased from 0.08% in 1Q 2020 to 2.9% in 2Q 2020, non-residential NFCs' PD increased to 0.72% in Q3 2020 and reached its peak of 1.93% in the end of Q4 2020. Overall, in contrast to non-residential NFCs loan portfolio (Figure 5), the impact of adverse scenario on residential NFCs (Figure 4) is expected more pronounced. It could be driven by stronger capital positions of non-residential NFCs.

Figure 1. Z-score forecast per sector

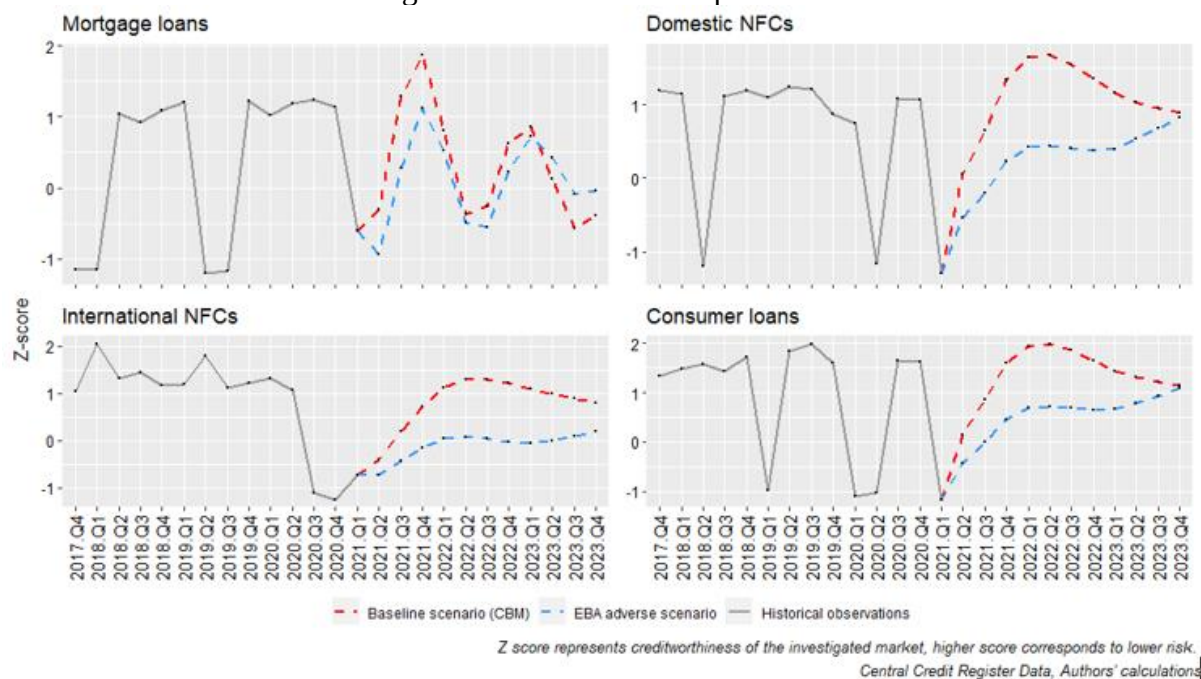


Figure 2. Mortgage loans

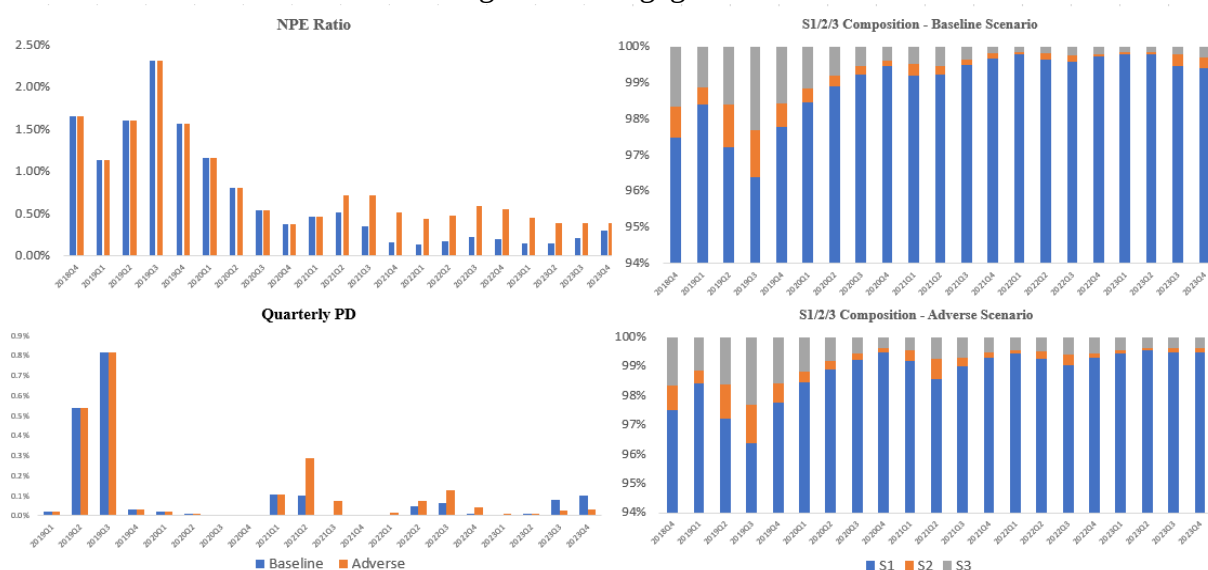


Figure 3. Consumer loans

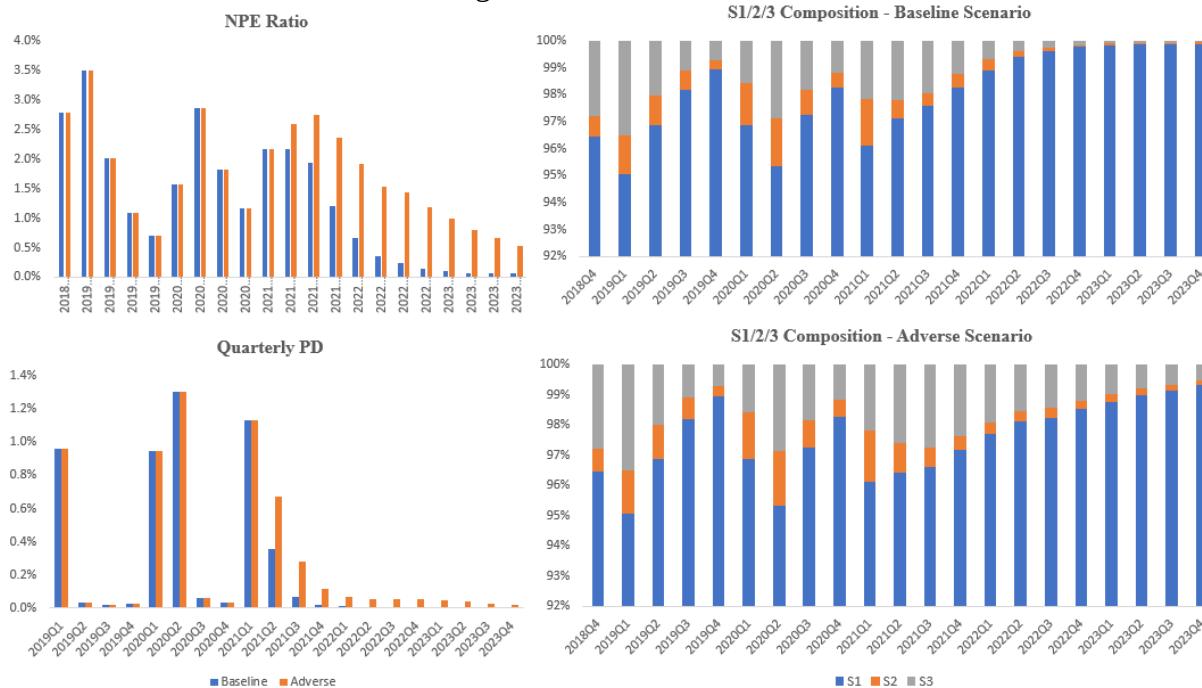
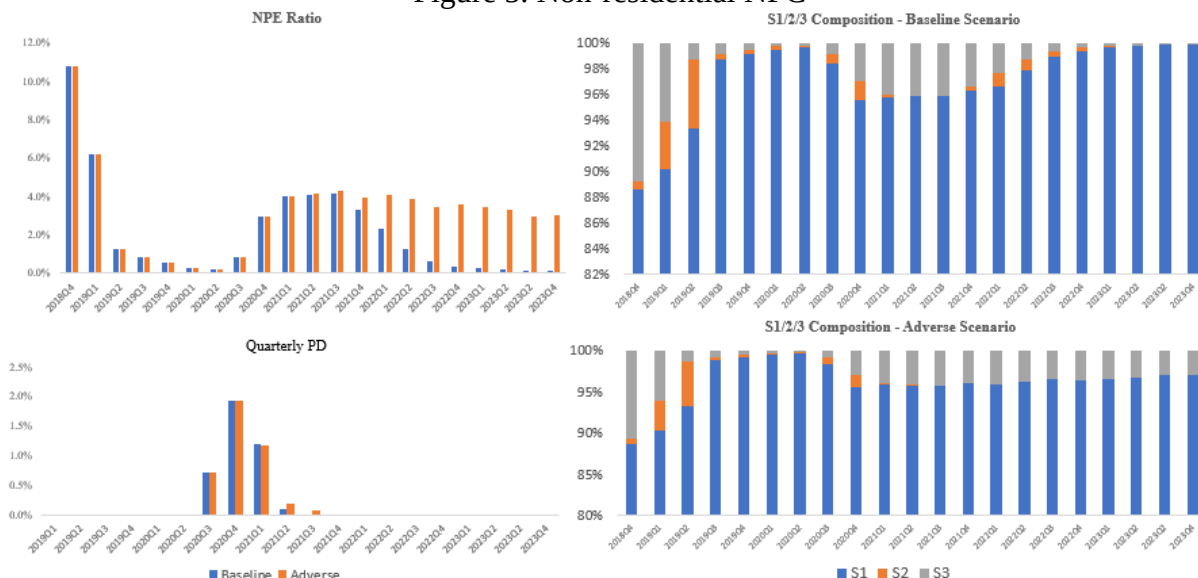


Figure 4. Residential NFC

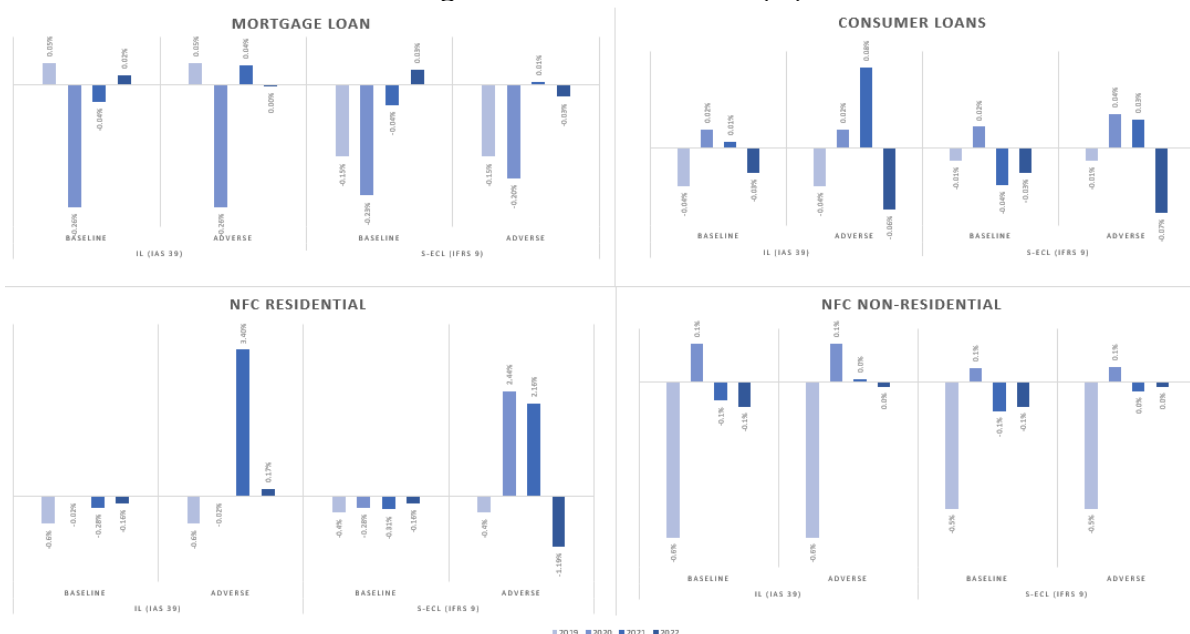


Figure 5. Non-residential NFC



At the core of the ECL-based impairment models under IFRS 9 lies its risk-based categorization of loans along with stage-specific provisioning. Stage 1 loans are to be provisioned with a 12-month horizon (12-month ECL), Stage 2 and 3 loans with a lifetime horizon (LT ECL). Loan loss rates (LLR) under old (IAS 39) and new accounting standards (IFRS 9) as per sector represent the provision flows as percentage change of end-of-previous year gross loan stocks with positive values corresponding to losses (Figure 6).

Figure 6. Loan Loss Rates (%)



According to the IAS for mortgages, for baseline scenario, the LLR increased by 0.05% in 2019 due to increase of non-performing exposures (Stage 3), as banks in Malta tend to recognize their expected losses mainly during the economic upturn. However, based on the ECL-based impairment model (IFRS 9), the decrease in loans allocated in Stage 1 and Stage 2 in 2019 (shifted to Stage 3) decreases banks' levels of provisioning. For baseline scenario, the LLR is expected to increase by 0.03% in 2023 mainly driven by an increase in LT-ECL (or

provisioning) of Stage 1 (in other words, the downgrade of loans at Stage 1 to Stage 3). The results for adverse scenario in 2022 and 2023 are partially driven by the increase of LGD, given the decrease of house prices, as per EBA adverse scenario.

Under the baseline scenario and IAS 39 accounting standards, an annual LLR for NFC residential shows a rising trend but remained negative in 2020, driven by increase of LT-ECL for Stage 2. In 2021, the LLR is slightly lower under IFRS 9 compared to IAS 9, as there is an expected increase of provisioning for Stage 2. In case of adverse scenario, an increase in the LLR for NFC residential was recorded in 2020 under IFRS 9, driven by increase of provisioning level of Stage 1. The LLR is expected to increase by 2.6% in 2021 under IFRS 9, driven primarily by increase in provisioning in Stage 3, and decrease in provisioning level in Stage 1. As for NFC non-residential, the LLR increased in 2020 driven by increase in provisioning in Stages 1 and 2, and it is expected to stay negative for both accounting standards.

6. CONCLUSION

The aim of this paper is to present the methodology and analysis of the impact of top-down IFRS9 – compatible solvency analysis applied to the Maltese small open economy. Although we acknowledge that there might be substantial differences across Maltese banks in the weighting of relevant macroeconomic variables, we assume that significant banks (Sis) have been compliant with the guidance of regulators at national and European level when estimating the ECL given high uncertainty and limited forward-looking information on the impact of COVID-19.

Furthermore, uncertainty around the evolution of the pandemic and its impacts on the Maltese economy is still elevated, making modelling of future loan performance and ECL not an easy task. In this context, the EBA IFRS 9 benchmarking exercise confirms that loan loss provisions are also calibrated based on a desired sensitivity towards future economic forecasts for most of EU countries. Moreover, the introduction of fiscal measures such as moratoria reduce credit risk caused by the pandemic crisis that might then significantly increase once those measures will phase out. This is the important aspect that is not easy to capture by the described modelling framework. Hence, using data from the pandemic crisis might introduce some bias in the models. To address these limitations, the centrally defined scenario was employed to address scenario uncertainty and to avoid possibly excessive increases in provision levels in the event that banks would use more conservative scenarios (ECB 2020, SSM 2020). Furthermore, The IASB stressed that IFRS 9 models should not be used mechanistically, and that government support measures shall be considered in determining lifetime losses⁵. In this context, we use granular portfolio-level data which in principle tends to provide more precise outcomes.

To our best knowledge, this is the first paper using bank-level granular data to model expected credit losses from a regulatory top-down stress testing perspective. Moreover, compared to other studies, we employed BMA to incorporate the element of model uncertainty and address the issue of short time series. Finally, contrary to the approach employed by ECB for euro-area-wide stress tests, we used “one-factor representation” of TM that is typically employed by the financial industry (Belkin et al. 1998, Wei 2003). Although the proposed methodology is applied to the Maltese economy, it could be replicated to any economy with the described features and data availability.

⁵ IFRS, March 27, 2020. IFRS 9 and covid-19 <https://cdn.ifrs.org/-/media/feature/supporting-implementation/ifrs-9/ifrs-9- ecl-and-coronavirus.pdf?la=en>

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COMPARISON OF IMPACT OF THE CORPORATE INCOME TAX RATE ON COUNTRY'S ECONOMIC GROWTH IN THE CZECH REPUBLIC AND BELGIUM

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Abstract: *The main aim of the study was to determine the significant influence of the different corporate income tax rates in the Czech Republic and Belgium to the country's GDP from 2018 to 2020. The study consists of literature review and empirical research. The method used in the empirical research is comparison. The main data sources are specialized publications and mainly statistical offices and OECD statistical reports. It was observed that even if Belgium has a higher corporate income tax rate of 29,58%, respectively 25%, the part of the revenues generated from corporate income tax are not significantly higher than in the Czech Republic. The difference in percentage which represents part of the country's GDP never exceeds 1%, usually the difference between the part of the GDP in the Czech Republic and Belgium is approximately 0,5%, therefore it can be concluded that the corporate income tax rate has a significant impact on GDP, however it is influenced by other factors and the higher corporate income tax rate is not linear with higher GDP.*

Keywords: *corporate income, GDP, tax burden*

1. INTRODUCTION

Taxes have been fundamental to the development of human society, democracy and for funding of the public services which are provided by the governments. Taxes have always been the most important part of the state's income, therefore corporate taxation plays one of the most important roles in shaping our society, well being and the country's economy. The country's governments need a stable source of revenues to be able to provide basic social needs for their citizens.

Economic growth and welfare of the citizens has been an important topic to every government, which lead to numerous research projects done on the topic. The relevance of the topic is also supported by the proposal made by the European Commission on Common Consolidated Corporate Tax Base. Usually, the research is done mainly due to political reasons. The political agenda is highly influenced by the state's deficits, cuts and debts. The research projects have been done to determine how well is the state government able to use the resources generated from collecting taxes. Therefore, the level of taxation should be adequately defined to provide the optimum economic growth and not result in tax burden.

The study examines the influence of the different corporate income tax (further referred as "CIT") rates in European countries and its effect on a country's GDP. The GDP has a large impact on the country's welfare and the country's growth. GDP affects firms and spending of the customer which leads back to the firm's income and its taxation.

The study has been done on two countries, specifically chosen for the comparison, mainly because other studies done previously did not compare the contrast between a country with a long-term, stable and relatively low income tax rate, such as the Czech Republic, and

country with recent corporate income tax rate change and with significantly higher corporate income tax rate, such as Belgium. Previous studies done on the topic, also cited in the study, focus mainly on a comparison of all the countries of the European Union, therefore the focus on selected countries in the similar region with above stated differences can bring interesting findings.

The study is divided into seven chapters, introduction, objectives and main aims and research questions, used methodology, literature review, results in form of comparison and conclusion.

2. OBJECTIVES AND METHODOLOGY

The main aim of the study is to determine the influence of the different corporate income tax rates in the Czech Republic and Belgium to the country's GDP from 2018 to 2020.

The study compares the influence of the stable corporate income tax rate of 19% in the Czech Republic to the GDP and Belgium's, which had a significantly higher corporate income tax rate of 33,99%. Belgium lowered its standard corporate income tax rate of 33,99% to 29,58% in 2018. It was further reduced to 25% from 2020. The study will compare the available data from 2018 to 2020 and the aim is to prove the significant effect of corporate income tax rate to GDP.

The most well-known and most used indicator of the share of the corporate income tax to GDP is called tax-to-GDP ratio. Tax-to-GDP ratio measures a state's tax revenue relative to its GDP. It measures a state's tax revenue relative to the size of its economy.

According to OECD's Brochure: Revenue Statistics (OECD, 2021, a) is the tax revenue defined as the revenues, which is collected from all taxes. Mainly on incomes, social security contributions, taxes levied on goods and services, payroll taxes and taxes on the ownership and transfer of property. Furthermore, in its Brochure: Revenue Statistics 2021 OECD (OECD, 2021, a) states that total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes.

The study consists of literature review and empirical research. The method used in the empirical research is comparison. The main data sources are specialized publications and mainly statistical offices and OECD statistical reports.

3. LITERATURE REVIEW

Income tax (as well as other direct taxes) has always been highly monitored at the state level, taxes have been carefully calculated by each economic entity, and as a result the individual jurisdictions maintain national sovereignty both in the amount of tax rates, the algorithm for determining them, and the method of levying them into the state budget.

The legal procedures for calculating the income taxes are very similar across European countries, however the overall systems for determining the final amount of the taxes are parametrically different. The research was done for example on the income tax in the countries of the Visegrad Group. The results of the research revealed that the systems of these countries differ mainly in the possibility of applying the loss of previous years, in the impact of depreciation on the amount of the tax and in the income tax rebate linked to the employment of the disabled (Hinke et al., 2021).

The effective corporate income tax rate is used for a more accurate determination of the taxpayer's tax liability, which includes not only the statutory corporate income tax rate, but also other aspects of the tax systems that determine the total amount paid. According to Kosturikova

(2016) most of the changes in the effective taxation of the legal entities are caused by the change in the statutory tax rate. Her study proved a value higher than 98%. Thus, a 1% increase in the statutory corporate tax rate results in an average increase in the effective average tax rate of 0,78%.

The final amount and complexity of collecting the corporate tax is by many experts (e.g. Bayer and Kostohryz, 2014 or Krysovatty et al., 2020) considered to be an important reason for the transfer of the business activities between the countries. Moravec et al. (2019) is monitoring the activity shifts between tax jurisdictions in the long term and identifies the attractive ones. Therefore, the attributes such as tax rate, the final amount of the tax and the complexity of the tax determination are considered variables that should influence the amount of GDP of each country. Nguyen et al. (2021) argue that a change in income tax has an impact on GDP as well as on private consumption and investment. This is also confirmed by results of other authors Wang and Zhang (2021). According to those authors an increase in the tax rate leads to the growth of hidden incomes, which ultimately leads to a decrease in GDP.

The authors Karagianni and Pempetzoglou (2012) bring an empirical finding that if the political task is to influence the country's GDP growth through taxation, it should be preferable by adjusting taxes imposed on production and imports, which means to impose taxes on corporate incomes. On the contrary, in case of demand for stable GDP growth and in the effort to change the tax policy, there should be a priority to restrict in the area of personal income taxation. The same result was reached by the authors Sen and Kaya (2013), whose causality tests confirm that there is unidirectional causality between taxes.

Corporate tax also creates the problem of income inequality. Each state is forced to solve income inequality through tax policy. Studies done by (e.g. Leightner, & Zhang, 2016) prove that corporate tax (along with property taxes) is the best tax to increase the GDP when shifting the tax burden from socially weak to socially advantaged subjects. A study done by Tikhonova et al. (2018) also revealed that there is a dependency between national socio-economic development and the income tax system. It is especially evident in the countries with a low tax burden and low GDP per capita.

The study was done based on the previous work of Clausing (2007) who evaluated the differences between the countries of the Organization for Economic Co-operation and Development in the size of revenues from corporate income tax in relation to GDP. The decomposition of the 24-year time series explains such fluctuations as a function of the statutory tax rate, the width of the tax base, the profitability of companies and the share of the corporate sector in GDP. The author's empirical results suggest a parabolic relationship between tax rates and returns, implying that the revenue-maximizing corporate tax rate is 33% for the entire sample. The study also demonstrates that this rate of revenue-maximization is declining. The reason is that the smaller economies are more and more integrated with the world economy. The authors Islam et al. (2018) performed a research on OECD countries. The authors examined the ratio of income tax to GDP for 21 OECD countries and extended the time series from 1870 to 2011. Gemmell et al. (2014) argues that both domestic and foreign corporate taxes are relevant to the country's GDP growth. Gemmel et al. (2014) states that tax effects on GDP operate largely through factor productivity rather than accumulation of the factors.

A similar study was done by the Szarowska (2010) on the composition of the countries of the European Union (24 member states at that time). The analysis of the influence of the tax burden on economic growth was carried out on panel data in the period 1995–2008, while the basic estimation method was panel regression with fixed effects. The results of this author prove a statistically significant negative effect of the tax burden on GDP growth. Quantitatively expressed - an increase in the total tax quota by 1% reduces the GDP growth rate in the same year by 0.29 percentage points.. The estimates also confirm the statistically significant negative effect of direct taxes on GDP growth, as a reduction in the quota of direct taxes by 1% increases

the rate of GDP growth by 0.43 percentage points. The created model presents a negative correlation between corporate income taxes and GDP growth - the regression coefficient (in the amount of -1.28) expresses a high negative impact of an increase in corporate income tax on GDP growth.

Tiwari (2012) distinguishes a short-run and a long-run Granger causality from differential tax burden on GDP. The study is done on the US time series. It shows that current tax revenues cause changes in GDP over a 3-month to 7-month cycle. At the same time, increasing the gross domestic product and GDP per capita through a reasonable and well-thought-out financial and economic policy in relation to the development and implementation of tax policy principles is one of the most significant tasks of any government. It should be carried out in the interest of the population, including by reducing corruption and the “gray economy” (Vitola and Boruks, 2008).

The tax burden affects economic growth and well-being, which is why tax policy is always a current topic. A comparison of tax policy within the corporate tax framework of individual states identifies harmful tax competition (Sokol, 2008) and helps in deciding what is the correct setting of the tax system, which would ensure sufficient resources needed to finance public expenditures and at the same time realize sustainable economic growth. For this reason, the authors focus on the topic of comparison in the field of corporate taxes of the Czech Republic and Belgium.

4. RESULTS

In the Czech Republic the corporate income tax is 19%. According to the Financial Administration of the Czech Republic (2021) the total corporate income tax in the Czech Republic resulted in 172,158.28 mil CZK (approximately 6,916 mil EUR) in 2020 after the deduction of tax relief according to § 35 Sec. 1 and/or § 35a or § 35b of the Income Tax Act. In its OECD's annual Brochure: Revenue Statistics 2021 (OECD, 2021, a) OECD states that the Czech Republic's tax structure is characterized by having an equal average from taxes on corporate income and gain to the OECD.

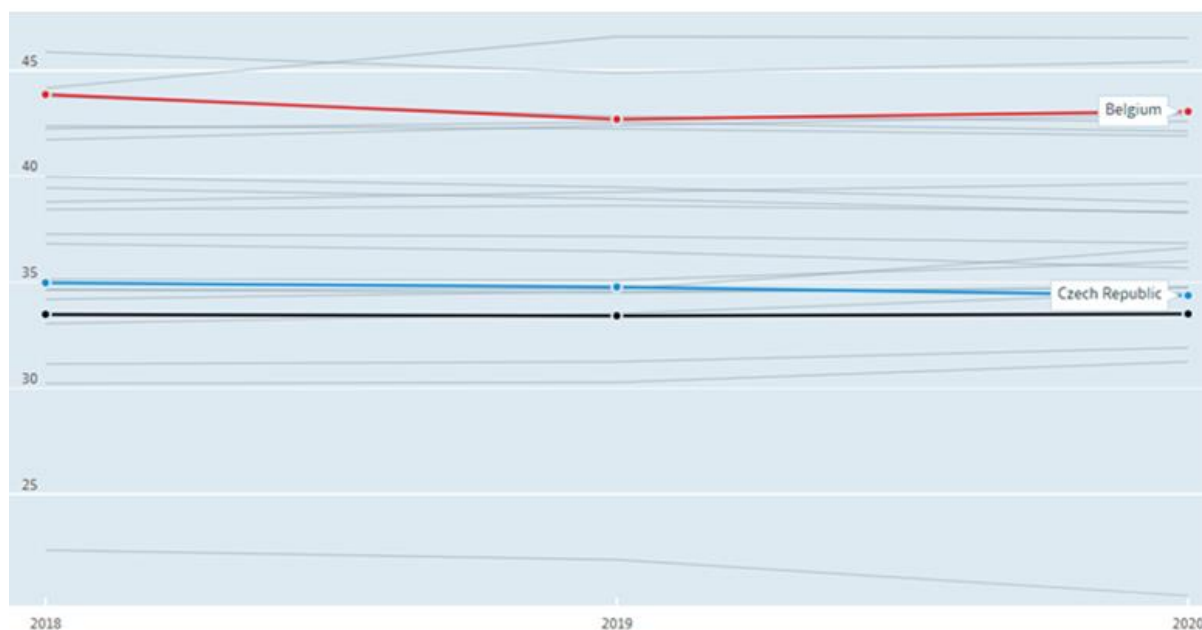
Belgium's standard corporate income tax rate has been lowered from 33,99% to 29,58% in 2018. And it has been further reduced to 25% from 2020. According to the OECD (OECD, 2021, a) the total taxes on income, profits and capital gains of corporates resulted in 14,941 mil EUR. According to the OECD's annual Revenue Statistics report (OECD, 2022, d) Belgium has a lower proportion of revenues from taxes on corporate income and gain to the OECD.

Total tax revenue to GDP

Within the EU, the structure of taxation changes from year to year. According to the European Commission (2022) the pandemic has reduced the share of indirect taxes and increased the share of social security contributions. In 2020 the revenue from indirect taxes decreased to 13,4% of GDP, social contribution increased to 13,5% of the GDP and direct taxes increased to 13,3% of GDP.

As shown in the graph below, in the Czech Republic the total tax revenue to GDP was 34,98% in 2018, 34,78% in 2019 and 34,38% in 2020. In Belgium the total tax revenue to GDP was 44,87% in 2018, 42,70% in 2019 and 43,07% in 2020. The black line indicates OECD average total tax revenues to GDP.

Figure 1. Total tax revenues to GDP from 2018 to 2020 (Czech Republic and Belgium)

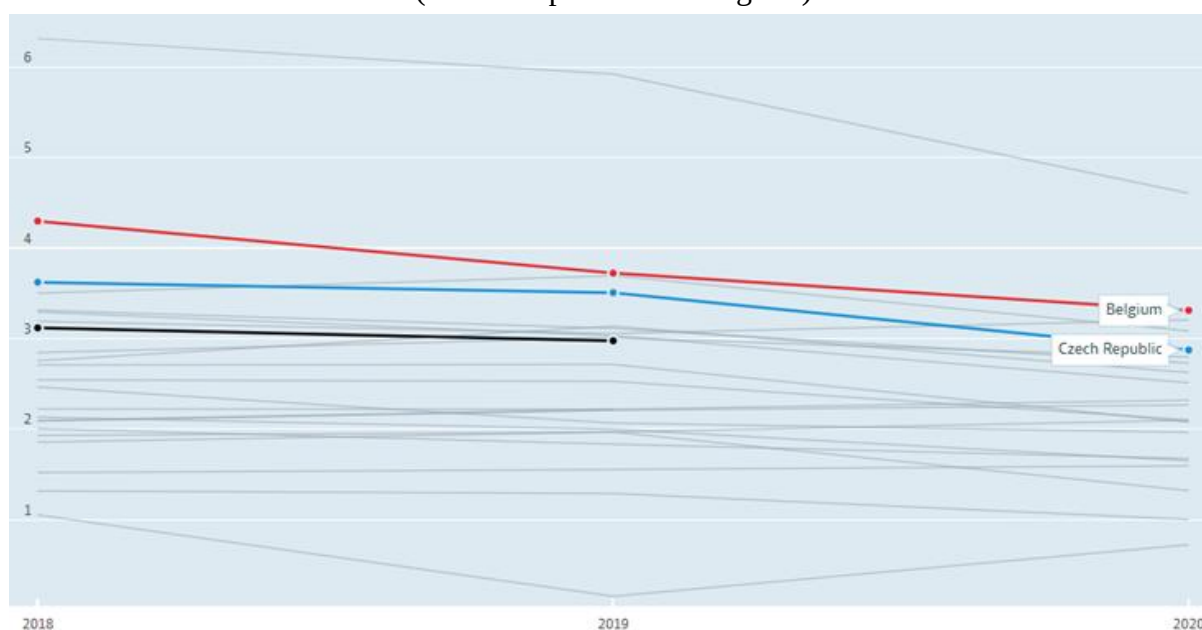


Source: OECD (2022,g)

Corporate income tax revenue to GDP

According to OECD (2022) the tax on corporate profits is defined as taxes levied on the net profit. The net profit is calculated as the company's gross income minus allowable tax relieves. As shown on the graph below the corporate income tax revenue to GDP is slightly decreasing from 2018 to 2020. The reason for the decline might be, among other the lower revenues generated by the Company's in 2020 during the Covid-19 pandemic.

Figure 2. Corporate income tax revenue to GDP from 2018 to 2020
(Czech Republic and Belgium)



Source: OECD. (2022, f)

The Czech Republic the corporate income tax revenue to GDP resulted in 3,623% of GDP in 2018, 3,508 in 2019 and 2,874% in 2020. In Belgium its corporate income tax revenue to GDP

ratio resulted in 4,298% in 2018, 3,723% in 2019 and 3,312% in 2020. The black line indicates OECD average total tax revenues to GDP.

Total GDP and share of corporate income tax in total GDP

The table below shows the total GDP of the Czech Republic in millions US dollars, percentage of corporate income tax revenue to GDP, the total amount of the part of the corporate income tax revenue on Czech Republic's GDP and corporate income tax rate in the current year.

Table 1. Czech Republic data (2018–2020)

	GDP (millions US dollars)	% CIT revenues	CIT revenues (millions US dollars)	Tax rate
2018	437 356	3,623	15 845,40	19%
2019	457 348	3,508	16 043,77	19%
2020	446 269	2,874	12 825,77	19%

Source: OECD (2022, c)

The second table below shows the total GDP of Belgium in millions US dollars, percentage of corporate income tax revenue to GDP, the total amount of the part of the corporate income tax revenue on Belgium's GDP and the tax rate in the current year.

Table 2. Belgium data (2018–2020)

	GDP (millions US dollars)	% CIT revenues	CIT revenues (millions US dollars)	Tax rate
2018	600 323	4,298	25 801,88	29,58%
2019	623 603	3,723	23 216,74	29,58%
2020	612 656	3,312	20 291,17	25%

Source: OECD (2022, c)

Impact of the tax rate on the country's corporate income tax revenues

In the Czech Republic, the corporate income tax rate has been stable for years and resulted in 19%, therefore if we assume the correlation between the tax rate and the corporate income tax revenue part of the GDP to be the only determinants there is a total dependence. It has been observed that the revenues generated from the stable corporate income tax rate have been approximately the same in 2018 and 2019. The revenues generated in 2020 have been lower, however, in this particular year it has to be taken into consideration that there might be other effects which may have had affected the corporate income tax revenues, and therefore the country's GDP, such as effects of COVID-19. Since a big part of the firms were closed, they were not able to generate its revenues and the final tax imposed on those revenues was lower.

It can be observed that even if Belgium has a higher corporate income tax rate of 29,58%, respectively 25%, the part of the revenues generated from corporate income tax are not significantly higher than in the Czech Republic. The difference in percentage which

represents part of the country's GDP never exceeds 1%, usually the difference between the part of the GDP in the Czech Republic and Belgium is approximately 0,5%, which shows that the significantly higher corporate income tax rate does not necessarily leads to higher revenues and higher GDP.

We can observe the significant effect of the corporate income tax rate on the revenues generated by the collected taxes, which form part of the country's GDP.

However, if we compare the two countries with different tax rates and the revenues part of the total GDP we can observe that the higher corporate tax rate does not lead to significantly higher revenues, which form part of the country's GDP. The Czech Republic the corporate income tax revenue to GDP resulted in 3,623% of GDP in 2018, 3,508 in 2019 and 2,874% in 2020. In Belgium its corporate income tax revenue to GDP ratio resulted in 4,298% in 2018, 3,723% in 2019 and 3,312% in 2020. The results show that the corporate income tax revenue difference never exceeds 1%, even if the difference in the corporate income tax rates is 10%, respectively 6%.

It can be concluded that the corporate income tax rate has a significant impact on GDP, however, it is influenced by other factors and the higher corporate income tax rate is not linear with higher GDP.

For further research on this topic it can be suggested to find the point where the corporate income tax rate is the most efficient and generate the higher revenues, further research can also include more variables and its correlation to revenues generated from corporate taxation and its impact to overall GDP. Including more variables on a longer time series of data can be a more precise way to determine the most efficient tax rate and impact of different tax rates on GDP.

5. CONCLUSION

The main aim of the study was to prove the impact of different corporate income tax rates in the Czech Republic and Belgium and its impact on revenues generated from the corporate income tax, which form part of the country's GDP. It was observed that even if Belgium has a higher corporate income tax rate of 29,58%, respectively 25%, the part of the revenues generated from corporate income tax are not significantly higher than in the Czech Republic. The difference in percentage which represents part of the country's GDP never exceeds 1%, usually the difference between the part of the GDP in the Czech Republic and Belgium is approximately 0,5%, therefore it can be concluded that the corporate income tax rate has a significant impact on GDP, however it is influenced by other factors and the higher corporate income tax rate is not linear with higher GDP.

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RUNS AND VARIANCE RATIO TESTS TO VERIFY THE STOCK MARKET DEVELOPMENT

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Abstract: *The Wald–Wolfowitz runs test and the variance ratio test are commonly used test of the random walk process. This paper deals with testing the weak form of the efficient market hypothesis (EMH) using daily data on the development of indices representing selected stock markets for the period 2001–2021, which was further divided into shorter periods. The Efficient Market Hypothesis (EMH) assumes that stock prices take the random walk and that it is impossible to achieve above-average returns in such markets. The British, American, Japanese and Chinese stock markets were chosen for the study.*

The evidence to date on market efficiency is mixed. The tested weak form of the efficient market hypothesis based on the random walk model was rejected for the majority of periods and markets. Most frequently, the weak form of market efficiency was discovered in the Chinese and Japanese markets in all periods under review. During the COVID-19 period, the British, American, Japanese and Chinese markets showed signs of the weak form of efficiency according to the Runs or Variance ratio test. It can be concluded that the market efficiency is not stable over time in the individual markets examined.

Keywords: *Efficient Market Hypothesis, Runs Test, Stock Market, Variance Ratio Test*

JEL Classification: G14, G15, C58

1. INTRODUCTION

The Efficient Market Hypothesis (EMH) is a relatively simple theoretical concept, which, however, has far-reaching implications for financial theories as well as investment practice. The validity of EMH has been subject to frequent testing for more than seven decades. At the same time, hundreds of studies have not yet come to a clear conclusion as to whether or not markets are efficient.

The concept of an efficient market, where the prices of traded instruments fully reflect a set of unexpected, available and relevant information, was first defined by Fama (1965b) in his study focusing on the analysis of price movements in stock markets. Fama's study found that stock prices take a random walk; that is, stock price movements are independent, future exchange rate developments cannot be forecasted, and markets have no memory. In his previous publication (Fama, 1965a), Fama presented the essence of random walk theory – which theoretically overshadows his discovery and its implications for proponents of technical and fundamental analysis. The term Efficient Market Hypothesis (EMH), in which the efficient market is a key concept, was coined by Roberts (1967). In the following years, EMH became an important theoretical concept in the field of financial theory, which was predominantly used to explain the behaviour of not only stock markets for several more decades. At the same time, practical knowledge significantly preceded the emergence of a comprehensive theory of price movements in stock markets. For example, the random movement of pollen grains as well as

dust particles in water (Brown, 1828), prices of selected commodities (Bachelier, 1900), food and stock prices (Working, 1934), stock and commodity prices (Kendall, 1955) and stock prices again (Osborne, 1959) drew attention to important scientific works several decades before Fama's definition of the efficient market. In his dissertation entitled *Theorie de la Speculation*, Bachelier (1900) even developed the mathematics and statistics of Brownian random motion of microscopic particles in liquid and gas, according to Sewell (2011), five years before Einstein (1905) created the equations for Brownian motion.

Concerning the kind of information that is quickly, almost immediately, absorbed by stock prices, Fama (1970) distinguished three forms or degrees of market efficiency. First, with the lowest degree of market efficiency, i.e., with a weak form of market efficiency, all historical information is absorbed by stock prices almost immediately. Under these conditions, technical analysis, which is based exclusively on the use of historical information, cannot be used to successfully forecast the future development of stock prices. In the semistrong form of market efficiency, stock prices react quickly, almost immediately to all publicly available information, i.e., to historical and current information. In this situation, fundamental analysis, which bases its outputs entirely on public information, also loses its usefulness. The strong form of efficiency presupposes the rapid, almost immediate reaction of stock prices to both public information and non-public, i.e., inside information. It is clear that the semistrong form includes the weak form and that the strong form, as the highest degree of market efficiency, includes both the weak form and the medium form.

Views on the validity of EMH have never been uniform. Opinions on the validity of the EMH split into two camps, but their relationship has changed over time. Proponents of EMH believe that it is unnecessary to look for trends and dependencies in price developments in the market because they do not exist. According to EMH supporters, market developments are moving persistently towards equilibrium, where there are no significantly overvalued and undervalued instruments on the market that fundamental analysts would find using their valuation methods, and technical analysts would use their graphical methods and indicators to time their sales or purchases to achieve an excess return. Opponents of EMH, on the other hand, argue that examples of unexpected market shocks (e.g., the October 1929 crash, or the October 1987 crash, the Hong Kong flu in 1997, the bursting of the Dotcom bubble, and the 2008 financial crisis) show that stock prices often significantly and repeatedly deviate from their fundamental intrinsic values. It should be noted that the recurrence of events that are inconsistent with EMH has given rise to other theoretical concepts that have also offered alternatives to explain financial market behaviour, such as behavioural finance, adaptive market hypothesis (AMH) or fractal market hypothesis (FMH).

The main contribution of this paper is to test the behaviour of stock market prices in relation to the EMH aspect in the COVID-19 period compared to previous periods after 2000. This paper tests the EMH in stock markets in Great Britain, USA, Japan and China using runs test and variance ratio test for the period 2001- 2021. The occurrence of global negative factors and influences, such as the 2007–2008 financial crisis or the global pandemic, strongly affect the development of financial markets, as they increase risk and price volatility, affect trading volumes and, thus, the nature and direction of exchange rates. Therefore, it makes sense to divide the overall monitoring period in the article into shorter periods, covering the period before, during, and after the COVID-19 pandemic. The application of the above-mentioned tests to the above shorter periods will make it possible to determine whether there has been a change in the behaviour of the monitored markets from effective to inefficient or vice versa.

The answer to the question of whether the market behaves effectively or not is the same as the question of whether effective or inefficient market behaviour is affected by the occurrence of negative events, such as crises or pandemics, which is very important for investors, especially for investment decisions, behaviour and investment choices, tools and

strategies. In an efficient market, it is not possible to achieve excess returns repeatedly in the long run, whatever tools and strategies are used. In contrast, in an inefficient market, certain investment instruments and strategies may, in turn, bring the investor excessive returns.

2. MATERIALS AND METHODS

If the market reflects all available formation, any shock to prices must be permanent, and the market, according to the EMH, must follow the random walk process. This paper focuses on aspects of the random walk model – randomness and variances in selected periods.

Tests will be applied to selected stock indices: the British FTSE 100 index (Financial Times Stock Exchange Index), the American S&P 500 index (Standard & Poor's 500 Index), the Japanese NIKKEI 225 index (stock index calculated by the Nihon Keizai Shimbunsha Company) and the Chinese SSE index (Shanghai Stock Exchange Composite Index) for the period 3.1.2001–18.11. 2021.

The whole period will be further divided into shorter periods, taking into account the impact of the 2007–2008 financial crisis and the COVID-19 pandemic:

- before the financial crisis, 01/2001–12/2007,
- the financial crisis, 1/2008–06/2009
- after the financial crisis and before COVID-19, 07/2009–02/2020
- the current COVID-19 period, 03/2020–11/2021.

The division of the data is according to the Business Cycle Dating Committee Announcement of the NBER (2010).

The daily return of the market index was calculated as the difference between two subsequent natural logarithms of daily closing prices of the index. In the whole article, a 5% or 10% level of significance is used for the interpretation of the results.

2.1 Runs Test

The runs test is a nonparametric test commonly used for the random walk testing and was proposed in Wald and Wolfowitz (1940). Positive and negative runs are monitored here, and the values in the actual and simulated files are compared in the test.

The null and alternative hypotheses, in this case, are as follows:

H_0 : Sample values come from a random sequence (or the given sequence is random)

H_1 : Sample values come from a non-random sequence (or the given sequence is non-random)

Whereas, if the null hypothesis is valid, the numbers of runs in the real and the simulated set are identical, and the existence of a weak form of market efficiency can be confirmed. However, if the results confirm the alternative hypothesis, the existence of market efficiency is rebutted because there is a dependence between price changes.

If the number of positive and negative runs is greater than ten, then for the mean value of the number of runs, the probability distribution is normal:

$$E(R) = \frac{2N_+N_-}{N} + 1$$

$$\sigma_R^2 = \frac{2N_+N_-(2N_+N_- - N)}{N^2(N - 1)} + 1$$

Where R is the number of runs calculated, $E(R)$ is the mean number of runs, N_+ is the number of positive changes in the time series, N_- is the number of negative changes in the time series,

σ_R^2 is the variance of the number of runs, and N is the sum of positive and negative changes in the time series. The test statistic is

$$U = \frac{R - E(R)}{\sigma_R}.$$

2.2 Variance Ratio Test

Lo and MacKinlay (1988) proposed variance ratio tests to answer the question of whether the asset prices or returns are predictable or not. The test is based on comparing the variance of time series data over various intervals.

Under the assumption that there is a random walk in the time series data, this means that the q period's variance should be q times the variance of the one period difference. In the article of Chow and Denning (1993), the multiple comparison variance ratio test was proposed. The multiple variance ratio test is similar to the variance ratio test. However, the multiple variance ratio test provides the joint probability is opposite to the simple variance ratio that offers the single probability.

The variance ratio test hypotheses are:

H₀: ln returns follow the random walk

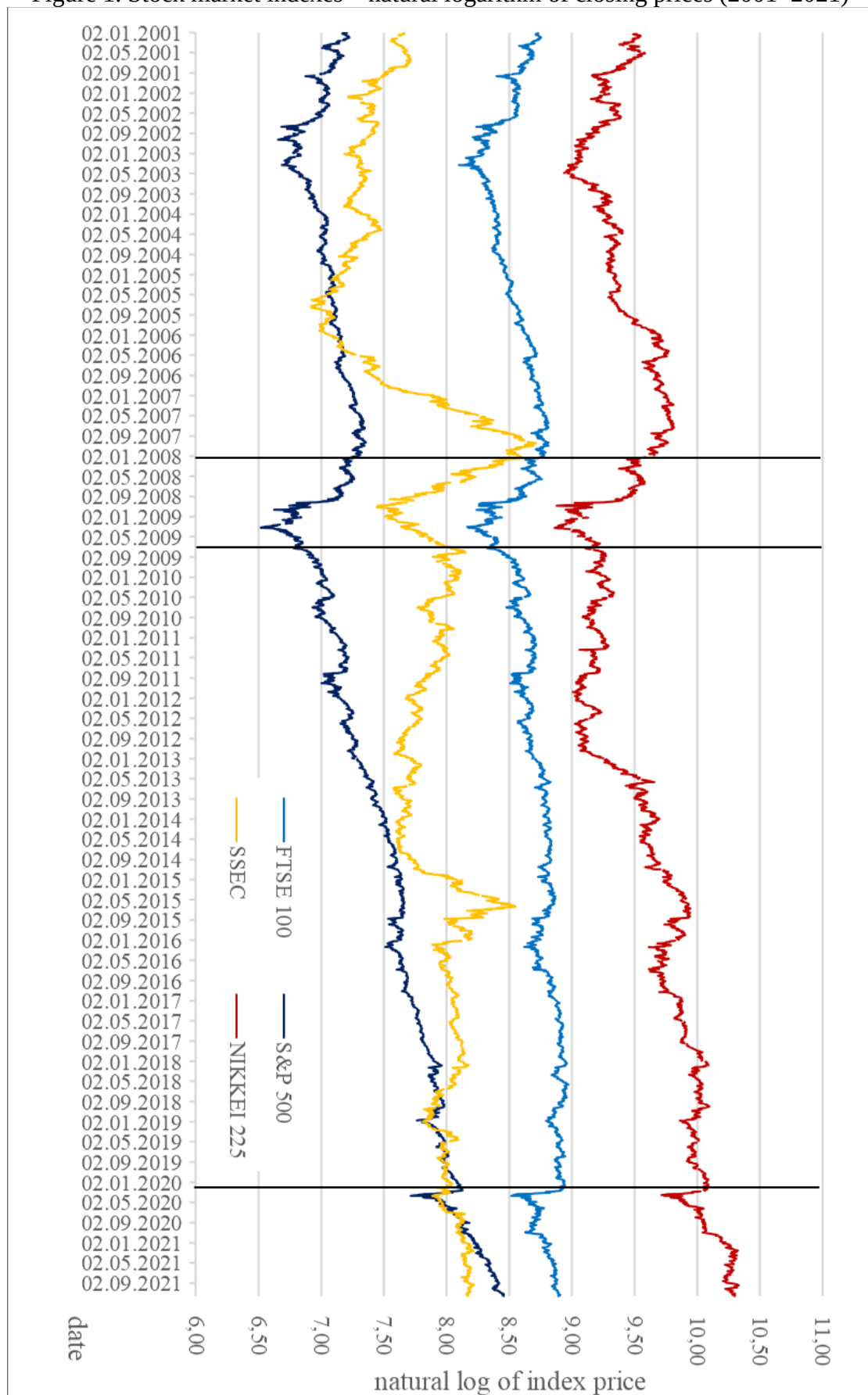
H₁: ln returns do not follow the random walk

This paper employs the multiple variance ratio test with the heteroscedastic assumption that is offered in the EViews. Details of the test can be found in the two cited papers or in Borges (2008).

3. RESULTS

Figure 1 shows the development of the closing values of stock indices from the analyzed British, American, Chinese and Japanese markets over the entire monitored period. A significant increase in the volatility of the monitored stock indices is evident during the financial crisis in 2008/2009 and also at the time of the outbreak of the global COVID-19 pandemic in the first half of 2020.

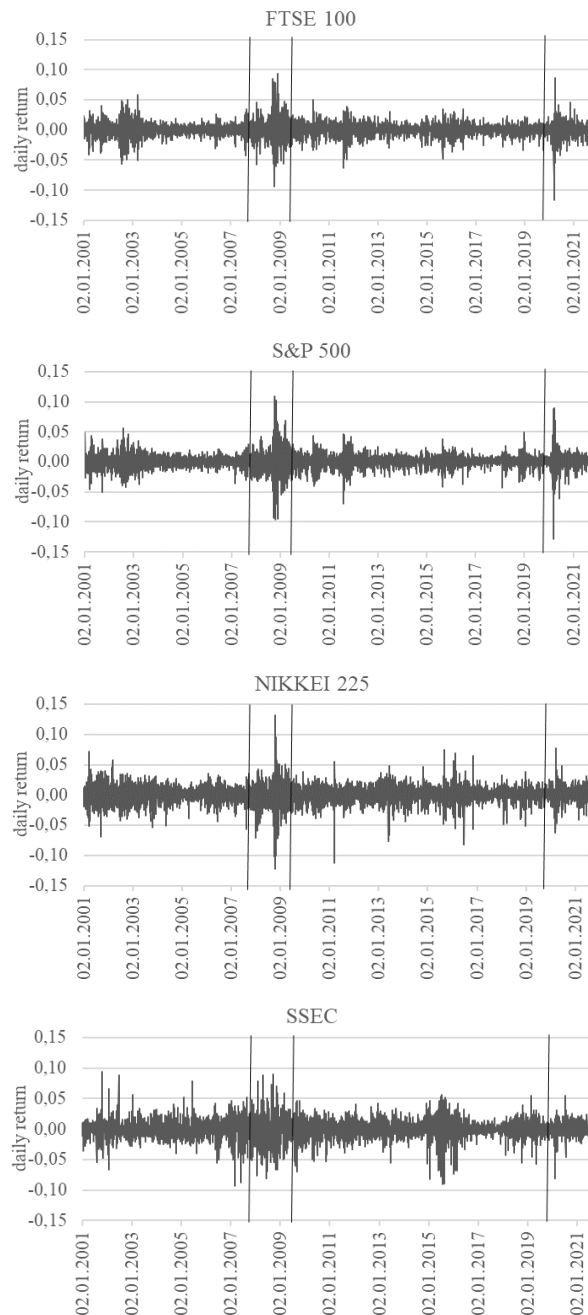
Figure 1. Stock market indexes – natural logarithm of closing prices (2001–2021)



Source: authors' work based on data from investing.com and The Wall Street Journal (FTSE 100)

The data of four indexes have different behaviour in the selected intervals. The chart shows the significant drop in all markets at the beginning of 2008 and the beginning of the COVID-19 pandemic in March 2020. All of the studied stock markets have recovered until the end of investigated period.

Figure 2. Stock market indexes – daily returns (2001–2021)



Source: authors' work based on data from investing.com and The Wall Street Journal (FTSE 100)

The development of daily returns on all four markets have different behaviour in the normal periods and in the crisis periods in terms of volatility. One of the random walk aspects is the stable variability in time. This assumption is not met in the whole examined period on all markets. During the crisis periods the volatility is bigger than in the other periods of the examined interval. The Variance ratio test checks this aspect of the random walk.

3.1 Runs Test

Values of the five runs test for each index were calculated in MS Excel and are in Table 1. The different number of observations is due to the different number of business days in each market.

Table 1. Runs tests

	FTSE 100	S&P 500	NIKKEI 225	SSEC
01/2001 - 11/2021				
Runs test statistic	0,814	4,668	2,134	0,641
p-value	0,416	0,000	0,033	0,521
n	5276	5254	5112	5063
01/2001 - 12/2007				
Runs test statistic	1,479	3,655	1,055	-0,420
p-value	0,139	0,000	0,291	0,674
n	1765	1755	1719	1685
1/2008 - 06/2009				
Runs test statistic	1,470	2,840	1,419	-0,733
p-value	0,142	0,005	0,156	0,464
n	377	377	363	364
07/2009 - 02/2020				
Runs test statistic	-1,067	1,552	1,019	0,658
p-value	0,286	0,121	0,308	0,511
n	2695	2684	2608	2594
03/2020 - 11/2021				
Runs test statistic	-0,917	-1,809	-2,130	-1,869
p-value	0,359	0,070	0,033	0,062
n	438	436	422	419

Source: authors' work based on data from investing.com and The Wall Street Journal (FTSE 100)

For most markets and periods, the test did not reject the hypothesis of a random sequence of returns, which should occur under the null hypothesis of a random walk.

The COVID-19 pandemic period changed the behaviour of the Japanese stock market. The random walk hypothesis could be rejected on a 5% level of significance for this market Japanese. On a 10% level of significance, the US and Chinese markets tests have the tested hypothesis of the random sequence rejected.

The American market, however, does not follow the random walk in all periods except for the period after the financial crisis.

3.2 Variance Ratio Test

The results of the Variance ratio test are shown in Table 2.

Table 2. Variance ratio test

	FTSE 100	S&P 500	NIKKEI 225	SSEC
01/2001 - 11/2021				
max z 	16,582	11,470	18,690	18,391
p-value	0,000	0,000	0,000	0,000
n	5150	5068	4863	4941
01/2001 - 12/2007				
max z 	12,239	13,536	13,695	11,142
p-value	0,000	0,000	0,000	0,000
n	1723	1693	1638	1658
1/2008 - 06/2009				
max z 	5,824	6,000	5,423	6,824
p-value	0,000	0,000	0,000	0,000
n	366	363	344	352
07/2009 - 02/2020				
max z 	15,263	11,790	14,080	12,638
p-value	0,000	0,000	0,000	0,000
n	2631	2588	2477	2522
03/2020 - 11/2021				
max z 	4,856	3,724	5,791	7,111
p-value	0,000	0,001	0,000	0,000
n	428	422	402	407

Source: authors' work based on data from investing.com and The Wall Street Journal (FTSE 100)

According to the multiple variance ratio test, the hypothesis that the variance of the q-differences increases linearly in the observation interval or that the variances grow more than proportionally with time can be rejected. Therefore, the random walk hypothesis for all stock markets in all periods can be rejected.

3.3 Summary of Results

The applied tests conclusions for all four markets are summarized in Table 3.

Table 3. Summary of results

	FTSE 100	S&P 500	NIKKEI 225	SSEC
01/2001 - 11/2021				
Runs test	NO	YES	YES	NO
Variance ratio test	YES	YES	YES	YES
01/2001 - 12/2007				
Runs test	NO	YES	NO	NO
Variance ratio test	YES	YES	YES	YES
1/2008 - 06/2009				
Runs test	NO	YES	NO	NO
Variance ratio test	YES	YES	YES	YES
07/2009 - 02/2020				
Runs test	NO	NO	NO	NO
Variance ratio test	YES	YES	YES	YES
03/2020 - 11/2021				
Runs test	NO	NO	YES	NO
Variance ratio test	YES	YES	YES	YES

Source: authors' work based on data from investing.com and The Wall Street Journal (FTSE 100)

The tested weak form of the efficient market hypothesis based on the results of two tests can be rejected for the majority of periods and markets.

4. CONCLUSION

In summary, for the entire period 2001–2021, the validity of the efficient market hypothesis in its weak form was confirmed for the British and Chinese markets by the runs test. The application of the variance ratio test rejected the existence of a random walk, i.e., a weakly efficient market in all four monitored markets. The American and Japanese market was pointed out as ineffective by the tests performed for the aggregate period 2001–2021, as both tests rejected the random walk hypothesis.

However, the two types of statistical tests selected in this paper were also applied to selected stock markets in shorter periods, which yielded different results.

The existence of a weak form of efficiency in all monitored periods was confirmed using the runs test in the British market. However, the variance ratio test in all periods led to the rejection of the EMH on the British market. Also, in the British market, the efficiency of the market with the arrival of COVID-19 did not disappear.

In the US market, the validity of the efficient market hypothesis was confirmed infrequently by used tests. In most periods the existence of a weak form of efficiency was monitored. The runs test did not reject it in the post-crisis and COVID-19 periods. In the overall and crisis periods, the functioning of an efficient US market was not confirmed by the variance ratio test.

In the Japanese market, the existence of a weak form of efficiency was discovered in most periods under review by the runs test. The runs test indicates the effective behaviour of

the Japanese market in the pre-crisis, crisis and post-crisis periods. While the variance ratio test monitored the weak inefficiency for all studied periods.

According to the runs test, the Chinese market behaved weakly efficiently in all monitored periods. The variance ratio test claims the opposite for all periods. Of the monitored stock markets, the British and Chinese markets are the markets where the weak efficiency of the market has been confirmed most often.

In inefficient markets, excessive return opportunities may occur, bringing the investor a much higher return than the risk taken. These opportunities can help investors identify different investment strategies, but these are associated with certain transaction costs. Conversely, in efficient markets, investment strategies with which investors seek to find and take advantage of excessive investment opportunities can be expected to fail, as significantly excessive investment opportunities do not exist in an efficient market. Therefore, market efficiency needs to be tested so that investors know in which market it makes sense to try to apply an investment strategy and in which market it is more appropriate to focus on portfolio risk management, as the return and risk of investment opportunities are roughly in balance.

Most notably, in all the monitored periods, a weak form of market efficiency was detected in the Chinese (5x) and British (5x) markets using the tests used in this paper. If these markets behaved effectively during the period under review, they could not offer investors significantly excess returns.

On the other hand, the smallest detection of market efficiency by the performed tests can be observed in the US market (only two times), which gives more room for the occurrence of potential revenue opportunities. The Japanese market monitored the weak efficiency three times.

Interestingly, except for the US market, market efficiency measured by the runs test remains in all monitored markets even during the financial crisis. Moreover, the outflow of investors from some markets during the financial crisis and the decline in liquidity of these markets do not seem to affect the efficiency of these markets.

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Management and Economic Policy

IMPACT OF TRADE POLICY LIBERALIZATION ON CHEMICAL INDUSTRY: CASE STUDY OF UZBEKISTAN

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Abstract: *This paper is mainly concentrated on Uzbekistan's accession process to the World Trade Organization and recent reforms in country's foreign trade policy. By employing the partial equilibrium model, it pays special attention to the chemical industry trade. Moreover, expected changes in imports of chemicals, budget revenues and consumer welfare also revealed in the paper. Specifically, two scenarios, namely abolition of country specific discrimination practices in imports or mere tariff reduction, are considered. Results show that in the former case, budget revenues will grow considerably, imports and consumer welfare will decrease, while in the latter case imports of chemical products and consumer welfare will slightly increase and budget revenues will decline. It is concluded that in the former case, the negative effect will be outweighed by creating a fairer and more competitive environment, since removing discrimination practices such as import-specific excise taxes and exemptions on import duties payments for state companies stabilizes balance of resource allocation within and among industries.*

1. INTRODUCTION

There have been massive changes in Uzbekistan since the new president, Shavkat Mirziyoev, took office in 2016. The country has embarked on a reform journey and the economy has experienced unprecedented changes. In particular, economic reforms are addressed on strengthening economic growth while keeping inflation in its possible lowest level. Like many other developing countries, primary focus of economic policies is on upgrading prosperity and achieving sustainable growth in all industries. Trade liberalization can be a good instrument to enhance the productivity capacity of industries especially in developing countries. Besides, Yameogo and Omojolaibi (2020) emphasize that trade openness supports economic growth and reduces poverty especially in developing countries. Concerning this, Uzbekistan's trade policy has been subject to reforms regarding particularly customs fees and procedures in order to lower tariff barriers and simplify the customs formalities. As a matter of fact, in order to support export-led growth in the country, Uzbekistan has recently resumed its negotiations with the World Trade Organization (WTO, 2020). Despite the fact that Uzbekistan as a non-member country of the organization can freely and independently modify trade policies, ongoing negotiations may lead future changes to reflect WTO requirements.

Besides, there are several programs that Uzbekistan has been taking place in order to increase its export capacity and liberalize its trade policies. For instance, Uzbekistan has been

debating with the Eurasian Economic Union (EAEU) regarding strengthening their relationship and mutual collaboration. Uzbekistan also takes part in The Global Trade Facilitation Programme of the World Customs Organization (WCO), which assists member countries in terms of adopting to international standards of trade between the years 2018 and 2022 (SECO-WCO Global Trade Facilitation Programme, 2020). Uzbekistan became an observer of EAEU in December 2020 (The Tashkent Times, 2021), and according to the official statistics, its trade with members of the EAEU account for almost 29% of the country's trade turnover (State Committee of the Republic of Uzbekistan on Statistics, 2020). Moreover, Uzbekistan is a member of the Commonwealth of Independent States Free Trade Area (CISFTA) comprising of Tajikistan, Kyrgyzstan, Kazakhstan, Ukraine, Russia, Belarus, Moldova, and Armenia. In particular, CISFTA enables member countries to trade without import tariffs with some exceptions (Ministry of Economic Development of the Russian Federation, 2021). Uzbekistan has also concluded free trade agreements (FTA) with Azerbaijan, Turkmenistan and Georgia (National legislation database of the Republic of Uzbekistan, 2020).

In July 2020 Uzbekistan resumed the negotiations on accession to the WTO (WTO, 2020). The WTO membership is currently an important issue and its benefits and challenges are being vividly discussed in the country since further liberalization steps will have to take place.

Uzbekistan had undertaken the first reforms before the WTO accession process has been resumed. In the past, the import regime of Uzbekistan was characterized by a high level of protectionism and at the same time, a large number of individual privileges regarding the payment of import fees were provided (hereinafter referred to as exemptions). Since 2017, important changes have taken place in this area aimed at liberalising the foreign trade regime. Many protectionist measures, however, persist.

The objective of this paper is to reveal the changes in Uzbekistan's foreign trade policy, its exports and imports, and to evaluate the impact of the possible WTO membership on trade in chemical products.

2. LITERATURE REVIEW

According to majority of the literature trade liberalization offers improved allocation of domestic resources, which in turn leads to an increase in welfare. On the other hand, any kind of import restricting policies lead to anti-export bias through raising relative price importable goods with respect to exportable goods. Trade liberalization can remove this bias and reallocate resources from production of import substitutes to export oriented goods and services. Following to this especially developing countries can benefit from their comparative advantage and accelerate short to medium term growth (McCulloch, Winters and Cirera, 2001).

Authors of empirical literature have come to ambiguous conclusions concerning the positive effects of the WTO membership on trade flows. This raises questions whether the tariff reduction promoted by the WTO and its predecessor, the General Agreement on Tariff and Trade (GATT), has had desired results.

Based on the standard gravity model of bilateral trade Rose (2004) state that the WTO does not seem to have had much impact on trade. He provides two explanations why WTO membership little effect on trade. First of all, WTO members often extend MFN status unilaterally to non-member countries, although they are not obliged to by WTO rules. Secondly, the GATT/WTO has not forced most countries to reduce trade barriers, which is typical mainly for developing countries that have received special treatment. He concludes that WTO membership has negligible effect on trade policy and therefore on trade flows as well (Rose, 2004). However, he does not claim that the existence of GATT and the WTO has been irrelevant

(Rose, 2010). He admits the WTO membership encourages creating trade links that may not exist otherwise.

On the other hand, Arwind Subramanian and Shang-Jin Wei disagree with Rose. According to their studies the WTO has a strong positive impact on trade liberalization. They argue that mainly industrialized countries mostly benefit from the WTO. However, they admit that not only industrialized countries but also developing countries experience advantages of the WTO, which can be detected in increased exports. Furthermore, Todd L. Allee and Jamie E. Scalera emphasize countries that highly demand accession to an international organization and actively promote substantial policy modifications to become a member benefit more from joining the WTO (Todd et al., 2012). Wacziarg and Welch (2008) indicate that economic integration can stimulate economic growth through its positive effect on investment inflows.

Richard Pomfret has elaborated a study where he identifies the barriers to completing Uzbekistan's WTO accession negotiations, and the benefits and costs of WTO membership. He claims that the government's commitment to economic reform is key to the eventual membership. A sector-specific study examining the economic implications of WTO membership on Uzbekistan's highly protected automobile industry has been done by Alisher Umirdinov and Valijon Turakulov. The authors suggest that the sector will have to deal with extreme pressures from internal and external players that will have immense consequences. In order to mitigate them, they suggest that a more extended phase out period will be required, and the state should decrease its support gradually.

3. STRUCTURE AND METHODS

In this paper, we first concentrate on analysing changes in the national legislation in recent years, especially the exchange rate policy liberalization, changes in import tariffs and import excise taxes that influence the eventual costs of import. In our analysis, we employed data provided by the International Trade Centre (ITC) and the State Committee of the Republic of Uzbekistan on Statistics.

In the following part, special attention is paid to Uzbekistan's chemical industry and the impact of the possible WTO membership on the industry. Specifically, effect of trade liberalization on chemical products imports, consumer welfare and budget revenues will be analysed in detail. We utilize the partial equilibrium model employing the SMART partial equilibrium modelling tool, which uses indicators of elasticity of demand for imports, elasticity of export supply and elasticity of substitution on the basis of the World International Trade Solutions (WITS, 2020) and estimates by Hertel et al. (2007).

Over the analyses two scenarios will be developed. In particular, scenario 1 considers only changes in tariff rates, while scenario 2 considers wider modifications. In scenario 1 we assume that the import tariff rates in Uzbekistan will be reduced to the level of the neighbouring countries' rates. However, scenario 2 assumes that Uzbekistan will abolish all discriminative practices in import along with the import tariff reduction. In the following paragraphs the two scenarios are explained in detail. We observe changes for four groups of countries: (1) MFN countries according to Uzbekistan's agreements mentioned in the Introduction (47 countries), (2) CISFTA countries (10 countries), (3) non-MFN, non-CISFTA but WTO member countries, and (4) non-MFN, non-CISFTA and non-WTO countries. We calculate the change in imports of each group, changes in budget revenues and consumer welfare.

4. RESULTS

Trade policy liberalization

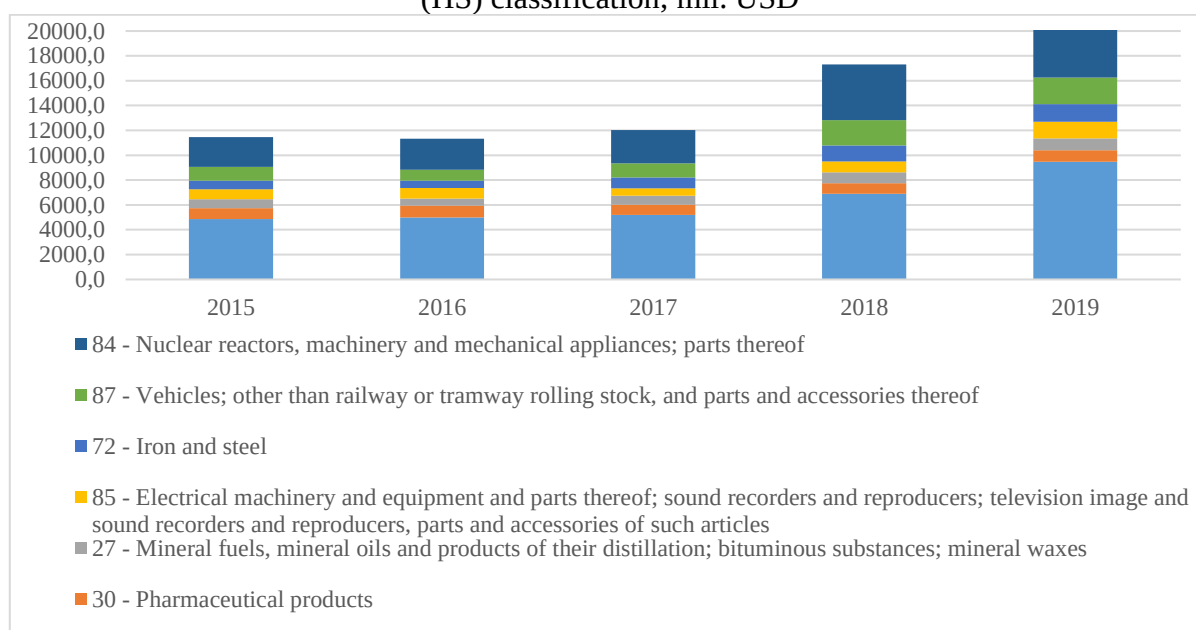
Past four years brought Fundamental changes in the national legislation. The key legal document with respect to the movement of goods across the customs borders of the country, customs control, customs clearance, collection and payment of customs payments and customs legislation violations procedures is the Customs Code (National legislation database of the Republic of Uzbekistan, 2016). Currently the new redaction of the Customs Code is under consideration

A measure of particular importance was the introduction of the current account convertibility in 2017 (National legislation database of the Republic of Uzbekistan, 2017). In the same year, the government adopted a decision to significantly reduce customs duties for a long list of items. The presidential resolution “On measures to further streamline foreign economic activity and improve the system of customs and tariff regulation of the Republic of Uzbekistan” from June 2018 further and substantially reduced not only the custom tariffs on imported goods but also the excise tax on imports (National legislation database of the Republic of Uzbekistan, 2018). Also, the customs tariff rates have been unified for items similar in type, properties and utilisation. In December 2018, some of the rates were increased again, e.g. for clothes, shoes, furniture, certain foods etc. High rates (40–70%) remain for vehicles. After the end of the acute phase of the coronavirus pandemic (2019), starting from 2020, excise tax reform was carried out in the republic.

Tariffs are not the only cost of imports. Import excise taxes, value added tax (VAT) and customs clearance fees have to be considered as well. Import excise tax rates and the list of imported excisable products were subject to fundamental changes too. Their importance has decreased but they are still an important tool for regulating imports and a source of budgetary revenues. Many goods are excisable only when they are imported in Uzbekistan, they are not subject to excise taxes if produced domestically.

Import and export customs procedures have been simplified significantly which received a positive response from the World Bank and exporters have been provided with state support concerning the customs clearance formalities. To better understand the changes in ease of trading across borders as a result of simplification of the customs procedures, World Bank’s “Ease of Doing Business” score and ranking can provide us with useful information. It “records the time and cost associated with the logistical process of exporting and importing goods and it measures the time and cost (excluding tariffs) associated with three sets of procedures – documentary compliance, border compliance and domestic transport” (World Bank Group, 2020).

Figure 1. Commodity structure of Uzbekistan's imports 2015–2019, Harmonized System (HS) classification; mil. USD



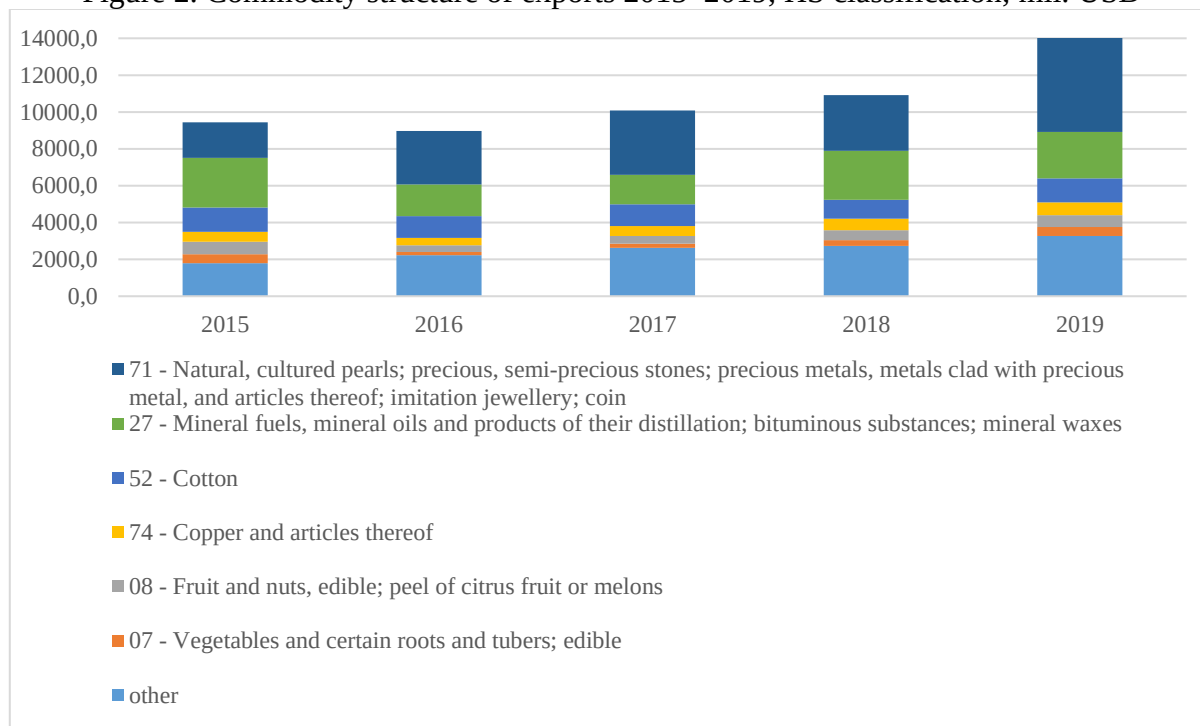
Source: State Committee of the Republic of Uzbekistan on Statistics, “Foreign economic activity – Merchandise trade”

Figures 1 and 2 show that the liberalization efforts had evident outcomes demonstrated by increased trade flows, especially imports. Reducing the customs tariffs and excise tax has resulted in larger imports values in 2018 and 2019. Uzbekistan experiences a trade deficit which has deepened in recent years (State Committee of the Republic of Uzbekistan on Statistics, 2020).

The export value grew (Figure 2) partly because of gold exports. Uzbekistan is one of the top exporters of precious metals. In 2019 they account for almost a third of the country's exports (29.8%).¹ Other main export items remain more or less unchanged: fuels, cotton, copper, food products, plastics, clothing and chemical products.

¹ “Uzbekistan exports over \$1 billion worth of gold in Q1,” The Tashkent Times, last modified 23 April 2020, <https://tashkenttimes.uz/economy/5205-uzbekistan-exports-over-1-billion-worth-of-gold-in-q1>, accessed 12 January 2021.

Figure 2. Commodity structure of exports 2015–2019, HS classification; mil. USD



Source: State Committee of the Republic of Uzbekistan on Statistics, “Foreign economic activity – Merchandise trade”

Impact of WTO accession on chemical industry trade

Uzbekistan’s production of nitrogen, phosphorus and potassium is ranked 8th in the world. In terms of volume and sorts of nitrogen and phosphorus fertilizers produced, the country occupies a leading position in the Central Asian region (Mirzamakhmudov, 2020). Chemical products are exported to more than 30 countries around the world. The main export markets are traditionally the neighbouring countries, such as Kazakhstan, Tajikistan, Kyrgyzstan and Afghanistan but new ones are being explored, such as South Korea, Japan and others (Mirzamakhmudov, 2020).

Uzbekistan’s chemical industry has a significant potential in production thanks to the locally available raw materials, technical base and labour force, and represents one of the top industrial sectors of the economy. Raw materials that are important for the industry are natural gas, ammonia, nitric acid, industrial salt, limestone and industrial sulphur, all of them available in Uzbekistan. The availability of natural resources is a key advantage in an industry where raw materials and utilities account for between 40% and 90% of production costs (International Finance Corporation, 2018). With such unique advantages, Uzbekistan could become a net exporter of chemical products.

However, high level of physical and moral depreciation of Uzbekistan’s production facilities has reduced productivity and increased energy and material consumption of production over the past years, which is the main factor holding back the development of the chemical industry. The measures taken in recent years were insufficient to improve the technical condition of the production facilities and increase their competitiveness in the global market (Mukhamedov, 2017).

Today, imports of chemical products are 5 times higher than exports.² The main volume of production is focused on meeting the needs of the domestic market. Real growth rates of

² State Committee of the Republic of Uzbekistan on Statistics, “Foreign economic activity – Merchandise trade.”

production have significant fluctuations and the share of chemical industry in the industrial sector has been decreasing; see Table 1.

Table 1. Key indicators of the chemical industry in Uzbekistan

	2015	2016	2017	2018	2019
Production (mil. USD)	1944.6	2488.4	1934.7	1868.5	2147.3
Import* (mil. USD)	558.4	579.6	630.7	777.5	1081.8
Export* (mil. USD)	234.6	188.0	245.7	217.2	208.5
Production growth (in % to the previous year)	110.4	138.3	101.7	99.1	102.3
Share in the industrial sector (%)	6.5	8.2	8.4	8.0	5.9
Number of employees in the industry	41797	42499	45986	46721	47085

Source: “Industry,” State Committee of the Republic of Uzbekistan on Statistics, accessed 12 September 2020, <https://stat.uz/en/official-statistics/industry>

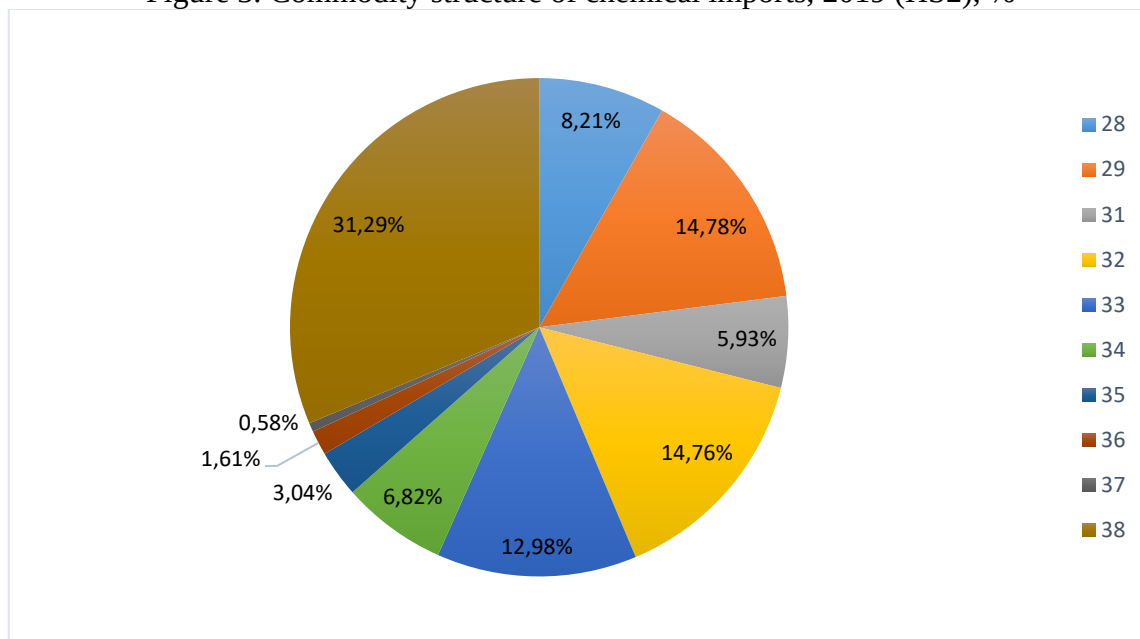
Due to the developed agricultural sector in Uzbekistan, the dominant position in the structure of the chemical industry is the production of fertilizers for agriculture. Agricultural chemistry practically meets the needs of the republic's cotton and grain cultivation (International Finance Corporation, 2018).

The share of imports in the total market of chemical products in Uzbekistan is 30.3%, and the share of local production is 69.7%.³ As mentioned above, local production is mainly concentrated in the production of fertilizers; this is the only product group where Uzbekistan is a net exporter. For other groups of goods, Uzbekistan is a net importer. Products such as pesticides and herbicides for agriculture and chemicals for rapidly developing industries such as textiles, leather and food production are mainly imported (International Trade Centre, “ITC Trade Map”). We can expect further growth in imports due to the fast growth of the textile, leather and food industries, as domestic production is not well developed.

The main import items are other chemicals (HS2 code 38), organic chemicals (HS2 code 29), tanning or dyeing extracts; tannins and their derivatives, dyes, pigments and other colouring matter, paints and varnishes (HS2 code 32) and cosmetics or toilet preparations (HS2 code 33).

³ “ITC Trade Map,” International Trade Centre, accessed 15 November 2020, <https://www.trademap.org/>; State Committee of the Republic of Uzbekistan on Statistics, “Foreign economic activity – Merchandise trade.”

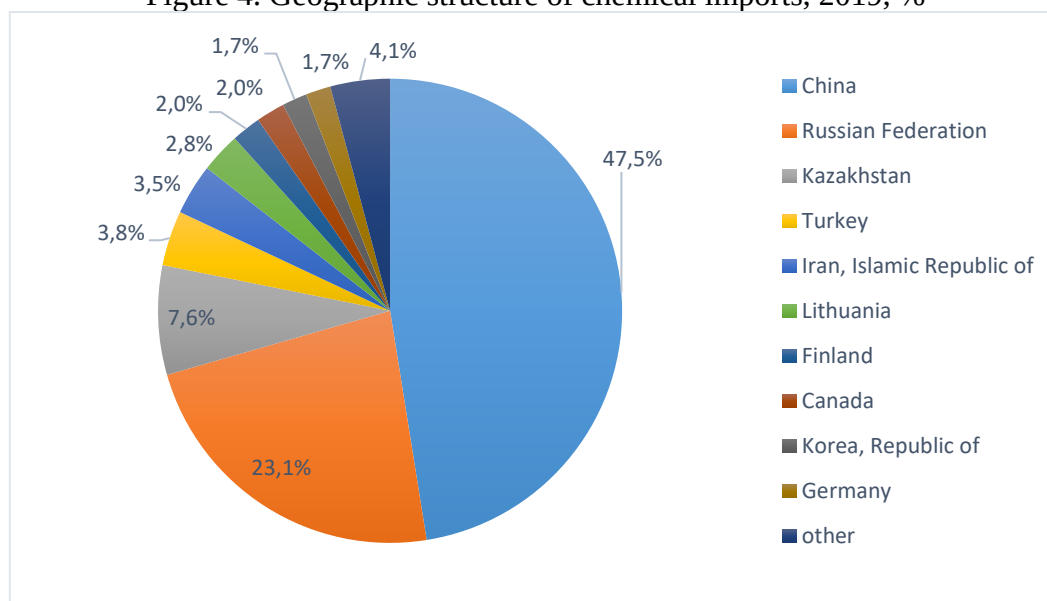
Figure 3. Commodity structure of chemical imports, 2019 (HS2), %



Source: International Trade Centre, “ITC Trade Map”

The main volume of chemical products is imported from China, Russia, and Kazakhstan (see Figure 4).

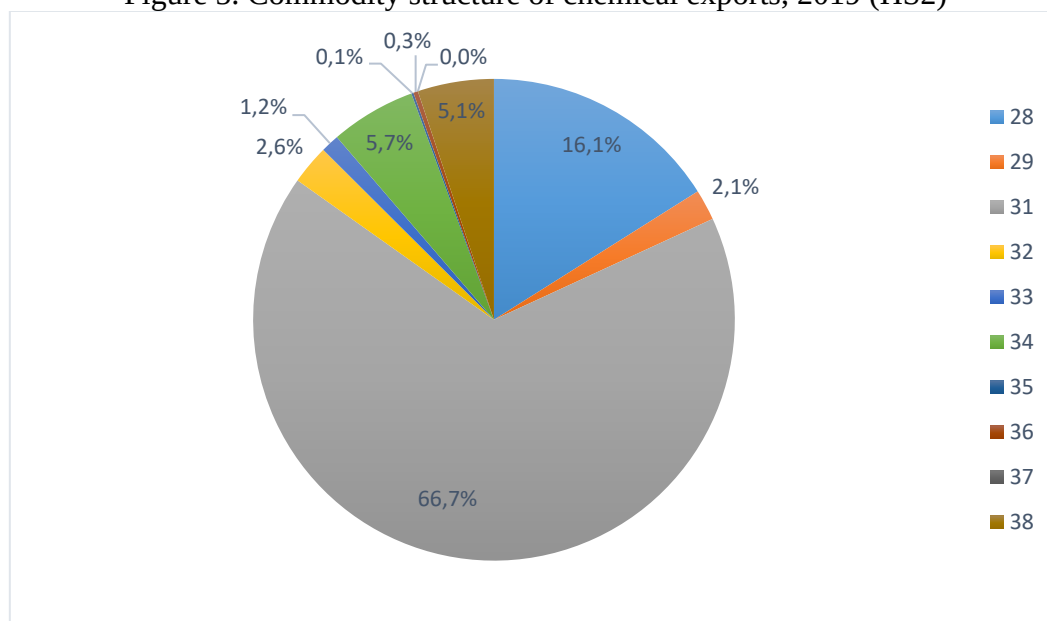
Figure 4. Geographic structure of chemical imports, 2019, %



Source: International Trade Centre, “ITC Trade Map”

Uzbekistan’s exports are mainly concentrated in fertilizers (HS code 31), which account for almost 67% of the industry’s exports. As mentioned above, this is the only commodity group where Uzbekistan is a net exporter with a trade balance of 73.7 million USD (International Trade Centre, “ITC Trade Map”).

Figure 5. Commodity structure of chemical exports, 2019 (HS2)



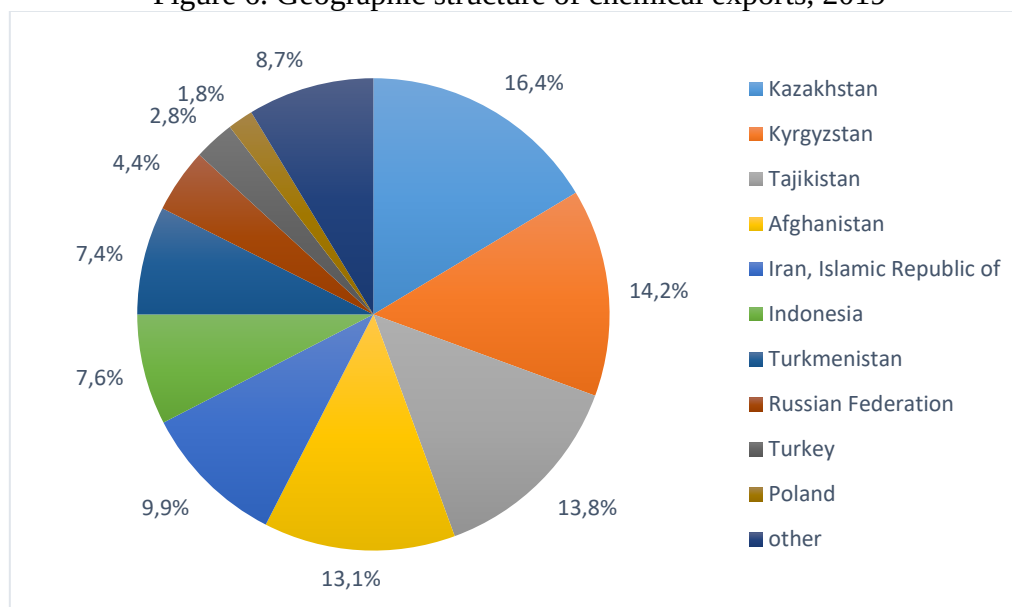
Source: International Trade Centre, “ITC Trade Map”

The chemical sector is predominantly regional due to high transport costs. This fact is confirmed by the predominantly regional nature of imports and exports in countries around the world; Uzbekistan is not an exception. The main share of chemical products is exported to such countries of the region as Kazakhstan, Kyrgyzstan and Tajikistan (International Trade Centre, “ITC Trade Map”). The geographic structure of Uzbekistan’s export of chemicals is shown in Figure 6. The bulk of exports are directed to countries with which Uzbekistan has an agreement on preferential trade. Recent improvements in relations with the closest neighbours have resulted in a significant increase in overall regional trade.

While in 2017 the growth in imports of chemicals amounted to 8.8%, in 2018 the growth in imports amounted to 23.2%, sharply reacting to a decrease in average import duties from 6.0% to 1.3%. A particularly sharp increase in imports in 2018 was observed in the group of fertilizer products (156%) (International Trade Centre, “ITC Trade Map”), where import duties were substantially reduced.⁴

⁴ “On amendments and additions to the Resolution of the President of the Republic of Uzbekistan dated June 29, 2018 No. PP-3818 “On measures to further streamline foreign economic activity and improve the system of customs and tariff regulation of the Republic of Uzbekistan”,” Norma, last modified 3 October 2019, https://static.norma.uz/official_texts/2019/%D0%9F%D0%9F-4470.pdf

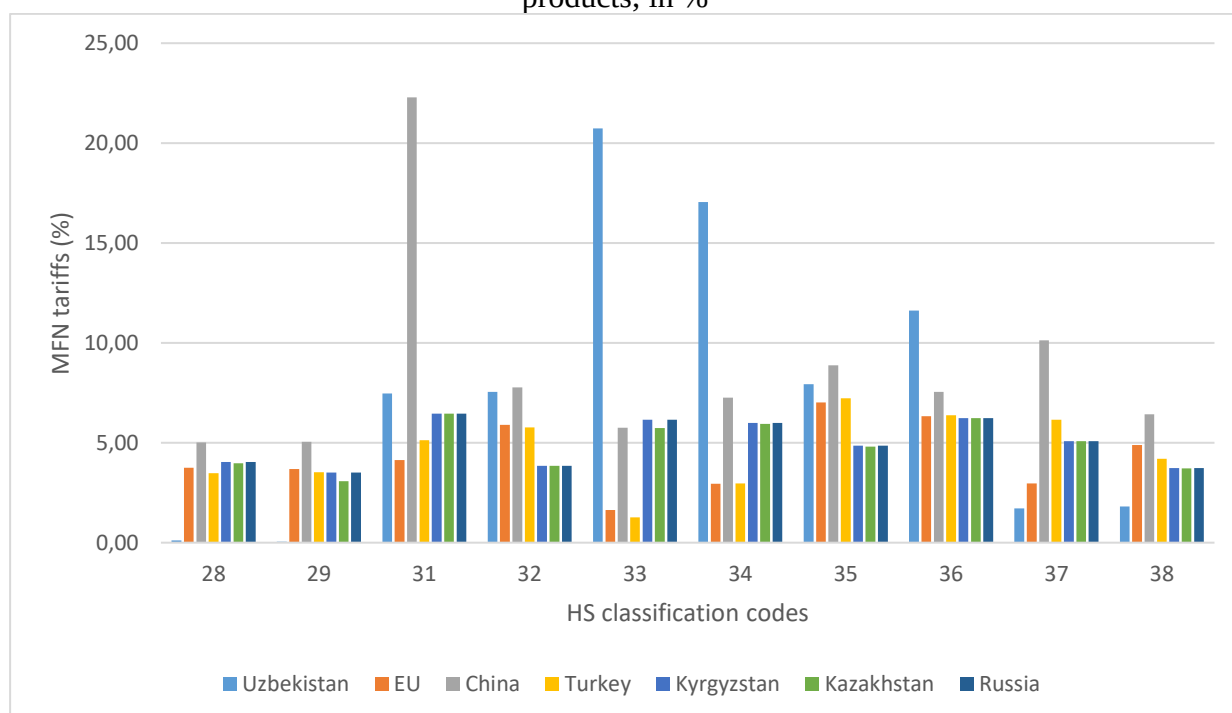
Figure 6. Geographic structure of chemical exports, 2019



Source: International Trade Centre, “ITC Trade Map”

In order to forecast the level of import tariffs in Uzbekistan upon accession to the WTO, the existing import tariffs of WTO countries – Uzbekistan’s major trading partners – were compared (MFN tariffs, Figure 7). Uzbekistan's import MFN tariffs for product groups 33, 34 and 36 turn out to be much higher than tariffs of the above-mentioned countries. However, tariffs for other groups of goods (28, 29, 37 and 38) are lower or almost equal zero. In bilateral negotiation processes, countries like the EU and Turkey may put pressure on Uzbekistan to lower tariffs on commodity groups where the level is higher.

Figure 7. MFN tariffs applied by Uzbekistan and its major trading partners on chemical products; in %



Source: International Trade Centre, “ITC Aggregated Market Access Indicators”

According to Uzbekistan's legislation, MFN tariffs are reduced rates which apply in the case of an agreement on trade preferences with another country. For the rest of the world excluding the CISFTA, Azerbaijan, Georgia and Turkmenistan, a double rate applies.⁵ The MFN tariff may be further decreased based on bilateral agreements which is the case of Uzbekistan's major trading partners (International Trade Centre, 2020).

Because of the predominantly regional nature of foreign trade in chemical products, most of the above-mentioned countries will be the main competitors for Uzbekistan. With regard to this fact, the average level of import duties in these countries is a more acceptable and likely option for Uzbekistan.

Another issue which may complicate the WTO accession process is that the customs system of Uzbekistan is characterized by the presence of exemptions for certain industries and enterprises where import duties payments are waived for them; this creates uneven conditions for producers in the market. Such conditions do not comply with the principles of the WTO. In accordance with the Agreement on Subsidies and Countervailing Measures of the WTO, benefits to individual enterprises and industries are classified as subsidies. They are either prohibited or subject to challenge if they cause negative effects to the interests of a WTO member country (WTO-GATT, 2020). The possible abolition of these benefits upon accession to the WTO will have a fundamental impact on the budget.

Another example of discrimination is the excise tax application. For example, the group of goods "Lubricants" (HS code 3403) is subject to an excise tax of 5% on imports, but not on domestic production.⁶ This approach is considered to be discrimination against imports under WTO rules and is not allowed. Uzbekistan will have to abolish or reduce to zero the excise tax imposed exclusively on imports upon joining the organization.

In order to predict the effects of Uzbekistan's accession to the WTO, we used the partial equilibrium model. To see the changes in the shares of different group of countries we divided them into four groups:

- (1) MFN countries according to Uzbekistan's agreements on trade preferences (47 countries); MFN rates are applied to goods originating in these countries;
- (2) CISFTA countries (ten countries) where zero import tariff rates are applied; Azerbaijan, Georgia and Turkmenistan also fall into this group thanks to the FTA with Uzbekistan but they are not included in the following tables due to their negligible share in chemical imports;
- (3) non-MFN, non-CISFTA but WTO member countries for whom a double tariff rate is applied;
- (4) non-MFN, non-CISFTA and non-WTO countries for whom a double tariff rate is applied.

Most trade of the country occurs with the MFN and CISFTA countries which made up 97% of total trade in 2019. We considered two scenarios:

Scenario 1

We assume that the level of tariffs in Uzbekistan is more likely to decrease to about the level of neighbouring countries. Therefore, it is assumed that the tariff rate will change from current rates to the average rate of the region, no other changes regarding import payments are considered (VAT, excise tax, import duty payment exemptions and valuation methods stay the

⁵ National legislation database of the Republic of Uzbekistan, "The Customs Code of the Republic of Uzbekistan."

⁶ National legislation database of the Republic of Uzbekistan, "Law of the Republic of Uzbekistan on the State Budget of the Republic of Uzbekistan for 2020. Appendix 8. Rates of excise tax on excisable goods (services) produced (rendered) in the Republic of Uzbekistan."; Complete legislation of Uzbekistan, "Excise tax rates on excisable goods imported into the territory of the Republic of Uzbekistan."

same). The assumed tariff rate remains unchanged if it is lower than the average rate in the region. Table 2 contains the input data for the partial equilibrium model.

Table 2. Scenario 1: Input data for the partial equilibrium model

HS2 code	share in imports	Current tariff rate for MFN countries (% of import value)	Expected tariff rate for MFN countries (% of import value)	change in tariff rate	import demand elasticity	export supply elasticity	elasticity of substitution *
28	8.21	0.11	0.11	0.0	1.05	99	6.6
29	14.78	0.04	0.04	0.0	1.59	99	6.6
31	5.93	7.47	7.47	0.0	4.03	99	6.6
32	14.76	7.55	5.40	-2.15	1.05	99	6.6
33	12.98	20.74	4.81	-15.9	0.94	99	6.6
34	6.82	17.05	5.35	-11.7	1.23	99	6.6
35	3.04	7.93	7.93	0.0	0.81	99	6.6
36	1.61	11.62	6.49	-5.3	3.38	99	6.6
37	0.58	1.71	1.71	0.0	1.58	99	6.6
38	31.29	1.81	1.81	0.0	1.18	99	6.6

Source: World Integrated Trade Solution, “SMART Simulation Tool.”; *Hertel, Hummels, Ivanic, and Keeney, “How confident can we be of CGE-based assessments of Free Trade Agreements?,” 611–35.; authors’ calculations based on International Trade Centre, “ITC Aggregated Market Access Indicators.”

Table 3 shows that the overall import of Uzbekistan would increase by 21.2 million USD mainly because of decreasing import tariffs. But it would not affect different group of countries equally. Imports from CISFTA countries would drop, as expected, since the tariff reduction for other WTO countries would dilute their relative import advantage. The share of the CISFTA countries would decrease from 27.4% to 21.6% while the share of the MFN countries would rise. The WTO member states who were neither the MFN nor CISFTA countries would feel stronger relief in import tariffs, their imports to Uzbekistan would increase by 72%. Imports from the non-CISFTA, non-MFN and non-WTO countries could improve slightly, since tariffs for them would generally decrease even if double tariff rate was imposed on their imports.

Table 3. Scenario 1: Import changes for groups of countries

	Imports before accession		Imports after accession		Growth	Import change
	Million USD	Share (%)	Million USD	Share (%)	%	Million USD
MFN countries for Uzbekistan (47 countries)	754.7	69.8%	824.7	74.8%	9.3%	70.0
CISFTA countries (10 countries)	296.8	27.4%	238.3	21.6%	-19.7%	-58.5
Non-MFN, non-CISFTA but member of WTO	10.8	1.0%	18.6	1.7%	72.4%	7.8
Non-MFN non-CISFTA non-WTO	19.5	1.8%	21.5	1.9%	10.2%	2.0
Total	1081.8	100.0%	1103.1	100.0%	2.0%	21.2

Source: Author's calculations

Table 4 shows the expected changes in tariff revenues, imports and consumer welfare for each product group. Our results show that budget tariff revenues would fall sharply, by 43%, reflecting the overwhelming effect of a decrease in tariffs over a small increase in imports, by only 2%. Insignificant increase in imports would have a small, but positive effect in consumer welfare.

Table 4. Scenario 1: Expected changes in tariff revenues, imports and consumer welfare

HS2 code	change in budget tariff revenue		expected import change		change in consumer welfare (million USD)
	million USD	%	million USD	%	
28	0.00	-3.1%	0.0	0.0%	0.0
29	0.00	-2.4%	0.0	0.0%	0.0
31	0.00	-0.5%	0.0	0.1%	0.0
32	-2.62	-25.6%	2.9	1.8%	0.2
33	-13.19	-64.2%	12.3	8.7%	1.2
34	-4.68	-56.3%	6.0	8.1%	0.5
35	0.00	-0.1%	0.0	0.0%	0.0
36	0.00	-15.2%	0.0	0.2%	0.0
37	-0.01	-5.9%	0.0	0.2%	0.0
38	-0.03	-0.6%	0.0	0.0%	0.0
Total	-20.5	-43.0%	21.2	2.0%	1.8

Source: Author's calculations

Overall, the negative effects of lowering the tariffs rates upon joining the WTO, resulting in a sharp fall in budget revenues may seem outweighing the positive effects in consumer welfare. On the other hand, Scenario 1 does not take into account wider policy changes associated with the actual WTO accession. Therefore, in Scenario 2 we consider further necessary liberalization in Uzbekistan's trade policy.

Scenario 2

Along with import tariff rates reduction we assume that the country will abolish all import duty payment practices not complying with the WTO rules. The main distorting factor, as discussed above, is the exemptions given to certain national companies or industries concerning import tariff, VAT and excise tax payments. Another one is the valuation method. In Uzbekistan, the basis for applying tariffs are prices quoted in the Import Price Bulletin of the State Customs Committee which are usually higher than declared import prices. The gap between the prices can vary from 10 to 30% making the import payments much higher than expected.⁷ Due to these distortions, the nominal protection rate does not reflect the actual situation. Therefore, we calculated the actual rate of protection as the ratio of collected import tariff, VAT and excise tax payments to import value (based on the Import Price Bulletin) from the database of the State Customs Committee, considering the existing exemptions. The main input data are provided in Table 5. It is evident that the nominal protection rate differs from the actual protection rate significantly. We therefore used the actual protection rate as the current rate in order to see the actual changes in revenues from import duties after they are adjusted to the regional level. The expected protection rate is calculated as the sum of regional average import tariff rate plus VAT, with a 0% excise tax due to its nature of a discriminative practice. Import excise taxes are currently applied to product groups 32, 33, 34.⁸ We also assume the abolition of exemptions provided to certain companies. We used the same elasticities as in Scenario 1.

Table 5. Scenario 2: Input data for the partial equilibrium model⁹

HS2 code	share in imports	Nominal protection rate (%)	Actual protection rate (%)	Expected protection rate (%)	change in protection rate (actual – expected)
28	8.21	15.1	15.2	15.1	-0.1
29	14.78	15.0	10.6	15.0	4.4
31	5.93	22.5	0.5	22.5	21.9
32	14.76	22.6	15.8	20.4	4.7
33	12.98	35.9	25.7	19.8	-5.9
34	6.82	32.2	24.0	20.3	-3.6
35	3.04	22.9	20.3	22.9	2.6
36	1.61	26.6	34.2	21.5	-12.8
37	0.58	16.7	13.4	16.7	3.3
38	31.29	16.8	8.2	16.8	8.6

Source: World Integrated Trade Solution, “SMART Simulation Tool.”; authors’ calculations based on International Trade Centre, “ITC Aggregated Market Access Indicators.”; “Customs duty rates and import volumes,” State Customs Committee of the Republic of Uzbekistan. Data set, 2019.

⁷ “Import Price Bulletin,” Open Data Portal of the Republic of Uzbekistan, accessed 14 February 2021, <https://data.gov.uz/en/datasets/7>; State Customs Committee of the Republic of Uzbekistan, 2019

⁸ Complete legislation of Uzbekistan, “Excise tax rates on excisable goods imported into the territory of the Republic of Uzbekistan.”

⁹ Explanatory notes: Nominal protection rate includes: current tariff rates, VAT, import-specific excise taxes, no import duty payment exemptions, valuation method: invoice prices (declared prices); actual protection rate includes: current tariff rates, VAT, import-specific excise taxes, import duty payment exemptions, valuation method: Import Price Bulletin prices; expected protection rate includes: tariff rates – lowered to regional level, VAT, 0% import-specific excise tax, no import duty payment exemptions, valuation method: invoice prices (declared prices).

The results of Scenario 2 for individual groups of countries are shown in Table 6. The overall effect of an expected trade policy change on imports is negative which can be explained by greater negative effect of abolition of exemptions over comparatively smaller total effects of tariffs reduction, elimination of discriminating excise taxes for some product groups and using actual declared import prices instead of Import Price Bulletin prices.

The CISFTA countries and the non-MFN, non-CISFTA non-WTO countries would experience the most negative effects, the least negative impact would be on MFN countries; their imports would decrease by 10.7%, 12.4% and 6.1% respectively, although without any major changes in their import shares. WTO member countries (non-MFN, non-CISFTA) would benefit from the changes and their imports would rise. For these countries the positive effect of a decrease from double tariff rates to lowered tariff rates seem to be outweighing the negative effect of the exemptions abolition.

Table 6. Scenario 2: Import changes for individual group of countries

	Imports before accession		Imports after accession		Growth	Import change
	Million USD	Share (%)	Million USD	Share (%)	%	Million USD
MFN countries for Uzbekistan (47 countries)	754.7	69.8%	708.9	70.7%	-6.1%	-45.8
CISFTA countries (10 countries)	296.8	27.4%	265.1	26.4%	-10.7%	-31.7
Non-MFN non-CISFTA but member of WTO	10.8	1.0%	11.5	1.2%	7.1%	0.8
Non-MFN non-CISFTA non-WTO	19.5	1.8%	17.1	1.7%	-12.4%	-2.4
Total	1081.8	100.0%	1002.6	100.0%	-7.3%	-79.2

Source: Authors' calculations

Table 7 shows impacts on budget revenues, imports and consumer welfare for each product group. Budget revenues from import tariffs, VAT and 0% excise taxes increases by 20.8% for chemicals in general, but not evenly across product groups, in some cases the results are negative. Budget revenues as a whole increase because the effect of abolished exemptions outweighs the reduced imports. In other words, the budget will receive import fees that were waived before. Significant decrease in imports is a consequence of abolishing the exemptions (imports became more expensive for importers) and pulls the consumer welfare to negative 7.58 million USD.

Table 7. Scenario 2: expected changes in tariff revenues, imports and consumer welfare

HS2 code	change in budget revenues from tariff, VAT and excise tax		expected import change		change in consumer welfare (million USD)
	million USD	%	million USD	%	
28	-0.07	-0.5%	0.08	0.1%	0.01
29	5.52	32.6%	-10.12	-6.3%	-1.30
31	3.20	996.9%	-40.68	-63.4%	-3.15
32	5.79	24.0%	-6.49	-4.1%	-1.12
33	-6.88	-20.4%	6.09	4.3%	1.29
34	-1.20	-7.8%	1.75	2.4%	0.35
35	0.45	6.9%	-0.45	-1.4%	-0.09
36	-0.33	-10.2%	1.69	9.7%	0.28
37	0.16	18.6%	-0.28	-4.5%	-0.04
38	23.01	82.9%	-30.80	-9.1%	-3.80
Total	29.7	20.8%	-79.21	-7.3%	-7.58

Source: Authors' calculations

The decrease in imports should normally result in lower budget revenues, but in our case the effect of exemptions abolishment is so great that it causes positive net change in budget revenues. With respect to the trade deficit, lower imports are considered favourable, although it reduces competition in the country's chemical industry. Scenario 2 demonstrates that import tariff reduction along with substantial trade policy changes can result in a net positive effect on the economy. Allee and Scalera (2020) or Dutt (2020) linked significant policy changes during the accession process to considerable benefits concerning trade flows. In our case, benefits of WTO accession in the short term would rather involve the elimination of trade distortions caused by discriminative measures. Scenario 2 is obviously the more realistic one because the WTO will expect Uzbekistan to abolish many practices used to help particular sectors and producers, as pointed out by Pomfret (2020). Such process will be helpful in creating a fairer, market-oriented environment. Authors of the study on predicted consequences of the WTO accession for the ultra-protected automobile industry in Uzbekistan also conclude that removing state interventions (in this case a monopoly position of a major domestic car producer) will be beneficial and improve the competitive environment in the country (Umirdiniv et al., 2019).

It should be noted that in the process of economic liberalization, including trade policy, the situation in the chemical industry of Uzbekistan began to improve. For the period 2019–2021, the industry production of chemical products increased by 1.5 times, and exports – by 2 times. According to the results of activities in 2021, this industry became profitable for the first time, and in the first 6 months of 2022, the export of chemical products amounted to USD 218 million. Currently, measures are being taken to improve the efficiency and transformation of enterprises in this industry. It is expected that in 2022 the chemical industry will export 969.4 thousand tons of mineral fertilizers and 118.6 thousand tons of other chemical products. By the end of 2022, 400 million dollars of investments will be disbursed and 9 large-scale projects will be launched with the attraction of private investments. To this end, accelerated privatization of enterprises in this area will be carried out (this year, foreign investors will be sold controlling stakes in 6 chemical plants). The task was set to form a portfolio of projects worth at least 1 billion US dollars in five chemical clusters.

The main prerequisites for the improvement of the chemical industry are:

- in 2017, a single agent for export-import operations was created, which contributed to ensuring the transparency of import-export operations and the implementation of a unified marketing strategy;
- in 2018, market mechanisms for the sale of products of the chemical industry were introduced (declaring prices was canceled, an exchange mechanism for selling products on the domestic market was introduced, a single tariff was established for the transportation of mineral fertilizers by rail throughout the country);
- the range of chemical products with high added value has been expanded, new production facilities have been created and existing production facilities have been modernized;
- the participation of the state in the authorized capital of chemical industry enterprises has been reduced;
- attracting direct investments to the industry in order to deepen the processing of products and develop cooperation ties;
- active development of sectoral scientific research, as well as integration into production of advanced scientific developments, improving the quality of design and engineering work and diagnostic studies;
- organization of an effective system of training and retraining of personnel.

Thus, the liberalization of trade policy, privatization and restructuring of chemical industry enterprises allowed Uzbekistan to take the 8th place in the world in the production of nitrogen, phosphorus and potassium, and the manufactured products began to fully comply with the requirements of international quality certificates. The industry's products are exported to more than 30 countries around the world.

If Uzbekistan joins the WTO on favorable terms of the transition period, the country's economy will be provided with free movement of goods, as well as services, capital and labor, which will further expand the potential of this industry.

5. CONCLUSIONS

Uzbekistan has set on a challenging journey of liberalizing its economy including the foreign trade. The impact of the first reforms on trade flows is already evident, reflected particularly in increased imports. The WTO accession process will require intense negotiations regarding not only tariff rates but also eliminating practices that do not comply with the WTO rules. The expected changes include reducing import-specific excise taxes to zero and abolishing exemptions for companies concerning import duties payments. In our paper we focused on the chemical industry trade and illustrated two situations. The first scenario involved only the reduction of tariff rates, the second one included also eliminating all discriminative practices in import creating unequal conditions. The two scenarios gave dissimilar results. While in the first case the outcome was negative in terms of budget revenues and slightly positive thanks to an insignificant increase in imports and consumer welfare, the second case had a different result. The budget revenues increased, mainly due to the abolition of exemptions, and imports dropped by 7.3%. Considering that Uzbekistan has been facing a negative trade balance in recent years, the reduction of the trade deficit is desirable. On the other hand, increased foreign competition would serve as a beneficial motivation for improving the obsolete production facilities. Increasing the technological competitiveness and productivity of Uzbekistan's chemical industry is crucial since the energy and material consumption of local production is high. The negatives, on the other hand, will be outweighed by creating a fairer, more competitive environment.

If Uzbekistan stays outside the WTO, discriminative practices and protectionist measures will remain and continue to distort the economy. Removing these barriers will create fair, equal conditions for all market players. Considering these benefits, the WTO membership will undoubtedly contribute to Uzbekistan's liberalization efforts and help the country to become a full-blooded member of the global economic community.

Uzbekistan should make the most of its developing country status in WTO sectoral negotiations. Participation of Uzbekistan in existing sectoral agreements within this organization will be an option, as most of the new members, including Armenia, Georgia, Kyrgyzstan, have already acceded to these sectoral agreements at the time of accession to the WTO. In particular, the republic needs to achieve an extended grace period for products of the chemical industry, as well as some other areas. The gradual liberalization of the market will send a clear signal to domestic enterprises about the need for modernization and transformation. In the era of global value chains, it is advisable for Uzbekistan to start modernization and liberalization from individual segments of global chains (highly liquid new types of products), and not from the whole industry.

An important part of Uzbekistan's strategy for WTO accession is the country's acceptance of the consequences of trade liberalization and the adaptation of the economy to the transition to a free trade system. In this regard, it is useful for the country to use trade protection tools, including various mechanisms to support domestic industry, prompt response to unfair trade practices by foreign states. Since arbitrary tariff increases and the abuse of non-tariff measures are prohibited after becoming a WTO member, other measures will have to be used to protect domestic industry, including the chemical industry.

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MISERY INDEX RESPECTED AND REFUSED

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Abstract: *Arthur Okun developed an indicator measuring poverty on the macroeconomic level. His misery index is the country's unweighted sum of the annual inflation rate and the unemployment rate. The indicator can be simply computed but this simplicity leads to problematic conclusions when comparing indicators in different years and even more in different countries. The misery index includes two main economic indicators that everybody understands and that may strongly influence the life of the whole society, which are reasons, why it attracts the attention of politicians, economists and ordinary people. The simplicity of the index is on one hand criticized by professionals, on the other hand positively assessed by politicians and people. Recent numbers of increasing inflation and unemployment remaining in many developed countries relatively high led to revival of interest in this field and discussion about the misery index values.*

Several famous economists contributed to the assessment of poverty by broadening the number of indicators when including the assessment of economic activity and main monetary indicators in countries. This article is the reaction on the growing publicity of Okun's misery index. The attention is concentrated on the assessment of the misery index results and their positive and negative aspects. The assessment and measuring poverty is not the authors' aim.

Keywords: *GDP, inflation rate, misery index, the unemployment rate*

1. INTRODUCTION

In 2021 the Misery index celebrated its 50th anniversary of being popularised in a Wall Street Journal.¹

Poverty is usually measured according to the minimum of the monthly (or daily) income (or minimum spending) of a person (or family) in the respective country by international banks or government institutions. The reader may learn the percentage of people living under the poverty line in countries. Sometimes other indicators are added, e.g. life expectancy or educational attainment. We turned our attention to the poverty measured by Arthur Okun (called misery) caused by two main macroeconomic phenomena – inflation and unemployment. The Misery index was invented by Arthur Okun at the Brookings Institution in the 1970s, and his misery index became an often cited used instrument in the 1976 and 1980 US Presidential elections. (Hall & Hart, 2012). We can speak of the danger of poverty resulting from these two indicators – inflation and unemployment – applied to some groups of people. So far the introductory explanation of the Arthur Okun's misery index. The article will briefly present some other measures of poverty available in recent decades.

The core of the article are chapters 4 and 5. Chapter 4 presents misery index data of selected countries in the period 2000–2021. Chapter 5 deals with the application of the misery index.

¹ Misery index was later modified by additional variables, nevertheless the original version was and is still used.

2. LITERATURE REVIEW

2.1 Okun's misery index

Arthur Okun² developed an indicator measuring misery (a more emotional word for poverty), and Janssen explained and introduced the concept to readers of the Wall Street Journal in 1971. Okun's misery index is the country's unweighted sum of the annual inflation rate and the unemployment rate. The indicator can be simply computed but this simplicity leads to problematic conclusions when comparing indicators in different years and even more in different countries. It must be completed with the analysis of changes in each of both indicators – inflation and unemployment.

Di Tella et. Al (2001) provided a large-scale survey in Europe and the United States and concluded that the equal weights of unemployment and inflation in the Okun's misery index is far from public opinion, while unemployment more heavily influences unhappiness than inflation.

Welsch (2007) in his study concluded that people care about growth and employment and stability, while stability may be expressed by the inflation rate or the long-term interest rate.

Critics offer for the assessment of poverty variables.

Lechman (2009) compares Okun's misery index, Barro's misery index, and its adjusted version and states that the misery index is not a perfect measure of poverty, but its changes over time and in different countries, definitely reflect changes in society's economic performance.

2.2 Other measures of poverty

This article does not pay attention to the assessment of economic level or the stage of development of countries or regions. There is a long list of indicators applied in this sphere. Some countries are called poor, even though there exist rich people or firms. We are interested in poverty (called misery by Arthur Okun) that may touch people (some groups of people) in any country. Governments in rich countries face problems of poverty as a general one. There is a so-called poverty line set.

The misery index is considered to be too simple (critics speak about oversimplification) and we come across different attempts that broaden the range of indicators in this sphere.

a) Barro's Misery Index

It was Robert Barro (1999) who improved the index by adding to its primary version who added two variables, namely real GDP growth rates, and long-term interest rates, and proposed also replacing values of indicators with changes in their values^{3 4}. In his amendments, he focused on the performance of US presidents. His results favored the free market approach.

b) HAMI (Hanke's Misery index)

Johns Hopkins economist Steve Hanke (2011) built upon Barro's misery index and began applying it to countries beyond the United States. His modified misery index is the sum of the interest, inflation, and unemployment rates, minus the year-over-year percent change in per-capita GDP growth.

c) HMI (Henderson Misery Index)

The paper of Masárová et al. (2022) uses this index that is the inflation rate plus the unemployment rate minus the growth rate of real GDP (per capita or not.). David Henderson applied one of biggest contributions of Irving Fisher who pointed out that nominal interest rates

² Originally named and sometimes known as Economic Discomfort index (EDI). This measure was devised by Arthur Okun, who served as President Lyndon Johnson's chief economic adviser.

³ The index is also called „Okun's and Barro's Misery Index“.

⁴ Historically, a high (or climbing) misery index has been a political football resulting in a change of Presidents while a low (or falling) misery index resulted in reelection.

already contain the market's expectation of inflation. So to put both inflation and interest rates in the index is to double-count inflation.

d) Index of „PAIN“ (Poverty and Inequality index)

The index of pain is based on the Gini coefficient (Asher, et al., 1993). Gini coefficient measures the combination of the poverty rate and overall income inequality. PAIN index is the sum of the poverty rate and income inequality index.

e) Elder index

This index is a unique way of measuring expenditures concerning the age of people (Center for Social and Demographic Research on Aging, 2017). It is a measure of the cost of living for older adults in the United States. It is a benchmark of living expenditures that include housing, food, transportation, health care, and basic household items for older adults. It considers healthcare expenditures, housing scenarios, and differences between one-person or two-person households.

3. METHODOLOGY

3.1 Okun's misery index

The Okun's misery index is computed as a sum of the inflation rate and the unemployment rate. The idea was that as inflation increases the cost of living rises and as the unemployment rate rises more people get close to poverty.

The index can be written down as

$$OMI = \pi + u,$$

Where

OMI - Okun's misery index

π - the inflation rate

u - the unemployment rate

3.2 Data and their source

The data of the OECD countries for the years from 2000 to 2021 were selected. The unemployment rate is measured among citizens of age 15 and older and values are calculated from sample household surveys.

The inflation rate is a consumer price growth in the same period of the previous year. The GDP growth is calculated from the national accounts as a real GDP year-over-year growth.

4. OKUN'S MISERY INDEX - ANALYSIS OF DATA OF SELECTED COUNTRIES⁵ IN THE PERIOD 2000–2021⁶

Main conclusions based on Misery Indices in selected countries can be found in the following charts divided based on the aspect of the misery index results.

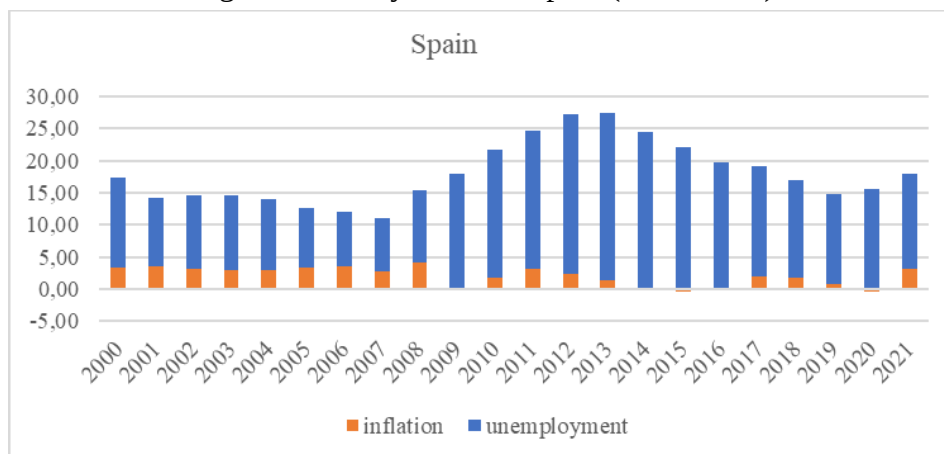
4.1 Value of the index

a) The highest value of the misery index reached

Spain in 2013 (27,50) – misery index did not go under 11 during the whole period.

⁶ The period covers latest data and is long enough to cover more than one business cycle.

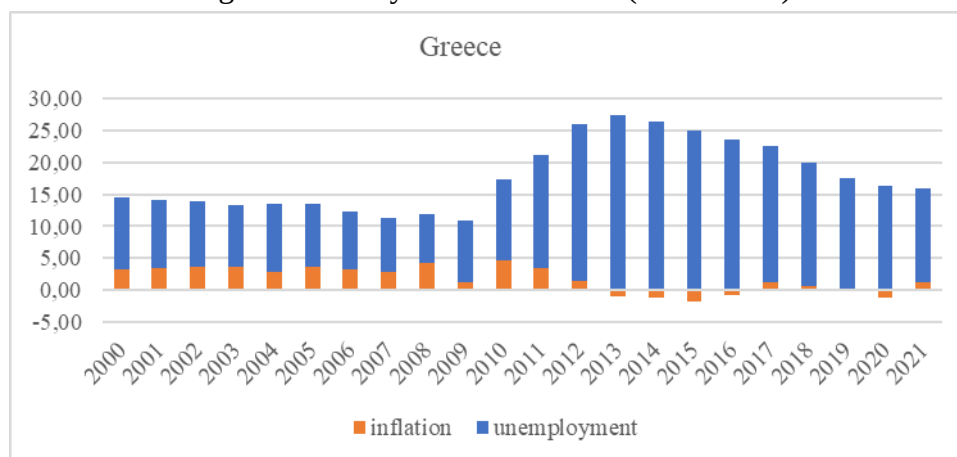
Figure 1. Misery index of Spain (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Greece in 2013 (26,55) In the period 2009–2015 in all years except 2014 the real GDP growth was negative.

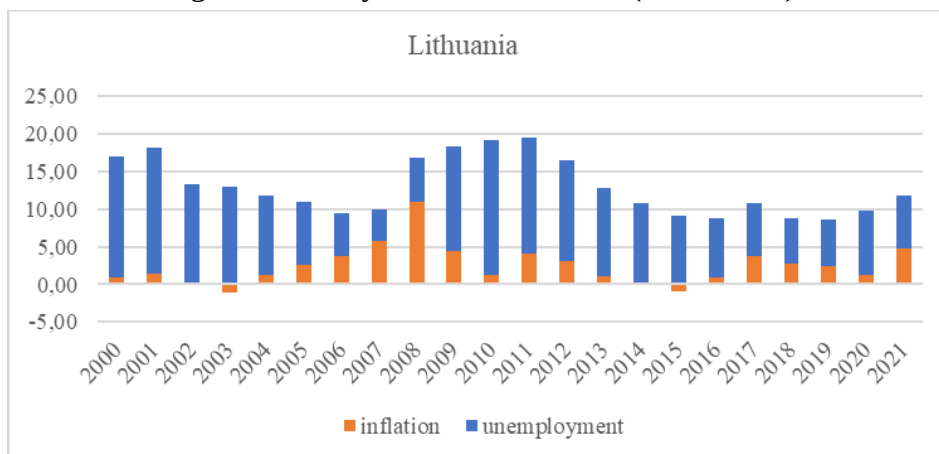
Figure 2. Misery index of Greece (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Lithuania in 2011 (19,51) – misery index did not go below 8 during the whole period.

Figure 3. Misery index of Lithuania (2000–2021)

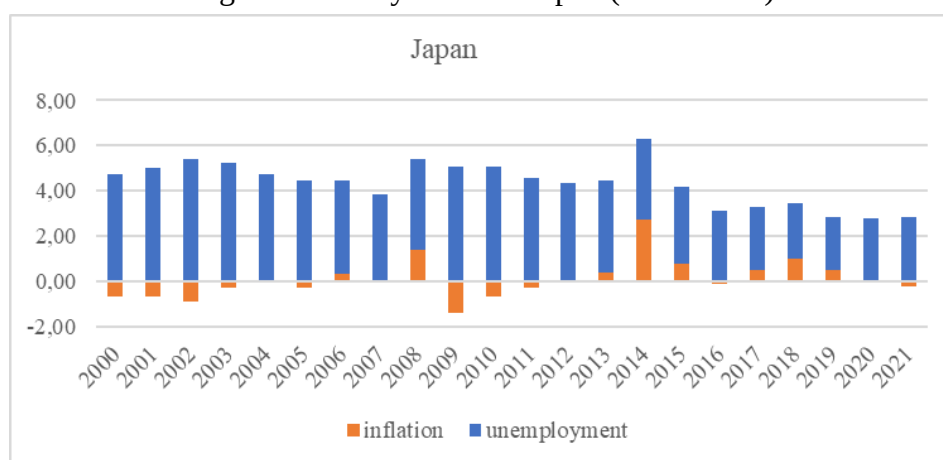


Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

In all 3 countries, it was unemployment that influenced the resulting number more than inflation.

- b) The lowest value of the misery index reached Japan and the spread of values during the whole period was very small (between 2,59–6,29).

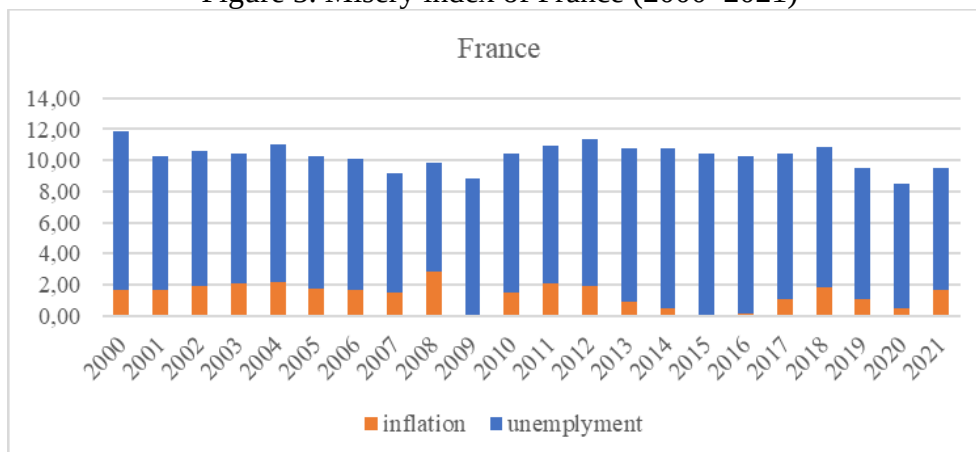
Figure 4. Misery index of Japan (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

- c) France showed the lowest spread of misery index values during the whole period 8,48 in 2020 and 11,90 in 2000).

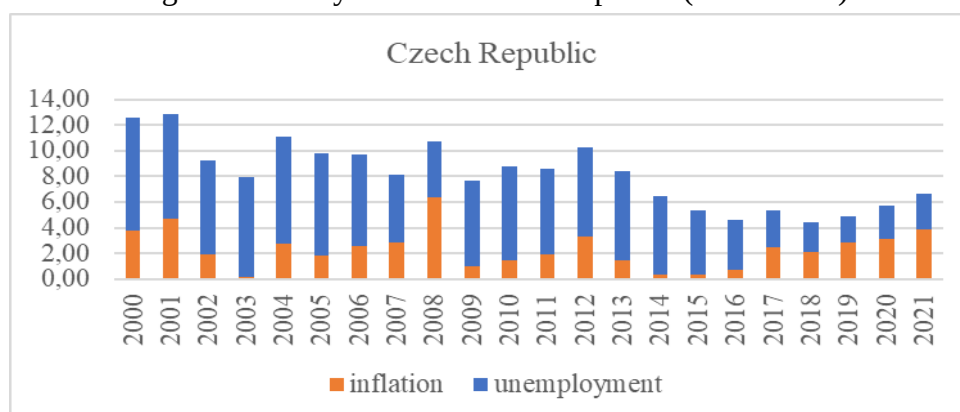
Figure 5. Misery index of France (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

- d) Fluctuation of values of the misery index from year to year during the whole period under analysis was strongest in the Czech Republic (the lowest value in 2018 – 4,39 and the highest value in 2001 – 12,83).

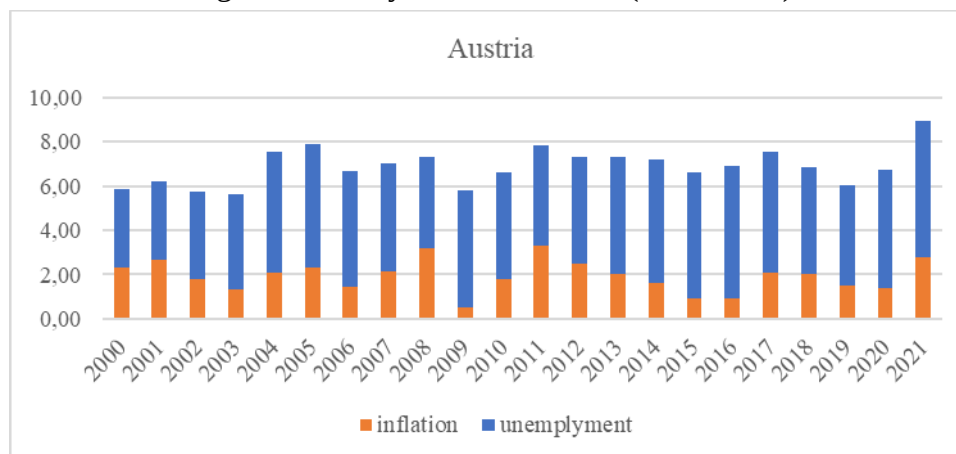
Figure 6. Misery index of Czech Republic (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

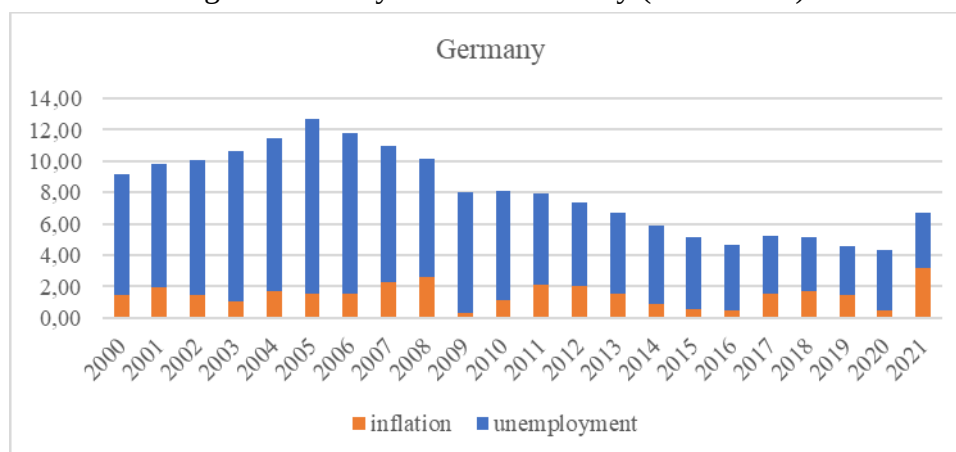
- e) Cyclical fluctuations of misery index values can be observed in several countries: Austria, Germany, Ireland, Greece, Lithuania, Netherlands Spain, United Kingdom.

Figure 7. Misery index of Austria (2000–2021)



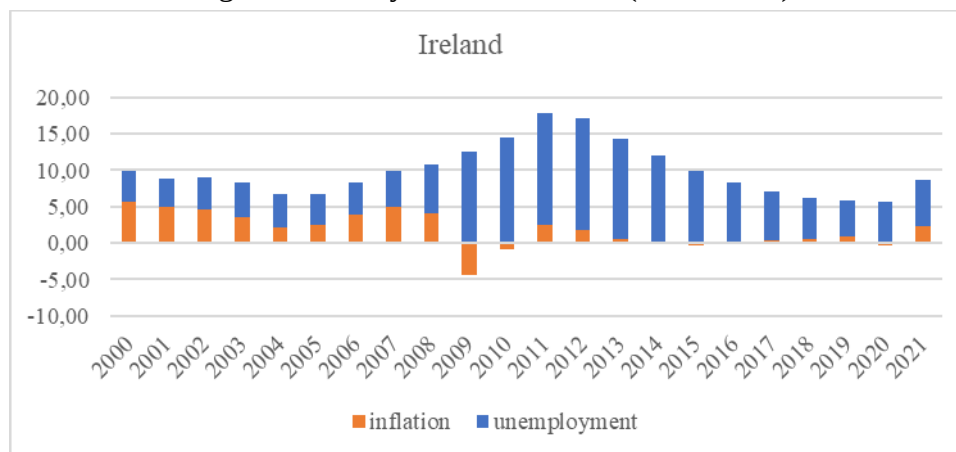
Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 8. Misery index of Germany (2000–2021)



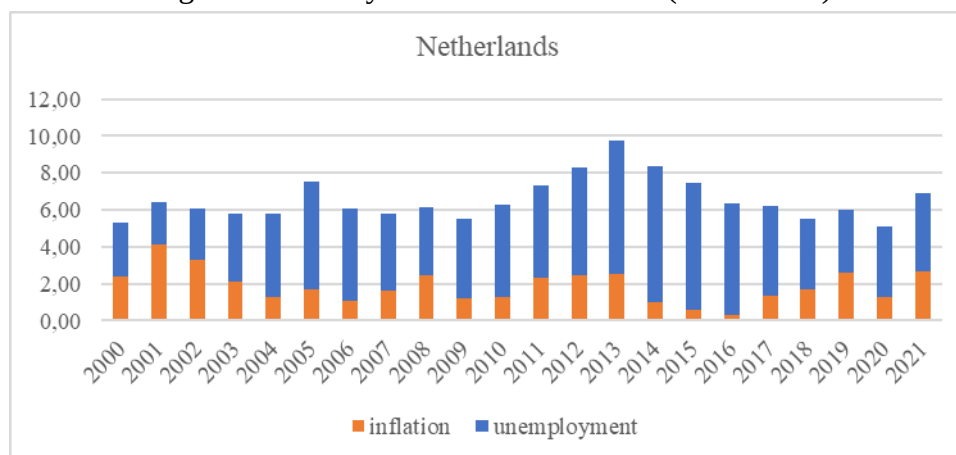
Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 9. Misery index of Ireland (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 10. Misery index of Netherlands (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

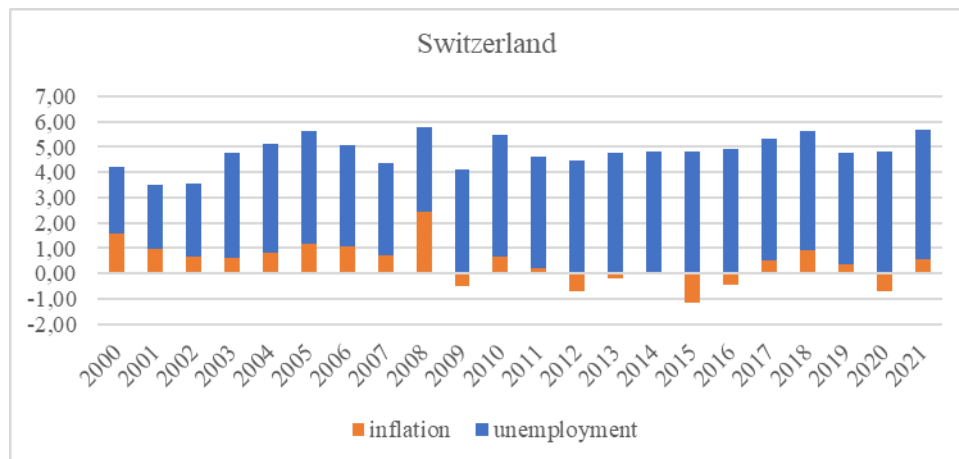
Figure 11. Misery index of UK (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

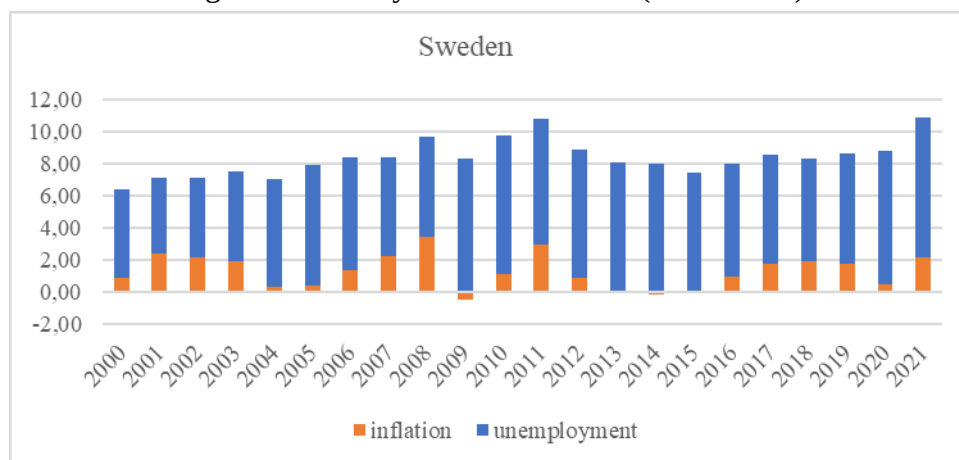
- f) Deflation might be observed in several countries in some years: Greece (price index in 2015 –1,74), Ireland (2009 – 4,48), Japan (prices were declining in the half of the whole period), less than 1% in several years in Switzerland, Sweden and Spain. In one year prices went down in the USA (2009).

Figure 12. Misery index of Switzerland (2000–2021)



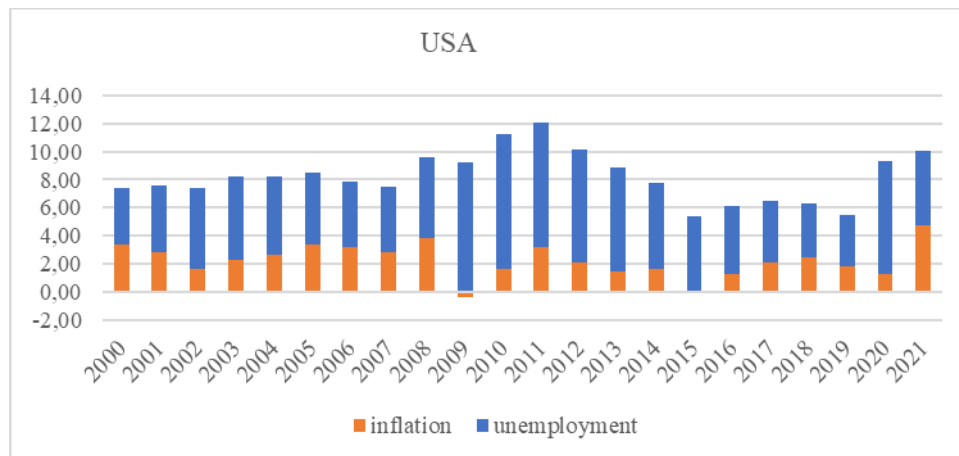
Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 13. Misery index of Sweden (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 14. Misery index of USA (2000–2021)

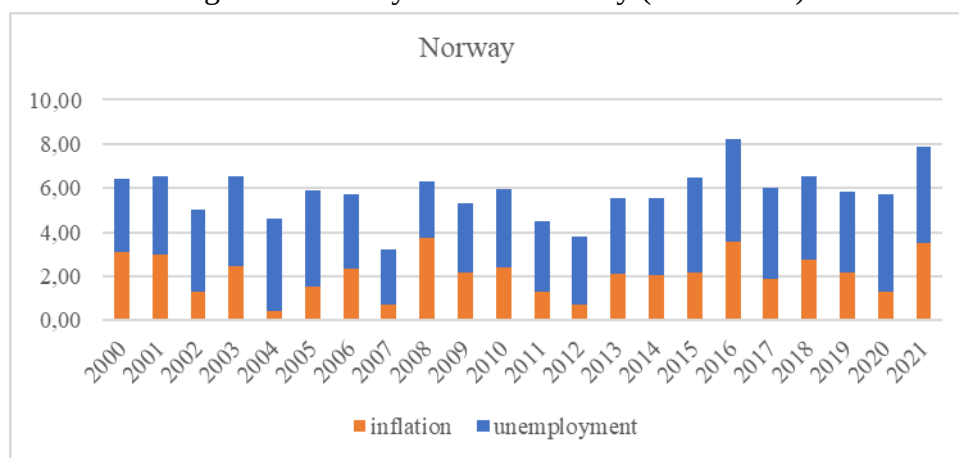


Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

4.2 The Impact of unemployment and inflation

In most countries, the weight of unemployment exceeds the weight of inflation. Exceptions are in individual years in several countries: the Czech Republic in 2008, Norway in 2008, Lithuania in 2008, the Netherlands in 2001 and 2002, Japan in 2014, and the USA in 2021.

Figure 15. Misery index of Norway (2000–2021)



Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Inflation data differ from unemployment data

- During the whole period prices fluctuated in a narrow range.
- Inflation was low in Germany, France, Spain, Sweden, the United Kingdom, and Switzerland.
- Japan is a special case: the country suffered from deflation in about half of the years in the period analyzed.

5. THE APPLICATION OF THE MISERY INDEX

We may come across many economic indicators that assess the economic level of countries, stage of development, and outlook in the near and far future. Economists explain growing or decreasing GDP, investment, inflation, unemployment, trade balance, exchange rate, government budget deficit, interest rates, and capital in or outflow. Politicians support government actions or call for changes. Each day citizens hear the words prosperity, crisis or recession, welfare, shortage or surplus decorated by different numbers and adjectives.

Most people do not understand most economic terms. An ordinary citizen has a family, some occupation, enjoys leisure time, and prefers being happy.

There are two main economic indicators that everybody understands and that may strongly influence the life of any person: the availability of jobs in the labor market and the prices of goods and services in the market. People perceive the strongly negative situation in either of them, i. e. unemployment, and inflation.

Okun's misery index touches on two main negative indicators that are watched by the majority of people and economists as well. This fact makes the misery index celebrate the 50th anniversary of its birth.

When operating with misery indices and presenting them it is necessary to know his negative aspects. When the problematic features of Okun's misery indices are known, their application may avoid mistakes and wrong conclusions.

5.1 Construction of the misery index

- Inflation may reach positive and negative values (unemployment rate is always a positive number). The simple sum of both indicators must be completed by investigating numbers of each one of them separately.
- In periods of recovery (often generally, i.e. always), numbers of inflation are low in comparison to the unemployment rate. Central banks keep the increase of price level close to the inflation target, which is set on 2% (sometimes 2–3%). The rate of unemployment is assessed as a good one with regard to the natural rate of unemployment, which is in most countries between 4–6%. During recessions, rates of unemployment are usually growing but prices hardly increase (may be even decreasing).
- Each indicator influences the economy of the respective country differently. Some economists propose unemployment be given higher weight.
- The change in the value of the misery index must be supplemented by the analysis of other macroeconomic indicators.

5.2 Rational application

- Both indicators have their optimal values, namely, unemployment close to the natural rate of unemployment (NARU), called often „full employment“ and inflation the target of the monetary policy of the Central Bank (usually 2%).
- Inflation may reach endless values (hyperinflation), which are not applicable for any analysis. Unemployment has its limits.⁷
- Changes in prices may go in both directions. Deflation is a completely different phenomenon compared to inflation with the most negative aspects.
- Lower inflation is still an increase in prices (it is called disinflation). Lower unemployment means fewer people being unemployed.
- The lower or higher number of either indicator does not mean a better or worse situation. It depends on the absolute value of either of them.

⁷ The highest unemployment in the 20. century was in Germany (over 40%), which helped Hitler to take power.

- Other factors (uneconomic) matter, namely political system, season, and government actions

5.3 Correlation of two indicators in the misery index

When analyzing two macroeconomic indicators closely linked to each other, one question usually appears. Are these two indicators correlated? If yes, is the correlation positive or negative? How is strong the relationship, what is the correlation coefficient?

All attempts to find the correlation between both indicators in the misery index failed. There is not a general relation either positive or negative. We can find countries and years when higher inflation caused lower unemployment but also countries and years with lower inflation promoting opposite changes in the labor market. The problem would need a detailed investigation of the rate of growth of prices and related structural changes in the GDP structure or unemployment and sectoral structure of the country.

6. CONCLUSION

The misery index measures the degree of economic distress felt by everyday people, due to the risk of (or actual) joblessness combined with an increasing cost of living. The first misery index was created by Arthur Okun and was equal to the sum of inflation and unemployment rate. The higher the index, the greater the misery felt by average citizens. It has broadened in recent times to include other economic indicators, such as bank lending rates or the growth of real GDP.

The misery index has two components: inflation and unemployment. Inflation shows the rate at which money loses buying power due to the rise of consumer prices. Unemployment measures the fraction of able-bodied adults in the total workforce who are actively looking for work. In most cases, the numbers are inversely correlated. With higher employment prices tend to rise and vice versa.

Both components of the misery index have inherent blind spots.

The validity and comparability of any macroeconomic indicator are problematic due to the practical impossibility of fulfilling the *ceteris paribus* condition. In the case of using the misery index in longitudinal or transverse comparison, such difficulty is especially prominent.

The unemployment rate only counts the unemployed who are actively looking for jobs. It does not include those who have given up looking for jobs. And the unemployment rate is considered to be a lagging indicator that understates perceived misery early in a recession and overstates it after the recession is over.

Low inflation can be accompanied by unexpected misery. Deflation (general decrease in prices) is a sign of a stagnant economy.

Large-scale surveys in Europe and the USA concluded that unemployment influences unhappiness of people more heavily than inflation.

Some economists (Tang, 2009) posit that the components of the misery index drive the crime rate to a degree.

When operating with misery indices and presenting them it is necessary to know their negative aspects. When the problematic features of Okun's misery indices are known, their application may avoid mistakes and wrong conclusions.

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ANNEX

Figure 16. Misery index of selected countries (2000–2021)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	5,9	6,2	5,8	5,6	7,6	7,9	6,7	7,0	7,3	5,8	6,6	7,9	7,3	7,3	7,2	6,6	6,9	7,6	6,8	6,0	6,7	9,0
Czech Republic	12,6	12,8	9,2	7,9	11,1	9,8	9,7	8,2	10,8	7,7	8,8	8,6	10,3	8,4	6,5	5,4	4,6	5,3	4,4	4,9	5,7	6,6
France	11,9	10,2	10,6	10,4	11,1	10,2	10,1	9,1	9,9	8,8	10,4	10,9	11,4	10,8	10,8	10,4	10,2	10,4	10,9	9,5	8,5	9,5
Germany	9,2	9,8	10,1	10,7	11,5	12,7	11,8	11,0	10,2	8,1	8,1	7,9	7,4	6,7	5,9	5,1	4,6	5,3	5,1	4,6	4,3	6,7
Greece	14,5	14,2	14,0	13,3	13,5	13,5	12,2	11,3	11,9	10,8	17,4	21,2	25,9	26,5	25,2	23,2	22,7	22,6	19,9	17,6	15,1	16,0
Ireland	9,9	8,8	9,1	8,2	6,7	6,8	8,3	9,9	10,8	8,1	13,6	17,9	17,1	14,2	12,0	9,6	8,4	7,1	6,2	5,9	5,3	8,6
Japan	4,0	4,3	4,5	5,0	4,7	4,1	4,4	3,8	5,4	3,7	4,4	4,3	4,4	4,4	6,3	4,2	3,0	3,3	3,4	2,8	2,8	2,6
Lithuania	16,9	18,2	13,3	11,7	11,8	11,0	9,5	10,0	16,7	18,2	19,1	19,5	16,5	12,8	10,8	8,2	8,8	10,8	8,9	8,6	9,7	11,8
Netherlands	5,3	6,4	6,0	5,8	5,8	7,6	6,1	5,8	6,1	5,5	6,3	7,3	8,3	9,7	8,4	7,5	6,3	6,2	5,5	6,0	5,1	6,9
Norway	6,4	6,5	5,0	6,5	4,6	5,9	5,7	3,2	6,3	5,3	5,9	4,5	3,8	5,5	5,5	6,5	8,2	6,0	6,6	5,9	5,7	7,9
Spain	17,4	14,1	14,5	14,5	14,0	12,5	12,0	11,0	15,3	17,6	21,7	24,6	27,2	27,5	24,3	21,6	19,4	19,2	16,9	14,8	15,2	17,9
Sweden	6,4	7,1	7,1	7,5	7,1	7,9	8,4	8,4	9,7	7,9	9,8	10,8	8,9	8,0	7,8	7,4	8,0	8,5	8,3	8,6	8,8	10,9
Switzerland	4,2	3,5	3,6	4,8	5,1	5,6	5,1	4,4	5,8	3,6	5,5	4,6	3,8	4,5	4,8	3,7	4,5	5,3	5,7	4,8	4,1	5,7
UK	6,7	6,7	6,7	6,4	6,1	6,9	7,9	7,7	9,2	9,6	10,4	11,9	10,6	9,9	7,7	5,8	5,9	7,0	6,4	5,5	5,6	7,0
USA	7,4	7,6	7,4	8,3	8,2	8,5	7,8	7,5	9,6	8,9	11,3	12,1	10,1	8,8	7,8	5,4	6,1	6,5	6,3	5,5	9,3	10,1

Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

Figure 17. GDP growth rates of selected countries (2000–2021)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	3,4	1,3	1,7	0,9	2,7	2,2	3,5	3,7	1,5	-3,8	1,8	2,9	0,7	0,0	0,7	1,0	2,0	2,3	2,5	1,5	-6,7	4,8
Czech Republic	4,0	3,0	1,6	3,6	4,8	6,6	6,8	5,6	2,7	-4,7	2,4	1,8	-0,8	0,0	2,3	5,4	2,5	5,2	3,2	3,0	-5,5	3,5
France	3,9	2,0	1,1	0,8	2,8	1,7	2,4	2,4	0,3	-2,9	1,9	2,2	0,3	0,6	1,0	1,1	1,1	2,3	1,9	1,8	-7,8	6,8
Germany	2,9	1,7	-0,2	-0,7	1,2	0,7	3,8	3,0	1,0	-5,7	4,2	3,9	0,4	0,4	2,2	1,5	2,2	2,7	1,1	1,1	-4,6	2,9
Greece	3,9	4,1	3,9	5,8	5,1	0,6	5,7	3,3	-0,3	-4,3	-5,5	-10,1	-7,1	-2,5	0,5	-0,2	-0,5	1,1	1,7	1,8	-9,0	8,3
Ireland	9,4	5,3	5,9	3,0	6,8	5,7	5,0	5,3	-4,5	-5,1	1,8	1,1	-0,1	1,3	8,7	25,2	2,0	8,9	9,0	4,9	5,9	13,5
Japan	2,8	0,4	0,0	1,5	2,2	1,8	1,4	1,5	-1,2	-5,7	4,1	0,0	1,4	2,0	0,3	1,6	0,8	1,7	0,6	-0,2	-4,5	1,6
Lithuania	3,7	6,5	6,8	10,6	6,6	7,7	7,4	11,1	2,6	-14,8	1,7	6,0	3,8	3,6	3,5	2,0	2,5	4,3	4,0	4,6	-0,1	5,0
Netherlands	4,2	2,3	0,2	0,2	2,0	2,1	3,5	3,8	2,2	-3,7	1,3	1,6	-1,0	-0,1	1,4	2,0	2,2	2,9	2,4	2,0	-3,9	4,9
Norway	3,2	2,1	1,4	0,9	4,0	2,6	2,4	3,0	0,5	-1,7	0,7	1,0	2,7	1,0	2,0	2,0	1,1	2,3	1,1	0,7	-0,7	3,9
Spain	5,2	3,9	2,7	3,0	3,1	3,7	4,1	3,6	0,9	-3,8	0,2	-0,8	-3,0	-1,4	1,4	3,8	3,0	3,0	2,3	2,1	-10,8	5,1
Sweden	4,8	1,4	2,2	2,3	4,3	2,9	4,7	3,4	-0,5	-4,3	6,0	3,2	-0,6	1,2	2,7	4,5	2,1	2,6	2,0	2,0	-2,2	5,1
Switzerland	4,0	1,6	0,0	0,0	2,8	2,9	4,0	4,0	2,8	-2,1	3,3	1,9	1,2	1,8	2,4	1,7	2,0	1,6	2,9	1,2	-2,4	3,7
United Kingdom	3,7	2,1	2,1	3,0	2,4	2,6	2,6	2,3	-0,2	-4,2	2,1	1,5	1,5	1,9	3,0	2,6	2,3	2,1	1,7	1,7	-9,3	7,4
United States	4,1	1,0	1,7	2,8	3,9	3,5	2,8	2,0	0,1	-2,6	2,7	1,5	2,3	1,8	2,3	2,7	1,7	2,3	2,9	2,3	-3,4	5,7

Source: Authors' work based on data from the OECD. Unemployment rate: Short-Term Labour Market Statistics; inflation rate: Key Short-Term Economic Indicators both available from <https://stats.oecd.org/index.aspx>

RESEARCH OF START-UP FUNDING BY BUSINESS ANGELS IN CZECH REPUBLIC: A LITERATURE REVIEW

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Abstract: *This paper focuses on research of start-up companies in Czech Republic. The aim is to create a review study that summarizes the existing empirical research in the area of financing start-ups by business angels. The reason for choosing this topic is, that start-ups as a source of macroeconomic development within SMEs in the Czech Republic is under-researched and the aim of this review is to find a research gap. This article uses the methodology of systematic literature review. The results show that there is a lack of connection between business angels in the Czech Republic. The sector is still evolving very rapidly and there is an increasing number of start-ups looking for funding for their businesses.*

Keywords: *Venture Capital, Private Equity, Business Angels, Start-up, Czech Republic*

1. INTRODUCTION

“A start-up is a people-formed institution designed to create a new product or service under extremely uncertain conditions.” (Ries, 2015)

Business Angels research has long been carried out mainly in the USA and the UK, but very little is known about BA's activities in Central and Eastern Europe. This is a topical issue as a result of emerging start-ups whose owners are seeking funding for their businesses. Most of these innovative start-ups have to raise capital from personal sources, institutional and non-institutionalised venture capitalists and banks.

The European Commission (2008) document states: “Risk aversion often makes investors and banks shy away from financing firms in their start-up and early expansion stages. Possible market failures in SME finance provision must be identified and corrected to further develop the European risk capital markets, to improve SME's access to micro-credit and mezzanine finance and to develop new products and services.”

The term SME refers to all policies, programs and measures that the European Commission develops and operates for SMEs. It also refers to the type of state aid. However, deciding whether or not a company is an SME is not as simple as it might seem (European Commission, 2005).

International business can take a number of forms, which we usually divide into three basic groups. These are the export and import of goods and services (business operations), forms that do not require capital investment (licensing, franchising, etc.) and capital-intensive forms of entering international markets (Machkova, 2014).

Through the CzechLink StartUp project, it connects domestic and foreign investors with Czech startups. They have an overview of young innovative companies suitable for investment from various fields of business. They actively cooperate with them, support their education and growth (CzechInvest, online).

When doing business with foreign countries, every exporter (small company or large corporation) encounters a number of specific situations that usually do not need to be dealt with in normal domestic business relations. Whether it is the need to cover the increased risks associated with an unknown market, or perhaps the need to provide favorable financing together

with the delivery of goods to a foreign customer, in all cases he can rely on the quality support and advice of the Czech Export Bank (Czech Export Bank, online).

The aim of this paper is to answer the research questions:

Q1: What journals do the authors publish in?

Q2: What are the objectives of the articles?

Q3: What research approach do the authors use?

Q4: What kind of data base?

Q5: What is the research method used to evaluate the data?

Q6: What are the results?

Q7: What are the recommendations for further research?

In the theoretical background, the theoretical frameworks will be described to further understand the topic explored in the following sections of this thesis. In this section the concepts will be defined Private Equity a Venture Capital, terms such as Business Angels (BAs) and start-ups are also defined. This article uses the methodology of literature search, i.e. content analysis. The results section will specify articles focused on the development of start-up companies in Czech republic.

2. THEORETICAL BACKGROUND

In order to understand the concept of a given topic, it is necessary to define the content of the concepts and their anchoring for their subsequent use. An ecosystem is a set of institutions and the links between them that support either the supply side, which are the investors who will bring capital and their know-how to the market in some form, or the demand side, which are the new start-ups that will use the infrastructure to develop their business.

2.1 Private Equity and Venture Capital

There are multiple definitions for Venture Capital and Private Equity and the Czech language is very inconsistent with the outside world. Private Equity or private capital is a medium to long-term financing to raise a share of capital for a prosperous company in the future and whose shares are not traded on the stock exchange (CVCA, 2021).

According to Fenn in *The Private Equity Market: An Overview* defines the private equity market as an important source of funding for start-ups, private market companies and companies in financial distress. Over the past fifteen years, this market has been the fastest growing for corporate finance. Today, the private equity market is roughly one-quarter the size of the commercial and industrial bank lending market (Fenn, 2010).

Private equity includes other markets and one of them is business angels. Business angels refers to investments in small, closely held companies by wealthy individuals who have experience in running similar companies. These investors, called business angels, have significant equity holdings and may be active in advising the company, but they are not as active as professional managers in monitoring the company and rarely exercise control. Under the category of Private Equity is Venture Capital (Fenn, 2010).

2.2 Business Angels

For two decades, information has been gathered on the topic of Business Angels and countless theories have been generated. The typical business angel is a middle-aged man who invests a relatively large amount of his personal wealth, most often in young technology-oriented companies (Mason, 2019).

One of the expectations of Business Angels is that they will be value-added investors who, in addition to offering financial capital, also support the development of new businesses

through their expertise and skills. Several studies have pointed out that these investors actually have an entrepreneurial career history in which they have often made their fortunes through cash from their previous ventures (Politis, 2008).

In the US, Gaston's study reported that more than 83% of Business Angels surveyed had previous experience starting a business. Mason, Harrison and Chalonera's study in the UK found that 67% of investors surveyed had previous experience and Tashiro, in turn, surveyed 60% in Japan. In 2017, the Business Angels sector was estimated to invest €7.3 billion in Europe, of which €727 million was visible investment by Business Angels with a total of 337,500 people. The investments represented 55.3% of the total initial investment in Europe (EBAN, 2017).

Many of the world's best-known companies received financial support in their early days as venture capital-backed businesses. In the UK, these include Skyscanner, Seatwave and Moshi Monsters, and global companies can include Google, Facebook and Skype (BVCA, 2019).

2.3 Start-up

At first it may seem that this is an expression that can be easily defined. For a long time, startups were considered smaller versions of large companies. Nowadays, the most common theory is that a startup is a new business entity on the market, which is often still at the stage of creating a business plan and is developing rapidly. As a rule, it is a newly established company, mainly of a technological nature. It is initially financed and operated by individuals or a small group of founders. They are trying to push a product or service on the market that is not offered anywhere at the moment (Blank, 2012).

The main and very important characteristics of a startup include fast growth and development, low initial costs. At the same time, however, the founder must take into account the higher risk of entrepreneurship. The aim of a startup is to develop into a profitable and stable enterprise in the shortest possible time (Blank, 2012).

Most authors avoid this specification and try to go into the depth of the core of a start-up. This is captured, for example, by Randall, who defines "A start-up is a flexible organization that aims to bring a new product to market that is unique or innovative" (reported in Zandl, 2010). Thus, a start-up is not only about the idea and innovation, but also about the organization (team, grouping) that creates and promotes the product or innovation. Eric Ries (2015, p. 33) sees a start-up in this way: 'A start-up is a people-formed institution designed to create a new product or service under extremely uncertain conditions'.

3. METHODOLOGY

At the beginning of this article, the issue was described in the theoretical framework for this issue in the Czech Republic. Furthermore, a literature search technique will be used to clarify the topic and to find out what the authors' evaluation methods are and what their conclusion is. A literature review is a text that aims to provide a critical overview of current knowledge on a particular topic. Content analysis is a set of methods and rules aimed at capturing the content or subject matter of a document and other relevant aspects for a given purpose.

The aim was to create a review study that summarizes existing empirical research in the area of financing start-ups in the context of business angels. The study reviews the existing literature in which the authors summarise the concept of start-ups in the Czech Republic. The literature search provides an overview of the current knowledge and enables the identification of relevant sources, methods and possible gaps in existing research. The collection and analysis of scientific articles was carried out with regard to quality within the Scopus and Web of Science

databases. In the PRIMO library catalogue, I used the logic of searching by combining keywords, namely “Start-ups”, “Czech republic”, “Business Angels” and applied Boolean operators AND, OR, NOT to narrow the search. Based on key criteria, the database offered 75 publications that were published between 2015 and 2022.

The literature review focuses on publications on the topic of Development of start-up companies in Czech republic and the literature was searched since 2015. The aim is to get an overview of the basic concepts and to show the relationship between these key concepts of the paper. During the information gathering in the literature search chapter, I came to the conclusion that there is a lack of knowledge about the profiles of Czech business angels. This fact is a consequence of the fact that the Czech Republic has a lack of scientific treatises on the financing of start-ups and therefore does not rank among the leading European economies in terms of new business development. In total, I selected 13 relevant sources for this paper from the 75 articles offered.

4. RESULTS

Šebestová (2020) states that small and medium-sized enterprises (SMEs) are the main engine of economic growth and economic development. Therefore, this article focuses on the evaluation of the findings from publications regarding the financing of start-ups in the Czech Republic. A number of publications state that there is a lack of information on the business angel sector, which enables financing for these start-ups. This finding is discussed in the paper Business angels in the Czech Republic: characteristics and a classification with policy implications (2022), which contributes empirical findings to identify the typical profile of business angels supporting start-ups in the Czech Republic.

For a more detailed specification of the current situation, an article entitled Angel investors around the world (Cumming, 2019) was selected. With this article, the authors discuss that the choice between business angels and intermediated private equity and venture capital investments depends on legal, economic and cultural differences. This article summarizes a wide range of complex data and facts of scholarly articles over the past thirty years in this field of economics (Cumming, 2019).

The first "angel investors" (BAs) were wealthy individuals who financed expensive Broadway productions. There is very few theories and discussions of BA-mediated investing in most parts of the world, and the impact of international differences in cultural and legal institutions on the incidence of BAs and their outcomes is equally neglected. BA assistance consists of either a one-off investment or can be ongoing throughout the life of the start-up. In addition, business angels provide not only financial support but also management assistance and coaching. Angels prefer to invest in local businesses and usually do not configure conventional control mechanisms such as sitting on the board of directors or signing contracts in the business. They hold a minority position in the companies they invest in (Cumming, 2019).

Hain (2015) argues in his thesis that the higher the geographic and cultural difference of the investor, the less likely the foreign investment. If a country has high market capitalization and low levels of corruption, this encourages investors to overcome local bias and consider investing in that particular country. It has also been found that trust in the country-investor relationship is more important than geographical and cultural distances.

For foreign investors, it is necessary that the country has sufficiently developed investor and asset protection, cultural assumptions, business ethics and practices, and low levels of corruption in the state. Despite the fact that geographic and cultural norms differ from country to country, innovative start-up companies are particularly attractive to investors (Hain, 2015).

Within the Czech Republic, the startup ecosystem does not reach the level of developed economies in the West. The Startup Map shows that there are 1717 continuously operating startups in the Czech Republic, while they are not fully explored in academic sphere. However, the exact number of Czech startups cannot be formulated into concrete numbers (Petrů, 2019).

Petrů (2019) states that the Czech Republic has high potential to become a European innovation leader in the future, just as Germany, Finland, Sweden or Denmark are now. All of the countries mentioned have focused on and decided to promote science and research in this sector in recent years and are now diluted among the thriving economies.

Šoltés and Štofa (2016), Bortlová (2015), Bortric and Bozic (2017) confirm that the Czech Republic lacks an investment environment that would motivate the creation and financing of new projects. They also recommend that if administrative barriers were reduced or removed or access to finance improved, the development of start-ups would be facilitated.

Another barrier on the part of research institutions and companies in the Czech Republic is the lack of cooperation. As Štverková (2019) states, there is a lack of companies in the regions and insufficient cooperation with universities. Another and fundamental barrier is the lack of experience. The basic success is to return to work as a mentor. The founder of a successful start-up should be obliged to dedicate himself to his industry even after the successful sale of the business, precisely by mentoring and investing in the industry. As mentioned by Štverková (2019), in the Czech Republic, about 30% of start-ups used mentoring as just non-financial help at their launch. This idea is called Giving back and it would improve the efficiency of start-up ecosystems.

5. DISCUSSION

The current situation of start-ups in Central and Eastern Europe shows a positive trend for the Czech Republic, despite the fact that the market is now unequal to the West. Authors focusing on the topic of financing start-ups at Business Angels agree that SMEs are the engine of the country's economic development. All the authors describe the typical Business Angel in the same way and refer to an originally outdated source that identified BA as such. According to my results during the literature search, it is evident that BAs can also be women, and in a higher percentage than mentioned by the authors of most articles. The authors argue that trust in the country-investor relationship is important and is even more important than geographical and cultural distance. I can confirm that innovative start-ups in particular are attractive to investors.

6. CONCLUSION

The motivation for choosing the topic Development of start-up companies in Czech republic is the combination of their importance in financing start-ups and the creation of new businesses. In the introduction, start-up companies were generally defined, i.e. start-ups together with their main attributes. Furthermore, the concepts of Private Equity and Venture Capital were characterized and views on the theory from different authors were presented. Last but not least, Business Angel and expectations from it were described.

The literature search allowed me to broaden my insight into the issues in the current topic. At the same time, I consolidated the background for future work and oriented myself in the subject matter.

Considering the previous analysis of the literature, it is evident that business angel financing is widely used in the Czech Republic, but in comparison with the global market it is still in its beginnings. A number of publications state that there is a lack of information on the

business angel sector, which enables the financing of these start-ups. There are very few theories and discussions on investing through business angels. Another barrier on the part of research institutions and businesses in the country is the lack of cooperation. The size and structure of Business Angels is unknown as there is no public or private agency in the Czech Republic that collects data.

Within the research approach used by the authors, data evaluation using a basic quantitative research tool appears most prominent. In addition, the authors used the method of comparing relevant data from their own primary research with secondary data or outputs. Most of these data were obtained through individual interviews or questionnaire.

A frequent method of evaluation approach is correlation analysis. Correlations in various forms are the most common statistical characteristic in the literature and aim to determine the correlation between the variables. The results of this method are used to confirm or refute given hypotheses.

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THE IMPACT OF INTERNATIONAL VALUE-ADDING CHAINS ON MANAGING CENTRAL AND EASTERN EUROPEAN COMPANIES

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Abstract: *The aim and the purpose of this article is to analyze the process of companies' internationalization, their role in global value-adding chains, new types of supplier-distributor relations, and the ways of managing flows of goods, services and money by Central and Eastern European companies. After massive privatization during the 1990s, most of the local companies fell into a position of low-added value players in international trade. The author's recommendations cover the areas of a company's process management, supply-chain management, customer relationship management, marketing management, and financial management, that must be changed and implemented by CEE companies to gain success in the global marketplace. Special attention is also paid to building corporate structures using offshoring and transfer pricing principles. Methodologically, the author based his findings on numerous interviews, domestic and foreign publications, databases, and company websites, Practical examples, collected during the long-term pedagogical and research work of the author, complement the text.*

Keywords: *value-adding chain, supplier-distributor relation, Central Eastern Europe*

1. INTRODUCTION

At the beginning of the twenty-first century, we have been witnessing constantly changing conditions in the area of international business when the interconnection of national markets into one global unit brings new opportunities and risks, unknown in the last decades. Cross-linked structures of economic entities, for which the name of transnational corporations has taken roots, have become the hegemon of this time. National boundaries do not exist anymore for these entities. They can acquire ownership control over all processes of creating and selling products. They control all activities from the access to raw materials, through research and development of new technologies, product finalization and assembly, and logistics and final sale reaching all countries of the world. They provide strong media support and elaborate desired perception of reality in the eyes of customers. They can predetermine the size and quality of present and future consumption. The Central and Eastern European countries are mostly export-oriented economies. Searching for new export opportunities constitutes a fundamental necessity both for the current exporters and for the companies operating locally so far. When preparing an export strategy, there is unfortunately a threat of considerable time and financial investments into non-productive research and mistakenly conducted negotiations. Therefore, it is necessary to know well the problems and the regularities of company expansion abroad.

2. LITERATURE REVIEW

There are a lot of different views and definitions of what a value-adding chain is. For example, Jaromír Veber in the book *Management* (Veber, 2009), describes a value-adding chain as a sequence of corporate processes that add a new value which occurs if the revenues from selling goods to customers exceed the cost of production and delivery of these goods. Pol Antràs

and Davin Chor (Antràs, Chor, 2013) worked out the idea that the incentive to integrate suppliers varies systematically with the relative position (upstream versus downstream) at which the supplier enters the production line. The prestigious magazine *Chinese Management Studies* recently published a systematic bibliometric analysis from 2007 to 2019 emphasizing the trend of themes, structure of publications and citations, the most cited publications, the most productive authors, universities, countries and regions. A large portion of it was devoted to the topics of value-adding chains and their importance in a global economy (Farrukh et al., 2022). The intersection of open innovation and the food value chain, including information about under-researched and emerging areas in the field of food innovation, was interestingly described by Avni Misra and Anne-Laure Mention (Misra, Mention, 2021). Riccardo Crescenzi, Carlo Pietrobelli, and Roberta Rabellotti (Crescenzi et al., 2014) made the empirical analysis covers the EU-25 regions and suggests that regional socio-economic conditions are crucially important for the location decisions of investments in the most sophisticated knowledge-intensive stages of the value chain. Within the concept of seeing the company's processes, it is possible to track which processes contribute to the creation of the value more and which less. Michael Porter in his book *Competitive Advantage* (Porter, 1993) has divided the company processes into two interdependent groups. Primary processes include input operations management (all activities associated with receipt, storage and re-distribution of inputs to production), production and operation (activities focused on the transformation of inputs), output operations management (collection, storage and distribution of the final production), marketing and sale (activities associated with sales and sales promotion) and service (activities helping to improve or to maintain the product's value for the customer). Supporting processes that include the company's infrastructure, human resources management, technological equipment and procurement. In the global world, in which we live, only a single entity is seldom involved in the creation of value. The content of individual parts of the value chain falls into the responsibility of a range of entities. The value chain is thus divided into different divisions within one company, among different companies within the alliance, among independent companies within the supplier-customer chain etc. We can see that added value for the customer can be created by the value chain, made up of primary and supporting processes but drawing resources from different market participants. Michael Hammer and James Champy in their book *Reengineering the Corporation: A Manifesto for Business Revolution* (Hammer-Champy, 2005), pay attention to so-called process maps that give a clear and understandable picture of the company's work. The strategy creation process results in strategy, product development creates the overall design of the product, the design modification process according to customers' requirements brings about a design solution to the order of a particular customer, and the process of production possibilities development creates the form and equipment of the production plant, the process of communication with customers responds to the questions and requirements of the customer, the order fulfilment process provides the customer with what he wants. The most important feature of the process map is the fact that it includes an element which is rarely expressed in the organizational schemes of the enterprises – the customer. The turn to the customer as a central driver of the company's processes is further developed in the work of Don Peppers and Martha Rogers *The One to One Manager* (Peppers-Rogers, 2002). One-to-One Customer Management understands competitive advantage differently than classical management. It is not about the volume of sold products or the higher number of customers won. It is about the degree of satisfaction of the existing customers' needs and maintaining or, as the case may be, increasing their consumption. Based on this knowledge, the company decides whether to manufacture the products or to buy them for its clients in other companies, whether and in which way to set up supplier-customer chains and whether to use outsourcing, enter into a strategic alliance or establish other forms of participating in value-adding chain processes. Klemen Knez, Andreja Jaklič, and Metka Stare (Knez et al., 2021)

propose a comprehensive methodology of value chain analysis in the international input-output framework that introduces a new measure of value chain participation and an extended typology of value chains, with the novel inclusion of domestic value chain to address the extent of fragmentation of purely domestic production.

3. METHODOLOGY

The article is written in the form of analytical expertise, and conclusions have been formulated in a way that might be directly usable in business practice. The text uses various scientific methods. A deduction discovers relationships between different market subjects and their influence on the creation of new forms of process management. Induction helps to apply theoretical frames to practical examples of companies' behaviours in foreign markets, from which it was possible to formulate important conclusions about new ways of carrying business internationally. A comparative approach serves in search of generally applicable contractual forms and standards that different companies operating in Central and Eastern European markets currently apply. The analytical procedures helped to assess the suitability and risks of various forms of foreign expansion. The method of synthesis allowed presenting the main strategies while creating the functioning value-adding chains. The article took advantage of numerous domestic and foreign publications, such as professional books, scientific articles, conference proceedings, databases, and websites of companies, institutions and international organizations. The important source of knowledge was also interviews with colleagues from academia and representatives of companies and institutions.

4. RESULTS AND DISCUSSION

International trade globalization is a natural and unavoidable process. The reasons for entering international markets are, however, different. From a strategic point of view, four main goals are increasing sales, obtaining resources, suppliers and customers diversification, and minimizing competitive risks. The volume of a company's sales depends especially on two factors – on the demand for their products and services and on purchasing power of customers in the target market. The number of consumers and their purchasing power is incomparably higher in international markets than in a single country market, so by entering foreign markets, new opportunities for increasing sales can open for the companies. The companies can also realize economies of scale and achieve more favourable profit margins.

Competition struggle in the global market influences also the access of companies to different resources that are necessary for their functioning. These include goods, services, capital, technologies and information. Companies are looking for resources in different countries, which are economically most advantageous from their point of view (availability, price etc.), and thus achieving comparative advantages. Depending on the size of these advantages, they move their production, purchase and sale capacities to places where they can achieve the highest profit margins. An example of successful use of resources is Bata Ltd. The company holds its operations in 60 countries of the world, employs 70 thousand people, owns 70 production plants, 6 300 department stores and controls a network of about 100 thousand independent retailers. Bata gathered enough resources to conquer most of the North American and Central Asian markets in the course of the 60th and 70th (Collinson, 1990). Companies often purchase products and services abroad that are not available on the domestic market. In this way, they achieve a quality increase in their products or more distinction from the competition, which allows them in both cases to achieve higher sales turnover or higher profits

in the domestic market. These principles are applied e.g. by Ikea, which does not have competition in the Czech market due to its technologies and designer's proposals (IKEA, www.ikea.com). If the company initially used domestic resources to expand abroad, after having established its branches on the territories of different countries in the world, its strategy is turning – it starts using the resources acquired abroad in competition struggle on the domestic market. This is a typical example of McDonald's that uses the financial resources of its successful branches to support newly established canteens in more problematic territories (Tomkins, 1996). Supranational companies are trying to be independent of one or limited amount of suppliers and customers. They create portfolios of these entities, balanced both in terms of subject matter and in terms of territory and business/politics. By this, they prevent possible failures in supplier-customer relationships and they can eliminate the occurred problems in a short time. Another reason is the effort to maintain the smoothness of sales and to avoid unexpected reversals and seasonal fluctuations. Coca-Cola Company is a company known for its extensive network of suppliers and distributors. It cooperates with thousands of contractual partners who, on the one hand, supply plastic bottles and filling lines, on the other hand, they distribute and sell corporate beverages (Coca-Cola, www.coca-cola.com). Many companies use the different timing of business cycles – recession and expansion – in different countries of the world. With the help of their partnership bonds, they decrease sales in the countries in recession and, in turn, activate trades in the countries with the economic boom.

Global Value-Adding Chains and Supplier-Customer Relations

Extending activities abroad is a key decision for every company. It ensues from the company's strategic goals towards the given territory, e.g. maximizing market share, maximizing current profit, maximizing market utilization (skimming), product-quality leadership etc. The company then considers the potential of the target market, trade and political conditions, the position of the competition and the strong and weak points of its own company, i.e. its prerequisites to be successful in a foreign market. In the final stage, the company decides on the most suitable mode of entry into a foreign market. In addition to such companies, more and more new companies emerge that start their activities already on the level of global seeing. These companies establish their subsidiaries; whether production or business ones, in several countries at the same time and create global supplier-customer chains interconnecting partners from many markets. The following explanation analyses this new phenomenon in more detail.

There exists plenty of possibilities for how to mutually connect suppliers, producers and customers into a system of global supplier-customer networks. These networks are always optimised to deliver the highest value for the customer. In other words, material, human, information and capital inputs, their transformation into products and the sale of these products are coordinated to increase benefit in each stage of the process.

Within a global supply-customer chain, suppliers may be a part of the manufacturer's organizational structure both in the case of vertically integrated companies or they can operate independently on a contractual basis. Suppliers have usually their networks. From a geographical point of view, suppliers can be concentrated in the country where they produce or at least assemble the products but they occur in any other country and export their deliveries to the country of production or assembly. Individual outputs of suppliers travel directly to the place of production or to collecting warehouses. The production process outputs move directly to customers or distribution warehouses. The products serve to end consumers or to business interlinks– distributors, wholesalers and retailers–, through which they reach the end consumers. Similarly, suppliers deliver their product outputs to the domestic or international customer network. Individual global companies' supplier-customer chains usually sign inter-firm agreements.

Companies operating on the global market are in different stages of internationalization. This implies that their organizational structures must be also in different stages of development since they reflect the reality in which they are.

The United Nations Conference on Trade and Development states, that due to revolution changes in the area of communications, liberalization tendencies in international trade and the occurrence of the global competitive environment, the forms with a lower degree of company integration are less and less sustainable (UNCTAD, 1993). The only perspective form is the form of integral linkage of horizontal and vertical management levels and their flexible relocation within in-house (inside an organizational-control unit) or inter-company structures (mutually among these unites, e.g. parent company-subsidary, among subsidiaries, subsidiary-subcontractor etc.). In his later statistics, UNCTAD states that the share of in-house trades (some sources also state the term ‘in-house trading’) in total world exports amount to almost 35%, where American and Japanese companies strongly dominate. UNCTAD characterizes the development of organizational structures in its reports as follows.

Company's structure	Bonds inside the company	Integration degree
Stand along production and business units in different countries (stand-alone, multi-domestic)	Ownership, technological	Weak
Companies established in different countries are linked to one another by a system of mutual deliveries (simple integration, outsourcing)	Ownership, technological, distribution, accounting	Strong only in several links of the value chain
The system is integrally linked, all companies are involved in the production and sale as it were one whole (complex international production, regional core networks)	All, i.e. controlling, ownership, human, financial, production, sale, research, marketing etc.	All links of the value chain are optimized throughout all companies

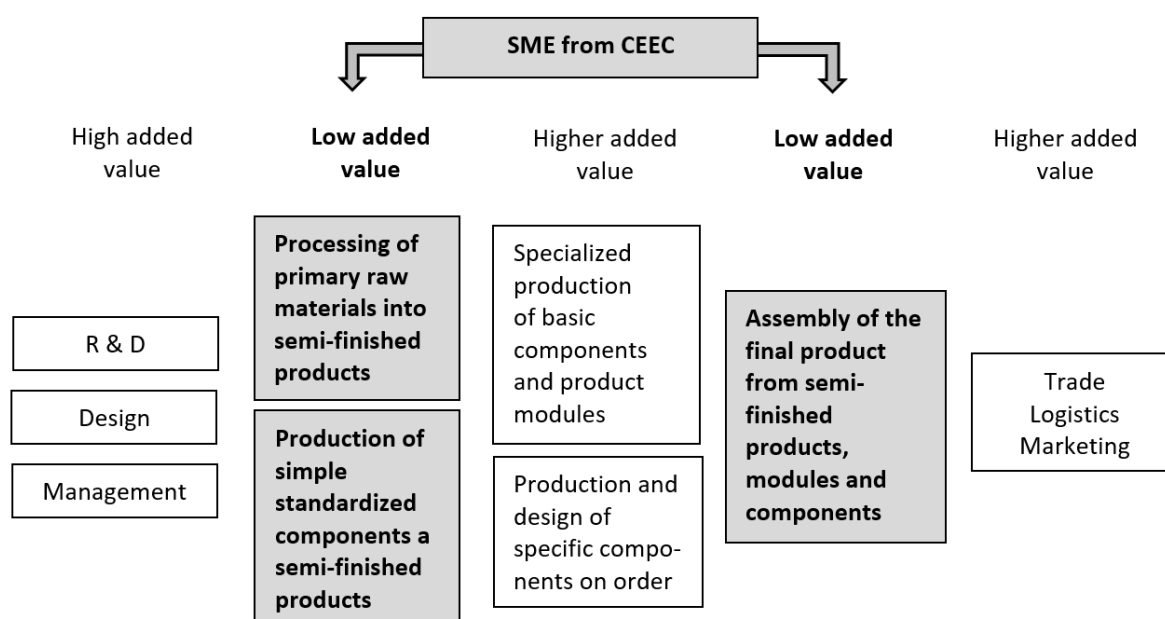
Reengineering of Company Processes

The emergence of the information society and the reality of the global seeing of the world have shown the weak point of the simplified understanding of management. Narrow-minded enterprises cannot live in an environment of change, in an environment where there is nothing constant or predictable, where there is uncertain market growth, consumer demand, life cycles, the pace of technological changes or the nature of the competition. The efforts to rationalize the established practice fail, the means and resources disappear irretrievably, and the customers leave. Reorienting from results to processes brings a historical change in management theory and practice. The new management creates flexible processes that connect all market participants under one common interest – to increase the value for everybody. It creates a model for interconnecting suppliers and producers, producers and distributors, companies and consumers, and the state and the public between each other. The work specialization process that was fragmented into small steps by Adam Smith and Henry Ford is at present connected by the process management into the forms of new and viable structures, each time differently, each time with the possibility to be transformed. Companies have been going through this transition all the time. Processes reengineering is a new motto for the third millennium. The economic point of view of added value given by the difference between costs and price is already history. The process-based view puts the customers at the centre of all that's going on and reflects the criterion of their satisfaction in their processes. The process management answers two key questions: 1) How the particular activity adds value (benefit) for the customer? 2) To what extent is the increase in benefits considering the costs to achieve it? “Not products, but the processes through which the products are made, bring a long-term success for the enterprises. Good products do not make successful entrepreneurs, but successful entrepreneurs

make good products (Hammer-Champy, 2005). In many companies, organizational units are interchanged for processes. It is because the people in the enterprise are acquainted sufficiently with the departments, divisions and groups but not with the processes. The organizational breakdown is obvious from the organizational schemes while it is different in the case of processes. The organizational units have their names, whereas processes mostly have no names. Instead of their organizational schemes, the companies create so-called process maps and make decisions alongside workflows, which have their names. For example, instead of “product development” we say “from concept to prototype”, instead of the word “sale” we use the expression “from preliminary interest to purchase order”, or instead of the word “service” we can use a more concise term “from inquiry to solving the problem”.

Reaching Higher Position within Global Value-Adding Chains in CEE countries

Many SMEs in the Central and Eastern European countries are under the control of foreign corporations. It is most visible in the automotive industry, production of engineering equipment, electrical industry and repair services. Many of them are not aware of this and are unable to determine their positions within the so-called value-adding chains. They must learn how to determine how much of the total value added to the customer in a given industry will be generated by their own company, and how they can absorb or capitalize it to cover the resources needed for their growth. Ownership and the ability to control the value-adding processes play a key role here. Small and medium enterprises usually take on the role of raw material processor, producer of semi-finished products or standardized components, or become an assembly line. Unfortunately, these activities add the least value – see the following chart (MPO, 2011).



In the Global Competitiveness Report, published by the World Economic Forum (WEF, 2010), the CEE countries are ranked among the ones providing a convenient subcontracting and manufacturing base for markets in Europe and the surrounding area, while the scope and nature of this base are being controlled by abroad. The endogenous business sector is still weak and its development strongly depends on the demand from subsidiaries of multinational corporations located in the CEE region.

So what can CEE SMEs do to strengthen their position within international value chains? So, above all, focus their marketing research on a detailed analysis of the overall

strategy and structure of the foreign corporations with whom they do business. In particular, see where they have their headquarters, in which markets they operate directly and where they use intermediaries, what are the principles they coordinate supplier-customer relationships, what resources are of their own and which are outsourced, and whether they use their know-how or rather license, from what sources they finance their operations and, above all, who are their owners, how transparent they are, and with whom we conclude business deals.

The more complex view of a foreign partner we can create, the more opportunities arise for potential involvement in its activities. The aim of the marketing strategy is not to stay with only one activity. It is necessary to synergistically interconnect the activities and try to take over as many activities as possible on their behalf, especially those which add more value, while the activities that add less value try to move elsewhere. The more roles a supplier integrates and coordinates, the higher position he/she acquires within the value-adding chain.

The position of CEE companies can be further strengthened by concluding as many exclusive types of contracts as possible. At the same time, it is necessary to maintain links with “friendly” structures on the domestic market, such as different guilds, associations, chambers or public institutions supporting domestic business. Foreign companies often use different lobbying pressures in the target countries. Membership in domestic structures will help CEE companies better defend themselves.

The major goal of CEE companies should be to gain a significant role in the research and development of new products, become an initiator of innovations, and occupy the position of an exclusive manufacturer, indispensable distributor and final marketer for as many target markets as possible. The top victory consists in taking equity control of a substantial part of a foreign company and its internal management processes. The owner distributes profits. The value chain coordinator allocates work, uses resources and decides on finances. He optimizes cost, prices and tax burdens to maximize net revenue. The CEE companies should also strive to get involved in the investment decisions of the foreign parent company. In this way, they will see the immediate impact of their activities on the economic results of the entire foreign corporation. There are many ways to find this out. In the age of the Internet, “everyone has all the information”. It is necessary to learn how to conduct data mining, behavioural profiling, social networking and how to use artificial intelligence to predict the behaviour of market players. Today, these are commonly used tools, which, due to the growing cyberspace, are gradually replacing the classical methods of market research. The sooner the CEE business start, the better.

Value Chains and Transfer Prices

A high percentage of international business transactions take place between the parent company and its branches abroad. It is estimated that among the 800 largest multinational corporations, making roughly 90% of all world trade, so-called In House Trading amounts up to 34% of total turnover. In these volumes, there occurs a situation, where the actual costs of the subsidiary operating in a foreign market, depend on contractually (subjectively) agreed prices that the subsidiary agrees upon with its parent or sister company. This kind of acting has nothing to do with the free creation of market prices based on supply and demand, differing significantly from these prices. There are two main reasons for using the so-called transfer prices – maximizing profits within a multinational corporation’s branch network and creating a defence against the risks incurred in foreign markets. When pushing through the profit-maximizing strategy, the company decreases the transfer prices of the goods delivered by some branches and increases, increasing these prices when the goods are taken by other branches. In this manner, the company accumulates profits in the branches where it is profitable, and on the contrary, keeps artificially low profits in other branches. Different levels of taxes customs and exchange rates, with a diverse structure of organizational and legal forms of subsidiaries abroad, are used. By

accumulating higher profits in a country with low taxes, the company reduces its overall tax burden and generates a higher profit. Similarly, customs tariffs can be reduced by charging low transfer prices for countries with high customs. In countries, where a different (e.g. lower) exchange rate is used at the export and a different (e.g. higher) one is used at the transfer of capital and profits, it is advantageous for a supranational company to charge higher transfer prices in mutual deliveries of goods, thereby replacing disadvantageous transfers of profits out of the country. Furthermore, the company will prefer to accumulate profits in the branches where it is the majority owner than in the ones where it has a minority. By using transfer prices, the company can avoid in this case the unnecessary co-partnership in profit with local partners. The strategy of creating a defence against risks incurred on foreign markets aims to protect the company's profits and assets in countries with a chronic deficit of the balance of payments and with frequent devaluations of currency. These countries strictly control the repatriation of profits outside their territory and the mechanism of transfer prices is for supranational companies the only way of defence, when the profits of the assets will be, at least, decreased to a minimum. A similar situation is in countries with political and social instability, where the companies' profits are threatened by direct government interventions. The practices of applying transfer prices can have immeasurable consequences for developing and transforming economies. In privatization processes, multinational corporations become usually so-called strategic partners of key industrial enterprises, banks or other economic entities. If the governments treat privatization contracts or license agreements with these companies in an inadequate way, they give room for uncontrollable leakage of precious resources from the particular country. The existing legislation and economic instruments of the host countries give only small possibilities of defence. Mostly it is indirect affection of the economic activities of multinational corporations, e.g. by the form of differentiated consumption taxes, the system of custom preferences or different governmental measures for customer protection (products safety), the environment (observance of technological standards) and national security. But the experiences of international companies with similar measures are so large that it is not a problem for them to cope with local directives, notwithstanding that in many cases, the local regulations are 'softer' than the foreign rules. Besides that, most of the similar regulations have a widespread nature and therefore affects also the competitors in the domestic market, increasing the cost burden of all equally.

The „Analysis of the outflow of profits: Implications for the Czech economy and draft measures“ published in 2016 by the Department of Analysis and Information of the Office of the Government of the Czech Republic states that the volume of the domestic economy in real terms since 1995 has not recorded any growth, but within the same period, the volume of foreign-owned activities increased seven times. Furthermore, since 2005, the outflow of revenue from the Czech Republic and Central European countries has exceeded the inflow of new foreign investment many times and has been still rising. Thirdly, the majority of research and development in the Czech Republic is dependent on a regular and systematic supply of resources, technologies and know-how from abroad. This implies a not too flattering conclusion for small and medium-sized CEE companies: capital produced from the CEE resources is not adequately re-invested back in these countries, and therefore domestic firms cannot expect their position in global value chains will improve spontaneously. So they have to help themselves.

5. CONCLUSION

At the beginning of the twenty-first century, national markets are merged into a single unit in which transnational corporations acquired ownership control over all processes of creating and selling products, from the access to raw materials, through research and development of new

technologies, product finalization and assembly, and logistics and final sale reaching all markets of the world. The key factor of survival and further development for Central and Eastern European companies in such an environment is to find their positions within the global value-adding chains, i.e. they must learn how to determine how much of the total value added to the customer in a given industry will be generated by their own company, and how they can absorb or capitalize it to cover the resources needed for their development. Only in this way, they will be able to get rid of their current role of a raw material processor, producer of semi-finished products or standardized components, or act just as an assembly line. The aim is to control most of the value-adding processes and play the key role as an owner. To achieve this position the CEE companies need to focus their marketing research on a detailed analysis of the overall strategy and structure of the foreign corporations with whom they do business. In particular, they must know how their partners conduct cost, price and tax optimization to maximize net income for their shareholders, what is their supply-chain strategy, whether they use their know-how or rather license, from what resources they finance their operations and, above all, who are their owners, how transparent they are, and with whom the CEE companies conclude business deals. It is also necessary to raise the level of management, particularly in the areas of information and communication technologies, operations, finance and marketing based on internationally recognized standards. Once on the global level, the CEE companies can take full advantage of global network structures, and use the internal system of transfer pricing and profit allocation. This might also contribute to lowering or even reverse the trend of outflow of capital from their own countries.

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THE NEW MONETARY THEORY AND ITS OLD FALLACIES

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Abstract: *The paper discusses the role of prevailing fashion in the development of economic theory. Particular attention is paid to the MMT, the Modern Monetary Theory.*

1. INTRODUCTION

Inflation unparalleled since the 1980s currently is the most important domestic policy issue for all developed nations. The last time inflation was comparable to this extent was in the 1980s. Then, the inflation was subdued by the time-honed instrument of extremely high-interest rates. The sharp restriction of the money supply caused a major economic crisis.

Yet, there is a little secret that economic theory is influenced by the prevailing fashion. Ruling Keynesianism of the 1930-1960s was replaced in the 1970s by the neoclassical synthesis. First, the new paradigm conquered academia, and later it formed the basis of the economic policies of the Thatcher cabinet and Reagan administration.

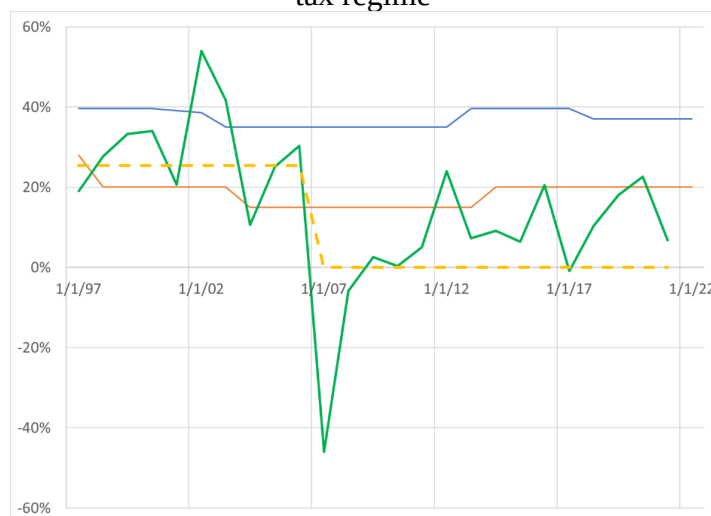
At the same time, neoclassical economic thought was appended by the supply-side theory. Its basic premise was that tax cuts pay for themselves through increased productivity and economic growth. Some of the “neoclassic” scholars, most prominently Robert Mundell from Columbia and Robert Barro from Harvard quickly became converts.

The new orthodoxy prescribed, in particular, balanced budgets, low-interest rates, and low taxes—usually, mutually incompatible goals. It seemed ironic that Paul Volcker, Reagan's Governor of the FRS, presided over the highest interest rates' raise in the XX century. If neoclassical thinking was literally followed, the interest rates must have been higher than inflation, i.e., in the double digits.

Moreover, the giant tax cuts, the last being implemented in 2017? achieved neither a balanced budget nor low inflation. Certainly, unexpected tax cuts increase the money supply and so they stimulate investment. However, any stimulus measures—and that is according to all mainstream versions of classical economics, are transitory and produce inflationary pressures in the long run.

The most spectacular failure of the supply-side ideology happened in 1993 when the Clinton Administration raised the taxes. Despite dire predictions tax raise was accompanied not only by falling inflation but also by a long economic boom. Yet, by that time, the supply-side theory was accepted by US politicians, and raising taxes for any reason became almost impossible. In the Figure 1 we show the connection between the level of taxation and the rate of growth of cumulative assets of the hedge funds, which we set as a proxy for the holdings of the very wealthy people.

Figure 1. Ordinary income marginal tax rate (blue), capital gains tax (red) and hedge fund contributions (green). Dashed orange line indicates a dummy variable for the change of the tax regime



The success of an obscure XIX century theory of J.-B. Say could be explained by the fact that donors of the ever more expensive political campaigns were themselves the unproportional beneficiaries of the tax cut policies. In the mid-nineties, the academic fashion shifted to “stockholder capitalism”. In a word, it proclaimed that millions of stockholders optimizing their own investment decisions almost always make correct decisions and so, government regulation is unnecessary. This thinking produced abandoning Depression-era legislation, which separated investment and commercial banking. Alan Greenspan, the Chairman of the FRS at the time suggested that “... I argued that the growing array of derivatives and the related application of more-sophisticated methods for measuring and managing risks had been key factors underlying the remarkable resilience of the banking system, which had recently shrugged off severe shocks to the economy and the financial system.” (Greenspan, 2005)

But the economic crisis of 2007–2008 compelled a reassessment of the dominant idea that large financial institutions can self-regulate. Alan Greenspan had to issue a mea culpa (Andrews, 2008). The crisis was resolved by the enormous expansion of the money supply. Because “printing money” could be politically unpopular, the new term, Quantitative Easing was invented. When I first heard about QE, I thought that the intent was to shift the interest rate curve into normal, i.e., upward position, by purchasing short-term securities and selling long-term securities. According to this understanding, the influence of the QE policy on the money supply could be partially sterilized. But very soon, QE became a synonym for increasing the money supply with no regard for the inflationary pressures of such policies.

Policies of Quantitative Easing or “Injecting of Liquidity” very soon found its own theoretical justification in the form of the so-called “Modern Monetary Theory”. MMT was different from the previous changes of economic paradigm because, unlike the previous orthodoxies, it emerged not from the strongholds of Harvard, MIT or Chicago, but from Bard College (L. Randall Wray, Pavlina Tcherneva), Stephanie Kelton (U. Stony Brook) and B. Mitchell (U. Newcastle). This theory meant that for the modern developed economies, the seigniorage effect was so prominent that governments can issue money without regard to the budget deficits. And for the time it seems that inflation did not rise, furthermore that some interest rates, for instance, in Germany, Japan and Denmark, went negative.

Despite its obvious fringe status, politicians quickly accepted that they could issue any amount of money they want. A giant bailout of the US financial system by Obama Administration and Ben Bernanke’s FRS was followed by equally impressive “helicopter

money” release by the Republican Trump Administration and then, by a slightly less impressive intervention by Biden’s Democrats (Figure 2). Equally impressive was the concurrent growth in balances of the Central Banks.

MMT, in spite of obvious contradictions with everything we know about the real world—that there is no free lunch—is surprisingly difficult to refute. Cynics can say that the Chinese, Brazilians, Indonesians, etc. would forever send their goods to the US, UK, and EU in exchange for the claims on their banks. However, any argument, no matter how naïve or cynical, must be formulated in the language of mainstream theory to be any guidance to the political decision-making.

Figure 2. A) T-bill rates and inflation were correlated for most of the period since 1960 but exhibited sharply different behavior during two rounds of quantitative easing (blue and red boxes), B) Money supply proxied as M2 in the XXI century. Money supply outgrows secular tendencies since 2019.

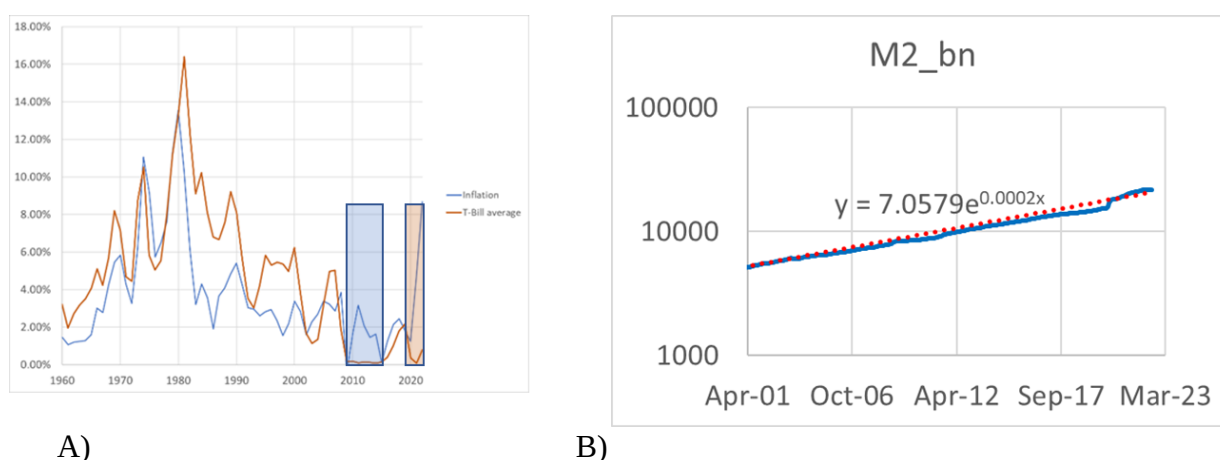
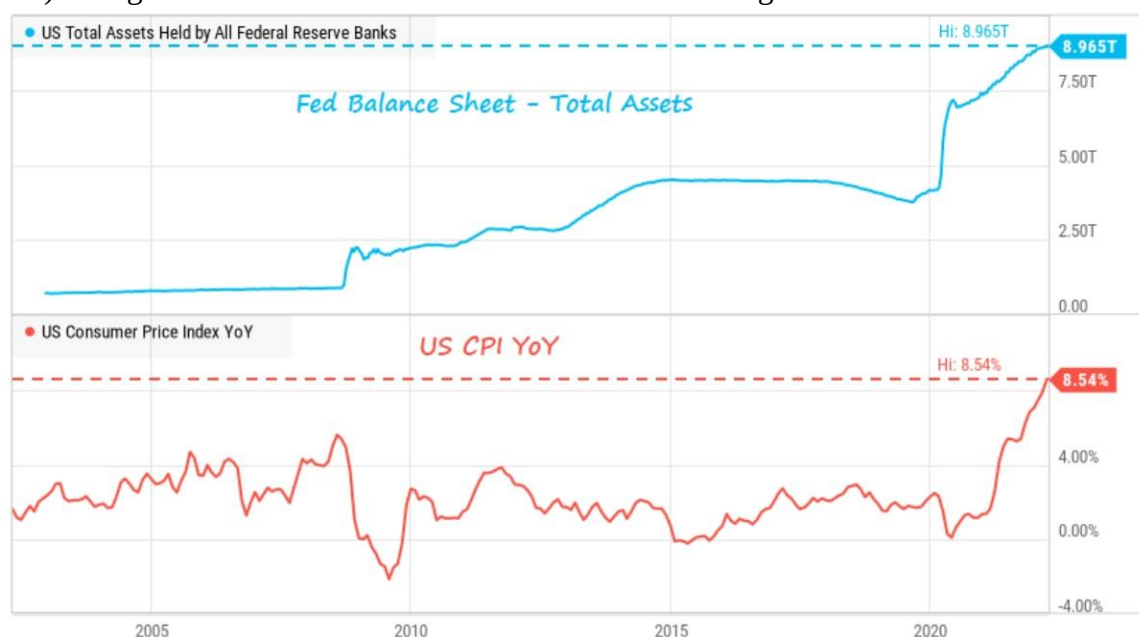
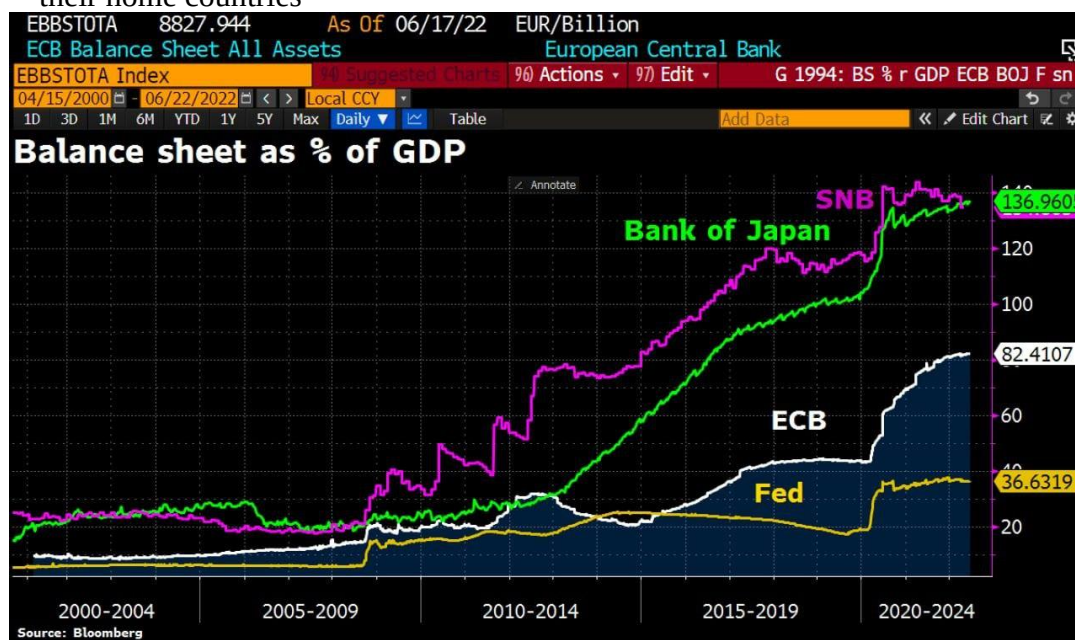


Figure 3. The results of the Quantitative Easing

A) The growth of the FRS balance sheet in USD and the growth of CPI



B) The growth of the balance sheets of major Central Banks as a percentage of the GDP of their home countries

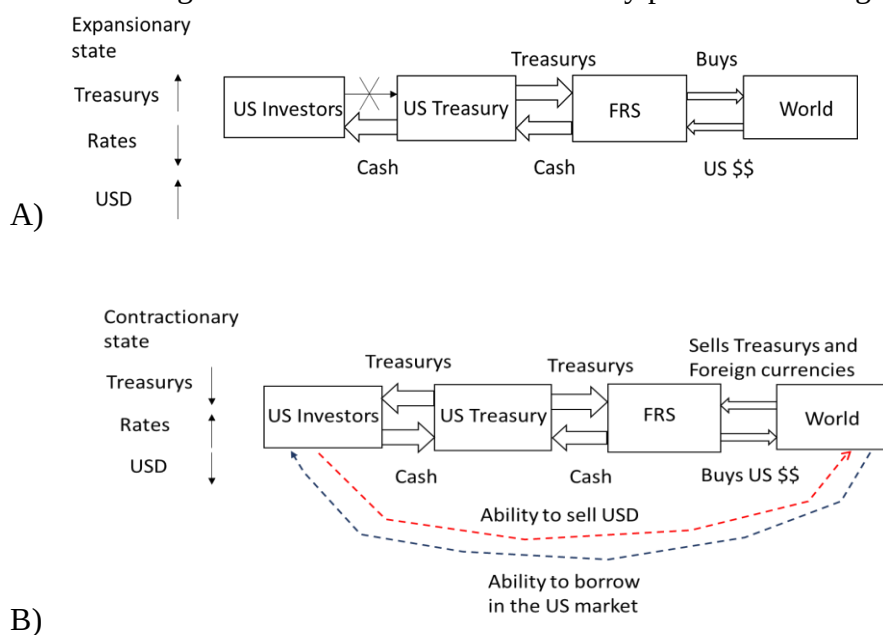


Source: Bloomberg©

2. THE INSTITUTIONAL DESCRIPTION OF THE MMT

The block chart of the MMT assumptions is shown in Figure 4 below.

Figure 4. A) MMT representation of an expansionary state of the US economy. B) Representation of contractionary state. Dashed lines in Figure B indicate the infinite ability to finance selling US dollars to the FRS financed by partial borrowing from the US banks.



The problem with the Figure 4 is that the MMT implicitly presumes that the rest of the world has an unlimited ability to sell USD to arbitrage an imbalance between their currencies and the dollar (dashed curves). But this ability requires an unlimited amount of borrowing power to finance such transactions, which is questionable.

3. THE ANGLES OF ATTACK ON THE MMT

a. Mankiw's theory on seigniorage

The first consideration, which can be applied to prove the (alleged) impossibility of the unlimited seigniorage, is the work of Mankiw related to optimal seigniorage (Mankiw, 1987). In this work, he derived three first-order conditions for the optimality of seigniorage:

$$\begin{aligned} E_t[f'[\tau(t+u)]] &= f'[\tau(t)] \\ E_t[h'[\pi(t+u)]] &= h'[\pi(t)] \\ \frac{h'[\pi(t)]}{k(\pi) + \frac{(\pi+\rho)}{k(\pi)}} &= k(\pi)f'[\tau(t)] \end{aligned} \quad (1)$$

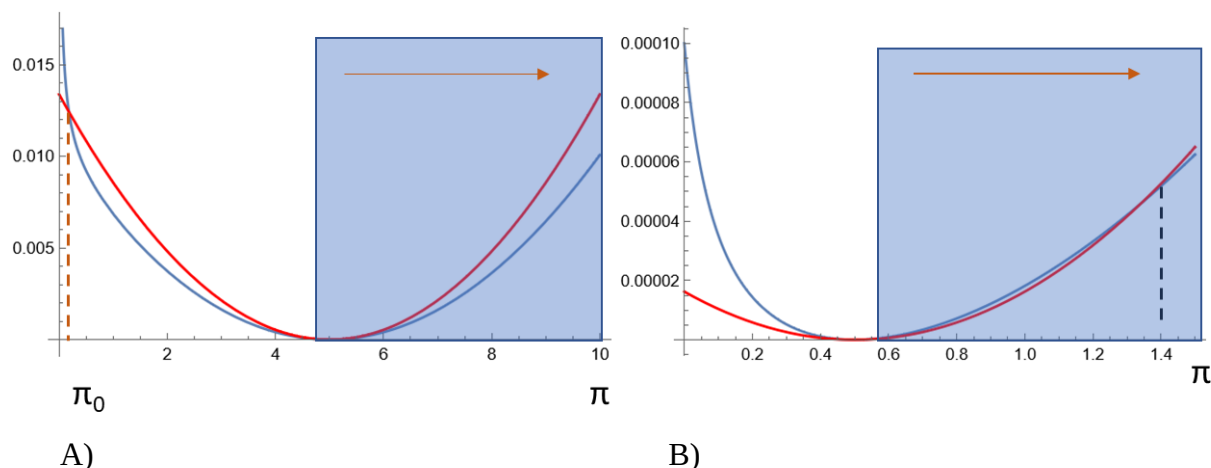
In Equation (1), $f[\tau]$ is a regret function for the level of taxation τ , $h[\pi]$ is a regret function for the logarithmic level of prices π , ρ is the risk-free rate and $k(\pi)$ is the coefficient of proportionality between the output of the economy and the rate of monetary expansion. For simplicity, we assume the function $k(x) = k_0 - k_1x$ as linear and $f(x) = f_0 + f_1x + \frac{f_2x^2}{2}$ and $h(x) = h_0 + h_1x + \frac{h_2x^2}{2}$ to be monotonous quadratic functions of their arguments.

The two first conditions mean the expected constancy of taxation and inflation in the future. Henceforth, we begin with a questioning of the third condition. Without loss of generality, we can put one of four coefficients f_1, f_2, h_1, h_2 to one, for instance, $f_1 = 1$. The original form of the third equation has the form:

$$\frac{h_0 + h_1\pi}{1 + \frac{\pi + \rho}{(k_0 - k_1\pi)^2}} = f_1 + f_2\tau \quad (2)$$

Where α and β are constants assembled from f_1, f_2, h_1 , and h_2 . As one can see from the graphic solution in Fig. 5, there are potentially stable (low inflation) and absolutely unstable (high inflation and negative real productivity) solutions. When the potential productivity k_0 is high, the low inflation solution. When productivity falls, the solution moves into absolutely unstable solution and the equilibrium becomes impossible.

Figure 5. Graphic solution of Equation 2. A) The parameters of the Equation are $h_0=0.1$, $h_1=1$, $k_0=0.1$, $k_1=0.02$, $\rho=0.02$, $f_1=1.1$, $f_2=0.95$, $\tau=0.25$. Optimum monetary emission lies in a stable region. B) The parameters of the Equation are $h_0=0.1$, $h_1=0.1$, $k_0=0.01$, $k_1=0.02$, $\rho=0.1$, $f_1=0.02$, $f_2=0.95$, $\tau=0.15$. The optimum solution lies in an absolutely unstable region indicated by a blue rectangle.



b. Liquidity trap

There are several theories of arbitrage between liquid and illiquid assets. For our purposes, we refer to the paper by K. Pan and Y. Zheng (2017). The theory is quite involved, so for brevity, we shall omit the quantitative derivations and cite only Corollary 2vi 2 vii: “The AP (Associate Participants) create (redeem) ETF¹ ... when there is initial excess bond long positions (excess bond short positions) ... no matter whether there is initial ETF premium or discount... The absolute amount of ETF shares created/redeemed and the sensitivity of initial bond inventory imbalance are increasing in asset volatility and liquidity mismatch”.

If we equate liquid assets with US dollars and illiquid assets with emerging market currencies (Yuan, Ruble, Rupee, Brazilian Real, etc.), we observe that at a certain level of imbalances, the ability of the rest of the world to absorb unlimited monetary expansion in the developed nations will approach the limits of possibility of their borrowing in developed market currencies, as was predicted in Section 2. In that case, the arbitrage between liquid and illiquid assets becomes impossible.

4. CONCLUSION

The impossibility of an optimal emission of money would not necessarily lead to chaos. The latter requires an additional but unproven assumption that an optimal solution is synonymous with the market equilibrium, which might not be true in all cases. The curious case of the MMT continues.

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¹ My chosen proxy for the illiquid asset.

SUMMARY AND FINAL COMMENTS

The **10th edition of the International Scientific Conference IFRS: Global Rules & Local Use – Beyond the numbers** was organized as a hybrid event. Hybrid mode allowed us to meet some speakers in person whilst it did not prevent other participants, including the International audience, from connecting. This year, there were 13 Ph.D. students presenting their research work. This is of particular interest and value as the conference has always had the ambition to provide a forum for discussion for young scholars and help them to improve their academic output. This goal has been accomplished because each paper was discussed and commented on by professors and also speakers from the audience.

The topics of this year's conference encompassed typical areas such as Reporting and IFRS, Integrated and financial reporting, including some ethical and legal issues as well as quantitative studies and effects of COVID-19 on different aspects of business and society. The presenting participants came from many countries including the Czech Republic, Slovakia, Poland, Romania, Ireland, Austria, Estonia, Greece and Turkey. Hot current topics covered inflation, rising energy prices and insolvency, i.e. negative features typical of the current economic situation in many European countries.

The conference premises of this year were in the historical Thurn Taxis palace just below the Prague Castle. The historical building provided a very amicable environment for conference gatherings.

All contributions went through a thorough double-blind review process, and after completion, the proceedings will be prepared for submission to Clarivate Analytics (formerly Thomson Reuters) Web of Science as in previous years. The proceedings from the years 2014–2020 are indexed in the core collection.

As far as organizational aspects are concerned, we need to highlight the work of our combined IT team and organizers in place. The quality of the conference can be increased or decreased depending on the organizational background. Since all involved technicians worked in concert, the final result was excellent.

Many contributions covered very interesting and up to date topics worth further elaboration for scientific journals. But not only publication opportunities can be the high-quality output of the conference, but also personal meetings with professionals from the area of Accounting and Audit at various levels, including state administration. At this conference, we had a professional representative from the Ministry of Finance of the Czech Republic, an experienced auditor from the Big Four and a representative from the Union of Accountants Czech Republic presenting their ideas.

To sum up, the conference contributions provide open-minded insight into the current state of accounting and finance topics. And last but not least, this collection of conference papers allows further dissemination of ideas presented at the conference inspiring new research in currently discussed areas.

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**IFRS:
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