University of Economics in Bratislava

Faculty of Business Economics with seat in Košice

ACTA OECONOMICA CASSOVIENSIA

Scientific journal

ISSN 1337-6020 (print)
ISSN 2585-8785 (online)

Vol. XIV, 2021
No. 1

The **aim of the journal** is to publish the papers concerned with developing of new knowledge in the field of economic theories and its application in business practice.

The **scope of the journal** covers the wide range of research problems of business economics, management, marketing and finance, knowledge economy, innovation policy, etc.

The journal contains empirically (experimentally) founded studies, survey studies, contributions to "Discussion" (personal views and attitudes on controversial issues in economics as science, as a professional practice, etc.) and reviews. Integrative studies documented by relevant data from central and east European regions and member countries of European Union are specially welcomed.

All papers are double peer reviewed. The journal is published twice a year.

Editor´s office
University of Economics in Bratislava
Faculty of Business Economics with a seat in Košice
Tajovského 13, 041 30 Košice
Tel.: 055/722 3111, fax: 055/623 06 20
IČO 00 399 957
E-mail: acta.phf@euke.sk
http://www.euke.sk
http://acta.euke.sk

Ministry of Culture reg. Nr.: 3239/09

ISSN 1337-6020 (print) 2585-8785 (online)

CONTENTS

SURVEY AND RESEARCH STUDIES

V4 COUNTRIES - ANALYSIS OF TOURISM

KRAJINY V4 - ANALÝZA CESTOVNÉHO RUCHU

Jana CORONIČOVÁ HURAJOVÁ – Miroslava MAJERSKÁ

Abstract
Tourism is a type of the economic activity carried out in almost every destination around the world, from the world's major capitals through smaller towns to villages. It is one of the world's largest industries and economic sectors. Tourism contributes billions of euros to the global economy every year, creates jobs and wealth, generates exports, increases tax revenues and stimulates capital investment.

In this paper we deal with the tourism and its impact on economy in the four selected countries, specifically in the countriesV4: Slovakia, the Czech Republic, Hungary and Poland, and using the multi-criteria decision analysis we compare the level of tourism in the given countries.

Keywords: tourism, GDP, analysis, entropy, TOPSIS, WSA

Abstrakt
Cestovný ruch je druh ekonomickej činnosti vykonávanej v destináciách po celom svete, od veľkých svetových metropol cez malé mestá až po dediny. Cestovný ruch patrí medzi najväčšie priemyselné a ekonomické odvetvia na svete. Ide o jedno z najväčších svetových odvetví a hospodárskych odvetví. Cestovný ruch každoročne prispieva miliardami eur do svetovej ekonomiky, vytvára pracovné miesta a bohatstvo, generuje vývoz, zvyšuje daňové príjmy a stimuluje kapitálové investície.

V tomto príspevku sa venujeme cestovnému ruchu a jeho vplyvu na ekonomiku v štyroch vybraných krajinách, konkrétne v krajinách V4: Slovensko, Česká republika, Maďarsko a Poľsko a pomocou viackriteriálnej analýzy porovnávame úroveň cestovného ruchu v daných krajinách.

Kľúčové slová: cestovný ruch, HDP, analýza, entropia, TOPSIS, WSA

Introduction

Tourism is, has always been and will continue to be a way of showing some progress in society in all countries of the world. Tourism is also reflected directly in the economic benefits for countries. It contributes to GDP growth and supports employment. Tourism is not only a stimulating factor for local and regional economies, but also a catalyst for all areas of activity with which visitors and tourists come into direct and indirect contact. The economic, social and environmental impacts of tourism are important for the whole local, regional and global economy. Although Slovakia is not one of the countries that focus exclusively or mainly on tourism and its development, the importance of tourism in this country is nevertheless not negligible.

In the global economy, tourism is one of the most significant and growing industries. It contributes to economic development and integration. This sector

plays an important role in supporting the national economy. Increasing the flow of tourism can bring positive economic results to countries, especially in terms of gross domestic product (GDP) and jobs, i.e. employment (Manzoor et al., 2019). Ren et al. (2019) adds that the tourism sector not only makes a significant contribution to GDP, but also plays an important role in providing jobs, reducing poverty, increasing income distribution, creating additional demand for goods and services, providing additional tax revenues and foreign exchange reserves for the government. As GDP and employment are closely linked to tourism, we pay more attention to these economic indicators in particular.

1 Methodology

To compare tourism in selected countries, a multi-criteria analysis is used (Fiala et al., 1997). It consists of several steps. First of all, it is necessary to determine the criteria according to which the countries will be compared. Subsequently, according to the type of criteria, i.e. whether they are of ordinal or cardinal character, the proper method of determining the weights is chosen. The input data are processed into a table, where the rows represent the variants and the columns represent the given criteria. Such a table is called a criteria matrix. In this paper, two methods of determining weights were chosen, namely the method of equal weights and the method of entropy. The first method, i.e. the method of equal weights, is based on the assumption that each selected criterion has the same weight of importance, namely 1: the number of criteria. The second method used in this paper is the entropy method. Even with the entropy method, it is not important to know the preferences of the criteria. However, in this case, the weights are determined in the next four steps:

1. to transform the criteria matrix $K = (k_{ij})$, created of input data into matrix $S = (s_{ij})$ as follows

$$s_{ij} = \frac{k_{ij}}{\sum_{i=1}^{m} k_{ij}}; \quad \mathrm{i} = 1, 2, \dots, \mathrm{n}, \mathrm{j} = 1, 2, \dots, \mathrm{m},$$

2. to compute the entropy E_j of each criteria as follows

$$E_j = -\frac{1}{\ln m} \sum_{i=1}^{m} s_{ij} \, ln \, s_{ij} \, ; \; \mathrm{j} = 1, 2, \dots, \mathrm{m},$$

3. to compute the number D_j for each criteria as

$$D_j = 1 - E_j,$$

4. to compute the weight w_j of the j-th criteria as

$$w_j = \frac{D_j}{\sum_{j=1}^{n} D_j}.$$

After the weights determination, the next step is to select a suitable method for evaluating the given variants, in this case the countries. The TOPSIS method and the WSA method were chosen for this purpose.

The TOPSIS method is used when the input data are of a cardinal nature, as is the case here. The result of this method is the identification of a variant that is as close as possible to the ideal variant and at the same time as far as possible from the basal variant. A by-product of this analysis is that it ranks all considered variants according to their distance from the ideal variant.

The procedure of the TOPSIS method:

1. to transform the criteria matrix $K = (k_{ij})$ created of input data to normalized matrix $Q = (q_{ij})$ as follows

$$\mathrm{q_{ij}} = \frac{\mathrm{k_{ij}}}{\sqrt{\sum_{\mathrm{i=1}}^{\mathrm{m}} \mathrm{k_{ij}^2}}}; \mathrm{i} = 1, 2, \dots, \mathrm{m}; \mathrm{j} = 1, 2, \dots, \mathrm{n},$$

2. to create a matrix R=(r_{ij})

$$\mathrm{r_{ij}} = \mathrm{w_j q_{ij}};\ \ \mathrm{i} = 1, 2, \dots, \mathrm{m};\ \mathrm{j} = 1, 2, \dots, \mathrm{n},$$

where $w_j$denotes the weight of the j-th criteria,

3. to define the ideal variant $h = (h_1, h_2, \dots, h_n)$ and the basal variant $b = (b_1, b_2, \dots, b_n)$ as

$$\mathrm{h_j} = \max_{\mathrm{i}} \mathrm{r_{ij}}\,; \mathrm{j} = 1, 2, \dots, \mathrm{n}$$

$$b_j = \min_{\mathrm{i}} \mathrm{r_{ij}}\,; \mathrm{j} = 1, 2, \dots, \mathrm{n}$$

4. to compute the distance indicator c_i as

$$\mathrm{d_i^+} = \sqrt{\sum_{\mathrm{j=1}}^{\mathrm{m}} \left(\mathrm{r_{ij}} - \mathrm{h_j}\right)^2}\,; \mathrm{i} = 1, 2, \dots, \mathrm{m}$$

$$\mathrm{d_i^-} = \sqrt{\sum_{\mathrm{j=1}}^{\mathrm{m}} \left(\mathrm{r_{ij}} - \mathrm{b_j}\right)^2}\,; \mathrm{i} = 1, 2, \dots, \mathrm{m}$$

$$c_i = \frac{d_i^-}{d_i^+ + d_i^-}; i = 1, 2, \dots, m$$

The rank of the variants depends on the value of the distance indicator, the bigger the value means the better variant.

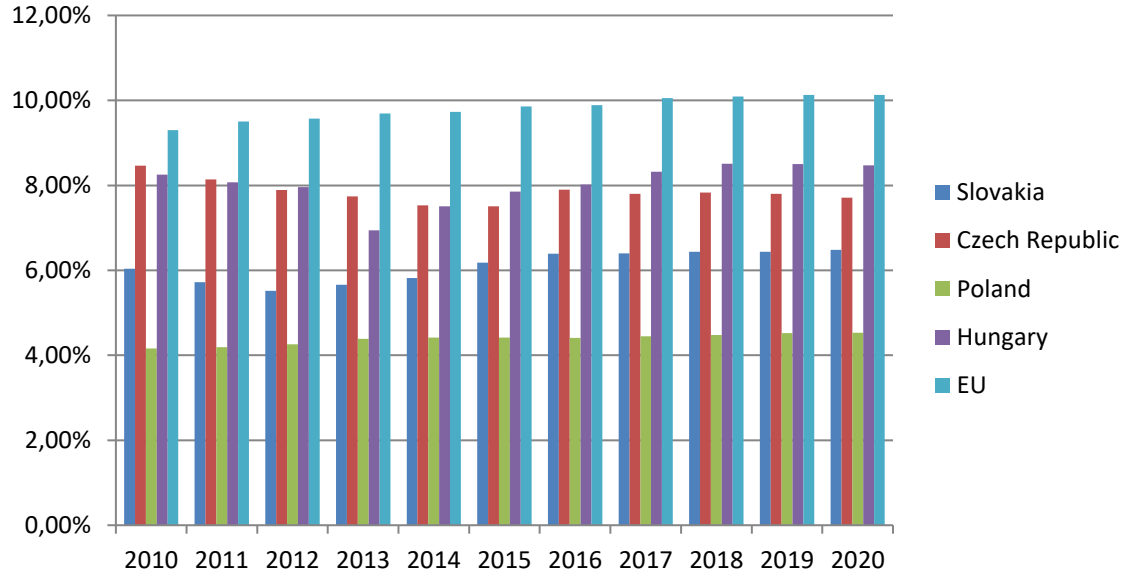
The second method chosen we used in this paper is WSA method (Weighted Sum Method). This method is based on the utility function which is computed for each considered variant V_i as follows:

$$u(V_i) = \sum_{j=1}^{n} w_j . \frac{k_{ij} - b_j}{h_j - b_j}, i = 1,2, \dots, m; j = 1,2, \dots n,$$

where h_j is equal to the best value in the j-th column, $b_j$is equal to the worst value in the j-th column, w_j denotes the weight of the j-th criteria and k_{ij} is the element in the i-th row and the j-th column in the criteria matrix. The value $u(V_i)$ expresses the utility of the variant V_i.

2 Results

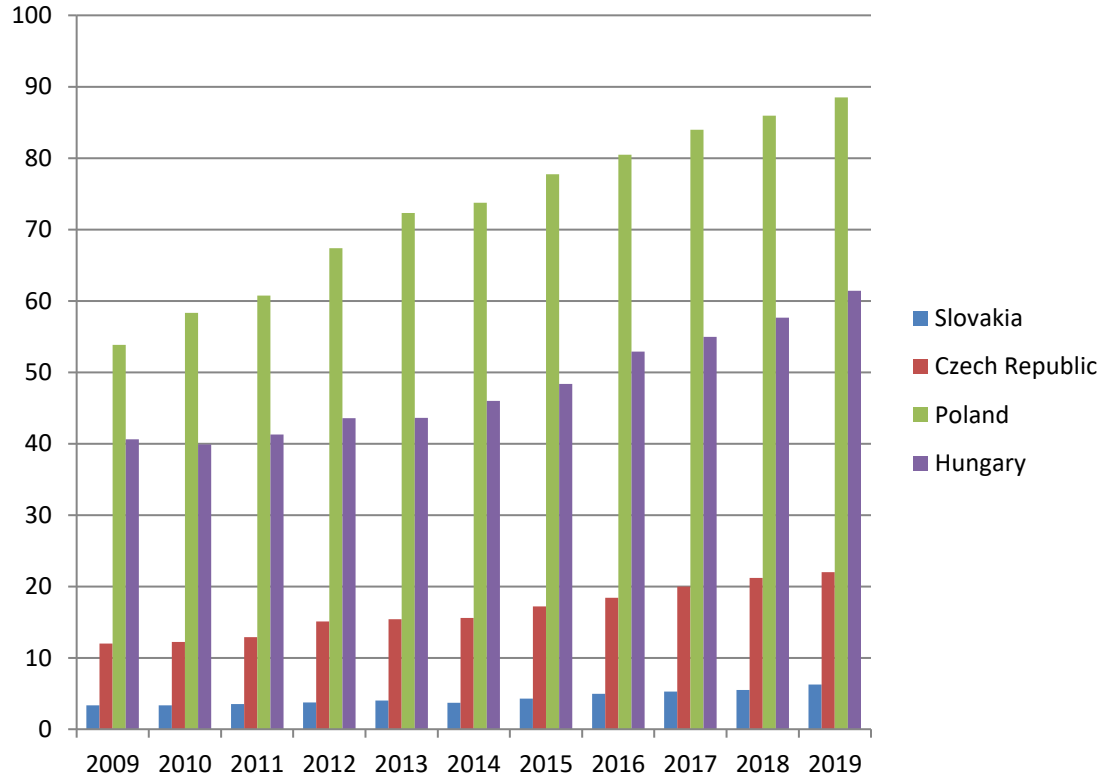
Slovakia is the smallest country of the compared countries, so its GDP is naturally the lowest in absolute terms. However, if we focus on the ratios indicators, i.e. the share of tourism as % of GDP, the situation can change. As we can see in Graph 1 the share of tourism as % of GDP in Slovakia is higher than in Poland, but it is lower than in Czech Republic and Hungary, which has taken a leading position within the countries of V4 on the basis of this indicator since 2015. However, it must be said that all V4 countries are below the European Union average. In each of the monitored countries, only a minimal increase or stagnation can be identified.



Graph 1 Percentage share of tourism in GDP

Source: Own processing based on data from World Travel and Tourism Council Data, 2021

Further the number of tourists coming abroad to the countries of V4 is evaluated on the basis of statistics offered by the Statista portal (STATISTA 2020a, 2020b, 2020c, 2020d), see Graph 2. Most tourists come to Poland in all monitored periods. Between 2009 and 2019, international visitors to Poland increased every year. The reason is both the size and characteristics of the country, but also the number of UNESCO monuments, we will mention, for example, concentration camps, whose attendance is calculated in millions. The second rank has Hungary, which attracts mainly with its water attractions, areas of wine and typical food.

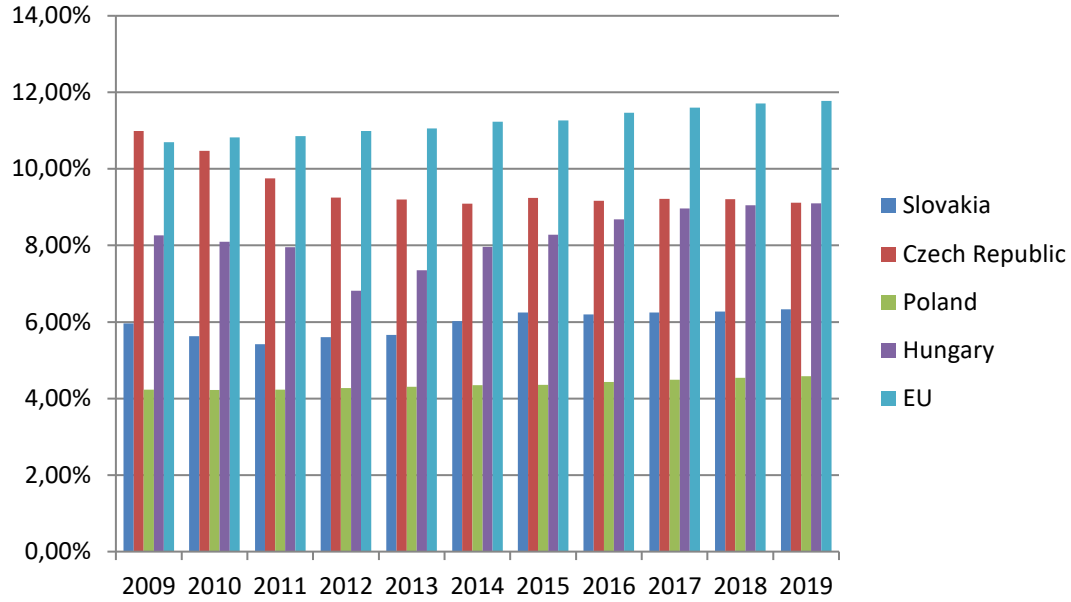


Graph 2 Number of foreign tourists in millions

Source: own processing based on data from Statista, 2020a, 2020b, 2020c, 2020d

The number of tourists coming to Slovakia has been rising since 2014. In 2019, approximately 6,27 million foreign and domestic tourists were accommodated in Slovak accommodation establishments.

In Graph 3, there can be observed the share of employment in tourism in the total employment of individual V4 countries. Poland reaches the lowest level at only about 4,5% on average. In Slovakia, the situation is a little bit better; the percentage is around 6%. In Czech Republic, there is an evident decline in tourism employees, though in the past the percentage of the employees in tourism was even above the average of EU.



Graph 3 Percentage share of employment in tourism in total employment

Source: own processing based on data from World Travel and Tourism Council Data, 2021

From the overall point of view, the percentage of employment in tourism in total employment in V4 ranges from approximately 4,5% to over 9%. Nevertheless, since 2011, none of these countries has managed to reach the average of EU.

The Travel and Tourism Competitiveness Index (TTCI) is measured by the World Economic Forum (WEF) and it measures the factors and policies that make a country a viable place to invest in the travel and tourism sector. As part of the comparison, we compiled an index for the analysed V4 countries for 2019.

Table 1 TTCI index of V4, 2019

		Slovakia	Czech Republic	Poland	Hungary
Overall ranking		60.	38.	42.	48.
TTCI		4	4,3	4,2	4,2

Source: own processing based on data from WEF, 2021

In Table 2, there are processed the input data corresponding to the year 2019. The four criteria used for the multi-criteria analysis corresponded to the given indices described above:

- K1 - percentage share of tourism in GDP
- K2 - percentage share of employment in tourism in total employment
- K3 - TTCI
- K4 - number of foreign tourists in millions

Table 2 Input data and weights of criteria

	K1	K2	K3	K4
Slovakia	6,44	6,27	4	6,27
Czech Republic	7,80	9,21	4,3	22
Poland	4,52	4,54	4,2	88,52
Hungary	8,50	9,05	4,2	61,4
Equal weights	0,25	0,25	0,25	0,25
Weights by entropy	0,07	0,11	0,001	0,82

Source: own processing

The input data were processed into a criterion matrix and subsequently the multi-criteria analysis was performed, specifically the TOPSIS and WSA methods were used. The results show that the best among the considered countries according to given criteria placed Hungary, followed by Poland and Czech Republic. Slovakia occupies the last place, see Table 3.

Table 3 Multi-criteria analysis of tourism in V4

	TOPSIS		WSA		SUM	Rank
	Equal weights	Entropy	Equal weights	Entropy		
Hungary	1	2	2	2	7	1
Poland	2	1	4	1	8	2
Czech Republic	3	3	1	3	10	3
Slovakia	4	4	3	4	15	4

Source: own processing

Conclusion

Tourism is one of the world's fastest growing industries and the largest service sector. It is also considered one of the important sectors of the Slovak economy, as well as the economies of neighbouring countries. Due to the numerous factors that affect the quality of tourism in a given region or country, it is necessary to choose appropriate methods in order to identify the order based on the selected attributes of the comparison. This ensures the use of methods of multi-criteria analysis, where we can choose different criteria and then compile the order of variants based on them.

Despite the fact that Slovakia has the potential to increase its level of tourism, it is currently at the tail end of the V4 countries. Slovakia has the third highest value of the percentage share of tourism in GDP and employment among the V4 countries, but in terms of the number of foreign tourists and the TTCI index, it is in the last place. Looking to the future, it is necessary to work on increasing traffic and also on the basis of the results of the TTCI index on the infrastructure as a whole.

References

1. FIALA, P. - JABLONSKÝ, J. - MAŇAS, M. 1997. Vícekriteriální rozhodování. Praha: VŠE, 1997. 316 p. ISBN 80-7079-748-7.
2. MANZOOR, F. et al. 2019. The Contribution of Sustainable Tourism toEconomic Growth and Employment in Pakistan. In International journal of environmental research and public health. 16(19). 3785. ISSN 1660-4601
3. REN, T. et al. 2019. The Impact of Tourism Quality on Economic Development and Environment: Evidence from Mediterranean Countries. In Sustainability. 11. 2296. 17 s. ISSN 2071-1050
4. STATISTA. 2020a. Available on: https://www.statista.com/statistics/447104/number-of-inbound-visitors-in-hungary/
5. STATISTA. 2020b. Available on: https://www.statista.com/statistics/446605/number-of-inbound-visitors-to-poland/
6. STATISTA. 2020c. Available on: https://www.statista.com/statistics/413213/number-of-arrivals-spent-in-short-stay-accommodation-in-the-czech-republic/
7. STATISTA. 2020d. Available on: https://www.statista.com/statistics/413258/number-of-arrivals-spent-in-short-stay-accommodation-in-slovakia/
8. The World Economic Forum, 2021. Available on: https://www.weforum.org/
9. World Travel & Tourism Council, 2021. Available on: https://wttc.org/

About the authors

RNDr. Jana Coroničová Hurajová, PhD.
University of Economics in Bratislava
Faculty of Business Economy with seat in Košice
Department of Quantitative Methods
Tajovského 13, 041 30 Košice
e-mail: jana.coronicova.hurajova@euba.sk

Ing. Miroslava Majerská
University of Economics in Bratislava
Faculty of Business Economy with seat in Košice
Tajovského 13, 041 30 Košice
e-mail: mmajerska1@student.euba.sk

ANALYSIS OF THE FINANCIAL PERFORMANCE OF A BUSINESS ENTITY

ANALÝZA FINANČNEJ VÝKONNOSTI PODNIKATEĽSKÉHO SUBJEKTU

Zuzana KUDLOVÁ

Abstract
Financial analysis is the basis for examining and evaluating the financial performance of a business entity. It is considered to be an effective way to assess the financial health of a business entity. The main tools with which we perform financial analysis are indicators. The aim of the paper is to analyze the financial performance of the selected business entity and to propose recommendations for the further direction of the company.

Keywords: company performance, financial analysis, financial indicators, financial performance

Abstrakt
Finančná analýza je základom skúmania a vyhodnocovania finančnej výkonnosti podnikateľského subjektu. Považuje sa za efektívny spôsob, ako posúdiť finančné zdravie podnikateľského subjektu. Hlavnými nástrojmi, ktorými vykonávame finančnú analýzu sú ukazovatele. Cieľom príspevku je zanalyzovať finančnú výkonnosť vybraného podnikateľského subjektu a navrhnúť odporúčania pre ďalšie smerovanie podniku.

Kľúčové slová: výkonnosť podniku, finančná analýza, finančné ukazovatele, finančná výkonnosť

Introduction

We encounter the term performance on a daily basis during normal activities. In today's business environment, performance is one of the conditions by which a business can "survive". Every business entity that wants to be competitive and successful in the long run must measure, evaluate and manage its financial performance.

For the first time, financial analysis was discussed in connection with the creation of money, when traders solved various calculations. Over time, the level of financial analysis has improved. Financial analysis as a modern method originated at the turn of the 19th and 20th centuries in the United States of America and gradually spread to Europe. In the Czechoslovak Republic, the term analysis of economic activity was used in the application of the central planned economy. In the conditions of a market economy, the Slovak Republic began to use the term financial analysis, its level and form from countries with a developed market economy. (Kotulič - Király - Rajčaniová, 2010)

Without the implementation of financial analysis, it is not possible to correctly and comprehensively evaluate the financial performance of a business entity. Financial performance is currently often monitored by the management of the business entity and other entities that come into contact with the business entity.

Some authors explain financial performance in connection with the transformation process, others with the evaluation of investments. (Freňáková - Cichovská, 2014) They compare it to the transformation process, where inputs change into outputs. (Zalai, 2013) This relationship between inputs and outputs represents the efficiency by which a business entity is able to evaluate the resources invested in the reproduction process. (Klučka, 2006)

1 Enterprise XXX, JSC.

Enterprise XXX, JSC operates as a manufacturing and trading company. Its history began in the early 1970s. Current Business XXX, JSC was established in 1995 and has been constantly improved and modernized since then. The business entity expanded its production by Tetra Pac's lines to 1 l and 0.25 l packaging of beverages and juices, to 1 l and 0.33 l packaging of carbonated soft drinks in glass bottles and to 1.5 l and 0.5 l packaging of PET bottles.

With the products of the business entity Enterprise XXX, JSC in addition to the domestic market, it is possible to meet on the market in the Czech Republic as well as on other foreign markets.

The products of this business entity are characterized by high quality and we rank them among the major brands that maintain a leading position in the domestic market.

By Enterprise XXX, JSC since 2020 it meets all three size criteria for a large business entity; we classify it as a large business entity. (Act No. 431/2002 Coll., On Accounting, as amended § 2 par. 8) The financial statements must be verified by an auditor, therefore company XXX, JSC accounts for inventories in manner A. Company XXX, JSC. considers the accounting period to be a calendar year, it is from 1.January to 31.December and is a payer of value added tax. (Value Added Tax Act No. 222/2004 Coll., as amended § 4 para. 1)

1.1 Traditional indicators

In this part of the paper we will calculate individual traditional indicators and compare them with the modern EVA indicator.

Table 1 Economic performance indicators

		2016	2017	2018	2019	2020
=	**EBITDA**	322 280	273 207	217 207	212 131	937 608
-	Depreciation	163 725	160 947	155 897	155 452	251 988
=	**EBIT**	158 555	112 260	61 310	56 679	685 620
-	Interest expense	0	0	0	0	0
=	**EBT**	158 555	112 260	61 310	56 679	685 620
-	Income tax	36 382	30 030	19 297	22 586	185 668
=	**EAT**	122 173	82 230	42 013	34 093	499 952

Source: own processing

In table 1, we identified individual indicators of the economic result in the accounting periods 2016 - 2020. The indicators had a declining character until the accounting period 2020, when they rose sharply. In the accounting period 2020, the EBITDA indicator is € 937,608. Compared to the previous accounting period, it is higher by € 725,477. After deducting depreciation, we received an EBIT indicator of € 685,620. This indicator is identical to the EBT indicator, as Enterprise XXX, JSC has no interest expense. Finally, after deducting income tax, we generated a net EAT of € 499,952. Compared to the accounting period 2019, it is higher by € 465,859.

Table 2 Activity indicators

	2016	**2017**	**2018**	**2019**	**2020**
Turnover time of total assets	387,94	448,22	431,01	424,92	93,80
Turnover of total assets	0,94	0,81	0,85	0,86	3,89
Turnover time of non - current assets	242,18	270,02	254,75	258,54	45,75
Turnover of non - current assets	1,51	1,35	1,43	1,41	7,98
Inventory turnover time	71,29	80,68	81,25	91,94	16,31
Inventory turnover	5,12	4,52	4,49	3,97	22,38

Source: own processing

From table 2 we can blame that the total assets of the Company XXX, JSC in the accounting period 2020 turned around in about 94 days, i.e. almost 4 times a year. The higher turnover indicator of total assets is the more efficient the business entity. The threshold value is 1. In our case, the turnover indicator of total assets for the accounting period 2020 is 3.89, i.e. it is higher than 1, which means that Company XXX, JSC achieved higher annual sales than the average value of its total assets. This means that it is a good performance of the business entity.

In the accounting period 2020, the non-current assets of the Company XXX, JSC turned around in about 46 days, representing almost 8 times a year.

Table 3 Activity indicators

	2016	**2017**	**2018**	**2019**	**2020**
Return on total investment - 1	3,11%	2,16%	1,16%	0,98%	7,04%
Return on total investment - 2	4,03%	2,94%	1,69%	1,62%	9,65%
Return on total investment - 3	2,42%	1,70%	0,91%	0,77%	5,56%
Profitability VI	4,98%	3,36%	1,75%	1,43%	9,27%
Profitability of revenues	3,25%	2,66%	1,18%	0,85%	1,57%
Profitability of sales	3,30%	2,65%	1,36%	1,14%	1,81%
Cost efficiency	3,39%	2,76%	1,20%	0,87%	1,60%

Source: own processing

The return on the total invested funds of a business entity in the accounting period 2020 is 7.04%. Thus, we found out that € 1 of the total assets of the business entity produced approximately € 0.0704 in accounting profit. Looking at the calculation of profitability using the EBIT indicator, we found that € 1 of total assets produced approximately € 0.0965 of the value of the EBIT indicator. By calculating the profitability of the total invested funds by the last method of calculation, we found that € 0.0556 of the accounting profit applies to € 1 of the total assets, taking into account the price of foreign capital.

Table 4 Liquidity ratios

	2016	2017	2018	2019	2020
Cash liquidity	0,27	0,37	0,31	0,18	0,21
Ready liquidity	0,62	0,66	0,52	0,31	1,29
Total liquidity	1,13	1,23	1,15	1,14	2,05

Source: own processing

The range of recommended values of monetary liquidity of business entities should be from 0.9 to 1.1. In that case, the business entity is able to pay its short-term liabilities with almost all or all of its most liquid assets. In our case, we see that Enterprise XXX, JSC did not fluctuate in the accounting period 2020 or in the accounting periods 2016 - 2019 in this recommended interval.

For ready liquidity, recommended values are in the range from 1.0 to 1.5. Enterprise XXX, JSC in the accounting period 2020 it reached the value of 1.29, i.e. it reached the required value in the given interval. In the accounting periods 2016 - 2019 Enterprise XXX, JSC did not reach the required value.

Recommended values for total liquidity range from 1.5 to 2.5. As we see Enterprise XXX, JSC reached the required value in the accounting period 2020, but did not reach it in the accounting periods 2016 - 2019. This means that the business entity did not have sufficient short-term accruals and current assets in these accounting periods to cover its short-term liabilities.

Table 5 Debt ratios

	2016	2017	2018	2019	2020
Debt ratio	37,11	34,73	32,99	30,51	22,06
Self - financing indicator	62,89	65,27	67,01	69,49	77,94
Leverage	1,59	1,53	1,49	1,44	1,28

Source: own processing

Business Debt XXX, JSC we do not consider it risky. Foreign resources account for approximately 22% of the business entity's assets in the accounting period 2020 and own resources for approximately 78%.

The leverage ratio represents to us that the total assets of Enterprise XXX, JSC is more than 1 times higher than equity. The golden rule of financing says that assets should be 2 times higher than equity.

We did not monitor other indicators, such as the interest coverage ratio and the credit indebtedness indicator, due to the fact that Company XXX, JSC currently has no loans.

From the point of view of traditional financial indicators, we can conclude that Enterprise XXX, JSC is doing well, achieving optimal results. This is also evidenced by the fact that it has no loans and does not need to finance its investment activities with external sources.

1.2 Modern EVA indicator

In this part of the paper we will calculate a modern EVA indicator. Calculating this indicator is more difficult, so we have to take the individual steps so that we can enter the data into the formula.

We calculate net operating profit by adjusting the pre-tax VH so that it includes only costs and revenues that relate to the operating activities of Company XXX, JSC.

Table 6 Net operating profit - NOPAT

	2016	**2017**	**2018**	**2019**	**2020**
EBIT	158 555	112 260	61 310	56 679	685 620
Corporate income tax rate	22%	21%	21%	21%	21%
NOPAT = EBIT x (1 – Corporate income tax rate)	123 672,9	88 685,4	48 434,9	44 776,41	541 639,8

Source: own processing

Net operating profit in table 6 was achieved by multiplying the VH EBIT indicator by (1 - corporate income tax rate). In the accounting period 2020, the net operating profit was approximately € 541,640, i.e. approximately 12 times higher than in the accounting period 2019, when it was approximately € 44,776.

The risk-free rate represents the return that the investment will bring to investors. There is no exact procedure for calculating the risk-free rate, it is recommended to use the yield of 10-year government securities. We calculate the annual rate as the arithmetic average of the individual monthly rates. The state is considered to be the least risky borrower, and 10-year government bonds are closest to the useful life of corporate income in terms of their useful life.

The average value of the coefficient β is determined at zero indebtedness of European businesses operating in the food industry.

Table 7 Calculation of cost of equity using the CAPM model

		2016	2017	2018	2019	2020
	r_f	0,54	0,92	0,89	0,25	-0,04
+	β	3,22	2,82	2,85	3,09	3,11
×	$(r_m - r_f)$	6,90	6,06	7,14	6,04	5,54
=	$r_e = n_{VK}$	**22,76%**	**18,01%**	**21,24%**	**18,91%**	**17,19%**

Source: own processing

In the table 7, we calculated the cost of equity of the business entity of the Company XXX, a. with using the CAPM method. In the accounting period 2020, they amounted to 17.19%, which is the lowest percentage for the entire monitored period. In the accounting period 2019, they amounted to 18.91%. The highest cost of equity for the entire period under review in the 2016 accounting period, when they represented 22.76%.

When we determine the individual weights of capital, cost of equity and debt, we can calculate the weighted average cost, which expresses the minimum return on capital.

Table 8 Calculation of the WACC indicator

	2016	2017	2018	2019	2020
OC /C	0,63	0,65	0,67	0,69	0,78
FC / C	0,37	0,35	0,33	0,31	0,22
$r_e = n_{VK}$	22,76	18,01	21,24	18,91	17,19
Cost of foreign capital - n_{CK}	0	0	0	0	0
Income tax rate – t	22%	21%	21%	21%	21%
$(1 - t)$	0,78	0,79	0,79	0,79	0,79
WACC	22,76%	18,01%	21,24%	18,91%	17,19%

Source: own processing

The table 8 shows that the weighted average cost of capital is equal to the cost of equity. This fact arose because the company has no foreign sources. The weighted average cost of capital is the lowest in the accounting period 2020, i.e. at 17.19 %. Compared to the accounting period 2019, they decreased by 1.72%.

Using individual previous calculations, we can calculate the EVA indicator.

Table 9 Calculation of the EVA indicator

	2016	2017	2018	2019	2020
NOPAT (v €)	123 672,9	88 685,4	48 434,9	44 776,41	541 639,8
WACC (v %)	22,76	18,01	21,24	18,91	17,19
Capital – C (v €)	3 917 761	3 713 706	3 557 072	3 418 919	10 789 168
EVA	**-89 044 567,5**	**-66 795 159,7**	**-75 503 774,4**	**-64 606 981,9**	**-184 924 158**

Source: own processing

The EVA indicator is in Company XXX, JSC for the entire monitored period, i.e. in the accounting periods 2016 - 2020 in negative values. This means that Enterprise XXX, JSC for all accounting periods it failed to create value for its owners.

The resulting values of the EVA indicator are negative and change with each accounting period. In the last accounting period, it fell the most to the value of -184,924,158 €. The best value was reached in the accounting period 2019, namely approximately - 64,606,982 €. With the deterioration of the EVA indicator, it is clear that the business entity does not value the investments made and does not increase its performance.

Conclusion

Since there is no single reliable way to measure a company's financial performance, it is important that we measure financial performance by combining a traditional approach with a modern approach. Using the traditional approach, which focuses on financial indicators based on the economic result, we found that the business entity does not achieve satisfactory results in all indicators, but in the accounting period 2020 they significantly improved. A big plus for a business entity is that it does not have any loans, resp. foreign interest capital, which could worsen individual indicators.

Using a modern approach, which is focused on financial indicators based on the creation of value of the business entity, we focused on the most well-known and most used indicator of financial performance, i.e. the EVA indicator. It measures the added value for owners in a business entity, which it created during the accounting period by its main activity. The results of the EVA indicator show that the business entity did not create value for the owners during the monitored accounting periods. This was the case even though the business entity reported a positive profit in each accounting period.

The analysis of the financial performance of a business entity is a complex process in which the measurement and evaluation procedure is not precisely defined. For a comprehensive and objective analysis of the financial performance of a business entity, quality information is needed, not only from financial accounting. Information from managerial accounting is also needed, which is accessible only to internal users.

References

1. FREŇÁKOVÁ, M. – CICHOVSKÁ, G. Problematika výkonnosti podniku, jej merania a hodnotenia. In Financie, účtovníctvo, dane 2014 so zameraním na súčasné problémy. [CD-ROM]. Bratislava : EKONÓM, 2014. 69 – 86 s. ISBN 978-80-225-3855-8.
2. KLUČKA, J. Riadenie rizika a hodnotenie výkonnosti podniku. In BIATEC. č. 8, s. 22-25. ISSN 1335-0900.
3. KOTULIČ, R. – KIRÁLY, P. – RAJČÁNIOVÁ, M. Finančná analýza podniku. 2. vyd. Bratislava : IURA EDITION, 2010. 238 s. ISBN 978-80-8078-342-6.
4. ZALAI, K. Finančno-ekonomická analýza podniku. Bratislava : SPRINT2, 2013. 446 s. ISBN 978-80-89393-80-0.
5. Zákon č. 431/2002 Z. z. o účtovníctve v znení neskorších predpisov.
6. Zákon č. 222/2004 Z. z. o dani z pridanej hodnoty v znení neskorších predpisov.

About the author

Ing. Zuzana Kudlová, PhD.
University of Economics in Bratislava
Faculty of Business Economy with seat in Košice
Department of Corporate Financial Management
Tajovského 13
041 30 Košice
tel. 055/722 3251
zuzana.kudlova@euba.sk

EUROPEANIZATION OF HUMAN RESOURCE MANAGEMENT

Jana MARASOVÁ – Anna VALLUŠOVÁ

Abstract
The paper concentrates on the process of Europeanisation of companies and its manifestations in HRM. It aims to present the theoretical framework of the problem and to characterize its development, which leads to the potential European model of HRM. The analysis focuses on identifying the characteristics of European management with an emphasis on European diversity as a challenge and a source of creativity, but also a factor of more demanding management for HR managers. The analysis is based on available studies mainly from the environment of French-speaking authors, as well as on the results of our own research project.

Key words: Management, Human resource, Europeanization, Development, Diversity

Abstrakt
Príspevok je zameraný na proces europeizácie podnikov a na jej prejavy v HRM. Jeho cieľom je predstaviť teoretický rámec riešenej problematiky, a charakterizovať jej doterajší vývoj smerom k potenciálnemu európskemu modelu HRM. Analýza spočíva v identifikácii charakteristických znakov európskeho manažmentu s dôrazom na európsku diverzitu ako na výzvu a zdroj kreativity, ale i faktor náročnejšieho riadenia pre manažérov HR. Analýza sa opiera o dostupné štúdie predovšetkým z prostredia frankofónnych autorov, a tiež o výsledky vlastného výskumného projektu.

Kľúčové slová: Manažment, Ľudské zdroje, Europeizácia, Rozvoj, Diverzita

Introduction

It has been almost 30 years since the legal framework of the European single market entered into force, which has allowed the free movement of goods and services, capital and people, and consequently the progressive Europeanisation of national enterprises at all of their levels. HRM as one of the managerial functions, undoubtedly contributes to this progress, because its purpose is, among other things, to harmonize the economic and social goals of the company and thus overcome the age-old antagonism between them. A company cannot be successful in the long run, if its activities are not aimed at reconciling these two groups of goals. Caring for people and respecting their rights in the working and non-working environment has always been a hallmark of the European Community and reflected the key values on which this community has developed. This development gradually included the business sphere of individual countries, whose companies became co-bearers of European values and thus the imperative to ensure the necessary harmonization of economic and social goals. As the key role of HRM is unquestionable in realizing this ambition, it is useful to examine how managers deal with this mission and how, despite the diversity of the European environment and management approaches, differences in national legislative frameworks and diversity of human resources themselves, contribute

to Europeanisation, specifically, to building clearer contours for the European HRM model, so far quite vague. This paper aims to define the concept of Europeanization of HMR based on the theoretical framework, to characterize its current development as well as the possibilities of its outcome in the European HMR model.

1 Theoretical Background

The key document for the process of Europeanisation was the Single European Act from 1986, although the origins of this process were already contained in the Treaty of Rome from 1957. The Single Act laid the foundation for the so-called four freedoms and marked the beginning of the Europeanisation process in all economic sectors as well as in the business environment (Bauby, 2011).

For the representatives of the institutions of the European Union (EU), Europeanization means a policy situated between the authorities of a national state and a supranational organization, which is built by harmonization or liberalization (Bauby, 2019). This process is associated with the development of new tools and new theoretical approaches, which originated and evolved from the need to transnationalise policy issues related to specific subject areas (Favell, 2000). Examples of the most Europeanized policies today are monetary union, agricultural and environmental policies, which are the result of the long-term implementation of common European policies. The EU's geographical area is thus gradually becoming a transnational economic, social and political space, where various political, bureaucratic, economic, legal and academic strategies meet, making this area highly heterogeneous. Despite this heterogeneity, Europeanisation through public policies represents certain coherent progress of the whole community.

Radaelli (2003, p. 30) defines Europeanisation as a process of building, diffusing and institutionalizing formal and informal rules, procedures, political paradigms, ways of doing things, shared beliefs and standards, which are first defined and consolidated in EU policy-making and then integrated into the logic of discourse, identities and political structures of public policies of individual states. According to some authors (Hoeffler, Faure, 2015; Green-Cowles et al., 2001, Uramová, Šidová, 2013, Lacová, Šuplata, 2019), the process of Europeanization in this "inclination of national states to the EU" can be considered synonymous with European integration.

Advancing institutional Europeanization has strengthened the convergence of practices in many spheres of economic and social life. In some of them, practical activity has even preceded official Europeanization processes and acted as initiator and accelerator. Europeanisation has therefore progressed through the political will of the Member States, but also through the natural way of harmonizing, particularly, the business environment and business management practices, especially after the Single Act allowed the free movement of people,

capital, goods and services across Europe and the development of the transnational entrepreneurial activity, which was further strengthened in the first decade of the new millennium by the enlargement of the EU to include the former centrally managed economies.

Today, no one doubts the importance of human resources for business success, equally at the national, European and global level. However, according to Adler (2009), HRM in a transnational context has certain specifics and principles resulting from, firstly, multiculturalism, i. e. the presence of individuals of several nationalities in enterprises and, secondly, the geographical dispersion which makes it difficult to apply the same methods and to harmonize long-standing practices. Nevertheless, since the 90s of the previous century, thanks to the advancing globalization of the economy, the creation of international departments, particularly HRM directorates in multinational companies, and also thanks to the rapidly evolving computerization of almost all HRM activities, many of these difficulties have been resolved and some of the human resources policies in the European area have been standardized. As the globalization tendencies of recent decades have significantly contributed to the internationalization of this managerial function, it is interesting to examine whether and to what extent its Europeanization is also advancing.

The phenomenon of the Europeanization of HRM and management, in general, is closely connected with the Europeanization of companies as such. So far, there is no clear and unambiguous definition of the concept of Europeanization of companies in professional or scientific sources. The authors rather focus on examining the degree of their integration into the European environment according to several criteria, and from the intensity of this integration they directly judge the Europeanization of these economic entities. For example, Laperche (2006) primarily examines the presence of companies in the European geographical area through exports, foreign direct investment (setting up a company in another country or buying an existing company) and other types of investment. Then, he analyses the degree of Europeanisation of companies according to the share of their exports on turnover, the percentage of turnover achieved in the host countries and also according to the share of staff employed by companies in the host country. The last criterion is directly related to the activities of the HRM department, which is in charge of selection, preparation of expatriates, including formal matters depending on the legislative framework of the country, their working and living conditions, logistics of their move, remuneration during expatriation, analysis of its impact on the future old-age pension of the employees, the adaptation of the tools of their education and career development to the European and international level, as well as their reintegration into the company after the return. This often means facing new challenges for HRM and by managing all expatriation-related activities, this management itself is being Europeanised.

2 European Features of Human Resource management

HRM in Europe, but also elsewhere in the world, was most affected by the so-called Harvard model, which is described as humanistic and which is based on the reconciliation of three groups of goals - the goals of the company, the individual and society - through the action of all actors who are interested in the effective operation of the company. They include not only shareholders and managers who traditionally control the company's activities, but also employees, trade unions, municipalities, and the government. This model aims at achieving the involvement of these actors in the context of common goals. Nyhan (2002) characterizes this philosophy in the following points:

- loyalty of individuals to the company,
- profitability in terms of number of employees, low absenteeism and cost reduction for society and for individuals,
- consensus between management and employees, between different groups of employees, between employees and their families and society as a whole.

It follows from the above that the strength of the Harvard model is the integration of HRM policy and strategy into all activities in the company, and thus the transfer of responsibility for them to the level of top management. In this sense, for employees' issues is no longer responsible only specific personnel department, but this managerial function is systematically integrated into the entire company, which is reflected in the presence of the human resources manager in top management. The application of this model in European companies means recognition of the fact that the human factor, especially employees, has a key role to play in meeting the economic and social goals of the company and in bringing them closer together. This approach assumes employees' involvement in addressing the given goals and on the key role of man in the development of the company.

As the political and legal context of the EU, in which companies operate, has been gradually harmonized, so were tendencies to homogenize managerial practices. Almost 20 years ago, Béret (2002) concluded, based on a survey focused on the development of the human resources function in multinational companies in the pharmaceutical, chemical and IT sectors, that some types of tools are being standardized, especially in the area of employee evaluation. Although Europe does not yet have a management model with clear characteristics and clearly defined contours, according to RH par Siapartners (2015), we can talk about the formation of European management, which has at least three features that distinguish it from Asian or American management style.

The first feature lies in the already mentioned strong focus on people, especially employees of the company, which is part of the social pillar of its social responsibility. It is well known that the management of North American

companies is more focused on the interests of shareholders and on the profitability of the company, which are met through effective HRM. Even Asian management, whose focus on people is stronger than in the US, is essentially aimed more at adapting them to the philosophy and functioning of companies than at valorising their abilities, skills and developing them. In any case, there is a growing number of analyses and research studies in Europe on the penetration of corporate social responsibility and human resource management practices, by which the concept of responsible human resource management has become established (Ramboarisata, L. et al., 2008; Dubrion, 2010). For companies, it means intensive addressing the expectations and aspirations of their employees and the associated challenges in terms of their professional and personal development. This care for the needs of employees began to be strengthened in the early '80s with the transition of personnel management to the stage of human resources management, in which the employee began to be considered a source of wealth of the company and its added value. However, the development of participatory management also meant the employee's participation in the company's social responsibility. Guiran (2011) considers as a characteristic feature that with the advent of human resource management, the conceptual apparatus of this managerial function has also changed, e.g. the term subordinate was replaced by the word collaborator. It is a sign of a transformation in the position of employees in the work environment from executive entities to co-actors of the functioning and future of the company.

The second feature of European management is internal negotiations. Negotiation, dialogue, the convergence of conflicting interests and the search for consensus have been one of the principles of European integration since its beginning, and it is still so. This principle is also typical for the decision-making processes of European companies, which have a long tradition of internal negotiations and social dialogue, especially in resolving employment issues, however, the nature of this process varies in different countries. Consultation and discussion in this environment are almost systematic, especially when making the most important decisions. This systematics is typical especially for large European companies, the development of which has been accompanied by a strong trade union tradition. Although the participation of trade unions in negotiations often complicates them, Alix (2015) believes that their participation makes it possible to take greater account of the individual employee and his professional development. The problem of this feature of European management lies in the different ways and manifestations of negotiations in different countries. In some of them, negotiations are more confrontational (France, Italy), in others less (Germany, Austria), because the dominant effort is to reach a consensus. However, despite the existing differences, internal negotiation in the business environment has strong roots at several levels: between management and employees, between trade unions, between the company and external actors (public authorities, local authorities, employers' associations), as well as between headquarters and their branches.

The third typical feature of the European model of HRM is developing in multinational companies. It is corporate diplomacy manifested in a considerable area of autonomy and freedom, which headquarters create for the local management of their branches in other European countries, especially in the implementation of socially responsible activities, the development of motivational communication and employee motivation. Significant elements of corporate diplomacy were also confirmed by our research in the Slovak branches of European multinational companies (Marasová, Vallušová, 2019). It can be seen as an expression of trust in local managers, their judgment and their ability to select and use appropriate human resources management tools and methods in terms of economic, social and cultural conditions in a given country. As we have seen in this research, managers return this trust to parent companies in the form of an equally open and motivating attitude to the creative abilities of their employees.

Another characteristic of European business management is the know-how in managing economic, social and cultural diversity. Many authors (Mešková, Come, 2012; Peretti, 2018, etc.) consider this feature to be essential in HRM on the old continent, because it is a summary of several national cultures and thus managerial styles. Garner-Moyer (2006, p. 25) defines diversity management as a set of employers' measures to attract, retain and develop employees from different social categories. Bender (2007) defines it as a managerial approach aimed at changing attitudes and thinking to eliminate any discriminatory behaviour in companies and build a culture of tolerance in them that allows the inclusion of everyone with its benefits and differences. Managing diversity is also understood as increasing the number of employees of different nationalities, gender and ethnic backgrounds in a company. It is a human resources policy that valorises diversity between individuals. As the European Union is a mosaic of 27 countries, since its inception, its public institutions, businesses, civic associations, and individuals have been confronted with a diversity of mentalities and cultures. This diversity has become a challenge for managers, and especially for human resource managers, to turn it into a source of creativity, new energy, and innovation in their companies to create added value. Experiences in diversity management of European companies is their advantage among other regions of the world, it is an important element of the Europeanization of their management and the harmonisation of national cultures. According to Alix (2015), the management of European companies focuses on harmonizing the manpower of the company to get optimal performance from them. It is a logical intertwining of the economic and social function of the company in a way that the first is in the service of the second and vice versa. In principle, it is dialogue-based management that valorises social policy and the role of man in the development of the company, regardless of its culture or nationality.

3 European Diversity and HRM

Despite the existing characteristics of HRM in European companies, there is no single or clear European model in this respect. Europe is a multicultural region in which it is difficult to identify the common features of its business management. But a survey by Calori, de Woot (1994) and later by Meier (2019) and other authors has shown that Europe can still be divided into several geographical units in terms of management practices. The first stand-alone unit is the United Kingdom, where the Anglo-Saxon model of American companies is practised. Furthermore, according to the authors, it is necessary to distinguish between the north and the south of Europe. The Nordic countries are characterized by weakly hierarchized management in the corporate sphere. In this group of northern European countries, it is possible to distinguish two other subgroups, namely the Scandinavian and Germanic countries. As for the enterprises of the former centrally planned economies, their management has inclined to one or the other subgroup over the last three decades. Businesses in Central and Eastern Europe have previously adopted the Germanic model with a certain mix of Anglo-Saxon features, the business community of the Baltic countries is adapting more of the managerial practices of the Scandinavian model.

Although many authors try to define certain categories of managerial practices or HRM models, whether geographically or otherwise, and although convergence of methods and tools towards the Anglo-Saxon model, which has become essentially dominant in Europe, has been observable for a long time, variability and diversity in HRM persist. It is reflected in several of its components, particularly in the recruitment and remuneration system, which remain dependent on national institutional and legislative frameworks and are naturally restrictive for companies. Hentschet (2002) saw the Europeanization of recruitment as an imperative for the reorientation of this HR activity towards the analysis of the European labour market and as a necessity to adapt the selection process and diversity tools in terms of their origin and the applicable legislation in individual EU countries. From this point of view, Europeanization could mean rather a valorisation of diversity than an effort to unify management methods and tools.

As far as remuneration is concerned, the limiting factor for companies is the regulated nature of wages, not only different levels of the minimum wage but also annual average wages in individual countries, in which there are still very significant differences, especially in terms of purchasing power. Mendez (2006) says that even in multinational companies, wages are set in relation to national standards, without much effort for harmonization. This raises issues of inequality in the growing number of multinational teams that human resource managers face permanently. One of them is professional equality between men and women, which is one of the long-term goals of the European Community (Article 119 of the Treaty of Rome) on the labour market. Europeanisation, from the point of view of achieving this goal, takes the form of a joint effort to achieve this equality throughout the European area. But European law in other areas does not interfere

with the remuneration of companies. The principle of free decision-making on wages and remuneration for its employees by the company's management applies. However, this freedom must, of course, respect the legislative and contractual guarantees of each country.

Another activity of HR management, in which the diversity of practices and methods is manifested, is the already mentioned internal negotiations, especially negotiations with trade unions, as one of the features of European management. Millot, Roulleau (2005) and Barabel, Meier (2014) talk about the existence of three trade union types or models in Europe:

- Rhine - based on the cooperative and partner approach of trade unions in social relations, which is typical of Germany, Austria, the Netherlands or Sweden, countries where there is a high degree of syndication and where the majority trade unions are very uniform;
- British - very weak state participation, decentralized negotiations at a company level, a clear link between trade unions and political forces; this model is used in particular in England, Denmark and Ireland;
- Latin - characterized by diversity and low trade union organization, but the attitude of the unions is militant and confrontational and the role of the state is strong. This type of trade union exists in France, Spain, Portugal and Greece.

The system of social relations in an individual European country affects almost all HRM activities. In addition to remuneration, which is the focus of trade unions, collective bargaining also determines how the careers of employees and managers develop. With the advancing Europeanization, their provision is becoming more complex and challenging due to the diversity of national legislative frameworks and the varying degrees of influence of the social partners and due to the growing mobility of workers in Europe.

HR managers manage an extremely diverse "human material", which is generally given by the uniqueness of each employee, manager and representatives of other stakeholders who affect HRM at various levels. However, in the business environment of the European Union, this diversity is emphasized by the nature of its multicultural context, but also by the already mentioned national legal framework, which must be respected by every European company expanding to another European country, as well as large multinationals. This affects almost all HRM activities, from the search and selection of employees, through the management of their remuneration, their careers and professional development, social benefits and motivation in general, to the dismissal process and the outplacement associated with it. The constant adaptation of the existing instrumental and methodological apparatus of HRM to this European diversity represents such demanding and complex processes that, likely, it will seldom be possible to apply a universalist approach to their provision.

The answer to the diversity of the European business environment and the high degree of uncertainty of its economic and social context in recent years can only be a certain contingency approach in HRM (Mendez, 2006; Peretti, 2020), which consists of applying management practices depending on the specific characteristics of the company and its environment while being coherent with its strategic direction. The Peretti contingency model consists of the following three components:

- logics - personalization, agility, mobility, participation and anticipation
- challenges - economic and social changes, demographic development, globalization, digitization, social responsibility, etc.
- Practices - management of individual HRM activities, including relations with stakeholders.

The model is based on the fact that managers must take into account a complex set of contextual factors, internal and external, currently known and probable to be able to identify new challenges, and then choose the logic to respond to challenges as well as methods and tools for securing individual HRM activities. This contingency model, therefore, presupposes flexible application of existing managerial practices and therefore contains elements of the so-called flexible HRM, which is analysed by several authors (Javed et al., 2017, etc.).

Conclusion

Examining the essence of Europeanization in HRM leads us to several partial conclusions. The first is the fact that Europeanisation is one of the forms of European integration, in which the European institutions, through their recommendations and regulations, influence the labour market and thus the activities of HR managers in companies. Provided that the governments of the Member States apply the recommendations, there is some unification of national labour markets. The second conclusion is that the efforts for this unification are reflected in areas such as ensuring human rights in working life, caring for people - managers and employees and their professional and personal development, as well as socially responsible behaviour of companies, reflecting their commitment to protection and improvement of the environment, solidarity with another person and respect for the differences of people in working life and beyond. Another conclusion can be formulated as the knowledge that the valorisation of European diversity in HRM takes place on two levels: first of all by fundamentally respecting the cultural dimension of individuals and their resulting needs and aspirations, and then adapting appropriate methods and tools to use this multicultural work environment as a source of new energy and creativity, not only for the benefit of the company but also to enrich the professional and personal profile of individuals. It follows that, if it is once possible to talk about a truly European model of HRM, its essential characteristic will most likely be this dimension of diversity and the art of managing it.

Acknowledgement

Financial support from the Research Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic grant no. VEGA 1/0668/20 "Digital inequality and digital exclusion as a challenge for human resources management" is gratefully acknowledged.

References

1. Adler N. J. (2009). International Dimensions of Organizational Behavior.
2. Alix, X. (2015). Les différentes méthodes de management: européenne, américaine et asiatique. Available at: https://www.cmgconseil.com/les-differentes-methodes-de-management-europeenne-americaine-et-asiatique /.
3. Bauby, P. (2011). Chapitre 1. Les grandes étapes du processus d'européanisation. In P. Bauby, *L'européanisation des services publics*. Paris: Presses de Sciences Po, 31-74.
4. Barabel, M., Meier, O. (2014). *Gestion internationale des ressources humaines.* Paris: Dunod.
5. Calori, R., de Woot, P. (1994). A European Management Model: Beyond diversity. London and New York: Prentice Hall.
6. Come, T., Mešková, Ľ. (2012). *Management de la diversité culturelle : Quels enjeux pour l'Europe ?* Bruxelles: Bruylant.
7. Hentschet, D. (2002). La gestion des ressources humaines face à l'Europe sociale. In Zielinski, B. Kauffmann, M. *France – Allemagne; les défis de l'euro.* Paris: PSN, 137-148.
8. Dubrion, B. (2010). Gestion des ressources humaines et responsabilité sociale des entreprises : éclairer des évolutions nouvelles à la lumière de questionnements anciens. *Management & Avenir*, 9(9), 31-51.
9. Favell, A. (2000) L'européanisation ou l'émergence d'un nouveau «champ politique » : le cas de la politique d'immigration. In *Cultures & Conflits* [online], 38-39 | été-automne 2000, mis en ligne le 20 mars 2006, consulté le 10 décembre 2020. Available at URL : http:// journals. openedition.org/conflits/274.
10. Garner-Moyer, H. (2006). Gestion de la diversité et enjeux de GRH. *Management & Avenir*, 1(1), 23-42. Available at https://doi.org/10.3917/mav.007.0023.
11. Green-Cowles, M. et al. (2001). *Transforming Europe. Europeanization and Domestic Change*. Ithaca, Cornell University Press.
12. Gouiran, M. (2011). *Responsabilité sociétale & ressources humaines.* La Plaine Saint-Denis: AFNOR Editions.
13. Hoeffler, C., Faure, S. (2015). L'européanisation sans l'Union européenne : Penser le changement des politiques militaires. In *Politique européenne*, 2(2), 8-27.

14. Javed, A. et al. (2017). Flexible Human Resource Management and Firm Innovativeness: The Mediating Role of Innovative Work Behavior. In *Journal of Human Resource Management,* vol. XX, 2017/1, 31-41.
15. Laperche, B. (2006). Système de gestion et potentiel d'européanisation des PME. *Marché et organisations*, 2(2), 108-125. Available at https://doi.org/10.3917/maorg.002.0108.
16. Lacová, Ž., Šuplata, M. (2019). *Perspectives of financial integration: V4 countries approach.* In: Miscellanea Oeconomicae, vol. 23, 2019/1, p. 79-91
17. Marasová, J., Vallušová, A. et al. (2019) CSR practices: the case of Veolia in three European countries In *Responsible organizations in the global context: current challenges and forward-thinking perspectives,* Washington DC. - Cham: Palgrave Macmillan, Springer Nature, 2019, 175-197.
18. Meier, O. (2019). *Management interculturel*. 7. vydanie. Paris: Dunod.
19. Mendez, A. (2006). GRH, mutations économiques et innovations technologiques. Vers une globalisation de la gestion des ressources humaines ? In *Cahiers français,* n° 333, 38-43.
20. Millot, T., Roulleau, J.-P. (2005). *Les relations sociales en Europe.* Rueil-Malmaison: Liaisons Sociales.
21. Nyhan, B. (2002). Le développement desressources humainesen Europe à la croisée des chemins. In *Revue européenne.* n° 26, 2002/II, 27-40.
22. Peretti, J.-M. (2020). *La gestion des ressources humaines.* Paris: Vuibert
23. Radaelli, C. (2003), The Europeanization of Public Policy. In K. Featherstone and C. Radaelli (eds), *The Politics of Europeanization*, Oxford: Oxford University Press, 27-56.
24. Ramboarisata, L. et al. (2008). Gestion responsable des ressources humaines : évaluation théorique et analyse du discours des banques canadiennes sur leur pratique. *Revue internationale de psychosociologie*, 33(33), 225-258.
25. Uramová, M., Šidová, I. (2013). *Komparatívna analýza možností implementácie flexiistoty v Slovenskej republike a v Holandsku. In Nová ekonomika,* n°2, p.147-155

About the authors

Jana Marasová
Faculty of Economics, Matej Bel University, Tajovského 10, 975 90 Banská Bystrica, Slovakia
tel. 00421 48 4462617, e-mail: jana.marasova@umb.sk

Anna Vallušová
Faculty of Economics, Matej Bel University, Tajovského 10, 975 90 Banská Bystrica, Slovakia
tel. 00421 48 4462616, e-mail: anna.vallusova@umb.sk

GENDER INCLUSION IN SLOVAK SMEs

RODOVÁ INKLÚZIA V SLOVENSKÝCH MSP

Michal PRUŽINSKÝ

Abstract
The female population represents more than half of the population in European Union, as well as in Slovakia. Nevertheless, men are dominant in doing business. There is also a below-average representation of women among entrepreneurs in Slovakia. Women's low entrepreneurial activity is also related to low self-esteem in entrepreneurial skills, insufficient perception of suitable business opportunities and a stronger fear of failure. (Slovak Business Agency, 2020). Adequate attention needs to be paid to the social inclusion of disadvantaged groups in business, such as women, young people, and the elderly. It is a matter of creating and developing existing support tools for these groups of entrepreneurs at national as well as European level by key stakeholders. This can support economic growth and employment.
The aim of the paper is to provide information about the gender structure of entrepreneurs. Based on the analysis of the data to propose measures in terms of regional and sectoral affiliation of entrepreneurs and a comparison of the gender structure of entrepreneurs in Slovakia with selected EU countries.

Keywords: Entrepreneurial skills. Women – individual entrepreneurs. Economic growth. Employment. Gender structure. Social inclusion.

Abstrakt
Ženská populácia predstavuje viac ako polovicu populácie v Európskej únii, ako aj na Slovensku. Napriek tomu sú muži v podnikaní dominantní. Aj medzi podnikateľmi je na Slovensku podpriemerné zastúpenie žien. Nízka podnikateľská aktivita žien súvisí aj s nízkym sebavedomím v podnikateľských zručnostiach, nedostatočným vnímaním vhodných obchodných príležitostí a silnejším strachom zo zlyhania. (Slovak Business Agency, 2020).
Je potrebné venovať primeranú pozornosť sociálnemu začleneniu znevýhodnených skupín do podnikania, ako sú ženy, mladí ľudia a starší ľudia. Ide o vytvorenie a rozvoj existujúcich nástrojov podpory pre tieto skupiny podnikateľov na národnej, ako aj európskej úrovni kľúčovými zainteresovanými stranami. To môže podporiť hospodársky rast a zamestnanosť.
Cieľom príspevku je poskytnúť informácie o rodovej štruktúre podnikateľov. Na základe analýzy údajov navrhnúť opatrenia z hľadiska regionálnej a sektorovej príslušnosti podnikateľov a porovnania rodovej štruktúry podnikateľov na Slovensku s vybranými krajinami EÚ.

Kľúčové slová: podnikateľské zručnosti, hospodársky rast, zamestnanosť, rodová štruktúra, sociálne začlenenie

Introduction

It is a matter of creating and developing existing support tools for women and elderly people groups of entrepreneurs at national as well as European level by key stakeholders. This can support economic growth and employment. Regular monitoring of gender and age aspects of business helps to assess the degree of fulfilment of individual priorities and goals of these tools. (European Union,

2021a). High levels of working capital and supplier diversification were found to be key to SMEs' ability to thrive before and during the pandemic. However, while SMEs that were growing prior to the pandemic depended on a few major customers, firms flourishing during this time have divided their sales among many clients. (Marconatto et al., 2021)

The coronavirus pandemic negatively affected the performance of the Slovak economy. The downturn in Slovakia's economy and employment is among the highest in the country. As a result of the forced reduction in business activity and the decline in consumer demand from customers, many employers have also been exposed to cost-cutting pressures, including redundancies. The situation on the labour market has been gradually deteriorating since the beginning of 2020, with a year-on-year decline in employment in almost the whole spectrum of sectors in April and May. At the end of second wave of epidemic unemployment raised and in March 2021was higher than 235,000 then in spring decreased as we may see on Figure 1.

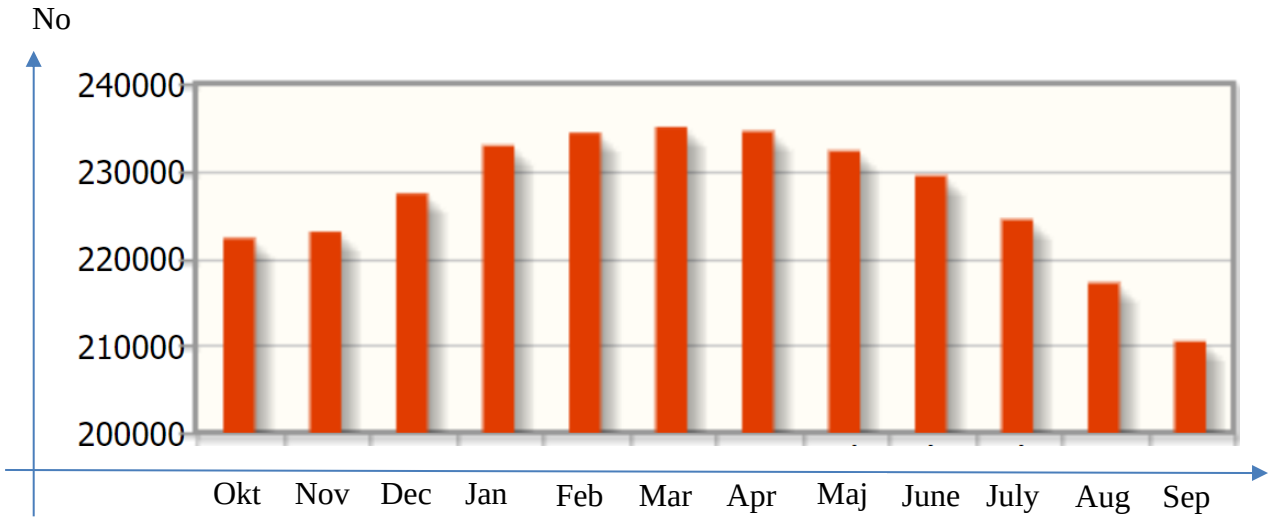


Figure 1 Number of unemployed people of selected months 2020/2021 in Slovakia

Source: Dlžník.sk Nezamestnanosť - Slovenská republika stav k 30.9.2021. 2021.

The labour market revived in May 2021 again, with labour, social affairs and family offices offered more than 70,000 job vacancies, the highest since the beginning of the year. 13,354 unemployed people found work. The registered unemployment rate thus reached 7.92% in May. Compared to the previous month, this is a decrease of 0.08 p. b.

After April, the month of May also brought positive changes in the labour market. A total of 13,354 job seekers found their employment, which is only 282 persons less than in 2019, when no pandemic measures were applied in Slovakia. Compared to the same period 2019, this is an increase of 3,689 persons (9,665 persons in May 2020. The registered unemployment rate reached 7.92%. This means a month-on-month decrease of 0.08 p. b. (8.00% in April 2021). The

number of jobseekers who are ready to start work immediately is 217,162 (a slight decrease compared to April (by 0.97%).

The unemployment rate calculated from the total number of jobseekers decreased month-on-month and was 8.47% in May 2021. Labour offices registered a total of 232,229 unemployed people. A total of 16,435 job seekers were excluded from the register.

The positive development is also confirmed by the growth of job vacancies, of which there are the most since the beginning of this year. Their number reached the level of 71,096 places. This is 4,411 more jobs than in April 2021. The Bratislava Region registers the most vacancies, 21,152 jobs (29.75% share), and the Košice Region has the least job opportunities, 3,463 (4.87% share). The month of May also offered the most jobs for graduates since the beginning of the year, a total of 32,414. Employers are mainly looking for operators and fitters of machinery and equipment, qualified workers, and craftsmen.

The number of reported mass redundancies also decreased. Compared to the period from January to May 2020, this year it is less by 34 in the case of the number of jobs at risk, this is a decrease of 3,462 people. But there is also very bad news for economy and entrepreneurs. The 3rd wave of epidemic Sars-2-Cov-19 brings thousands of daily positively tested people of this disease and total country capacity of 300 artificial lung ventilations is almost occupied by the serious sick people. Due to the fact the anti-vaccine campaign is strong and there are thousands of hoaxes on daily routine, Slovakia doesn't reach even 50% of vaccinated people over 55 years of age. The doctors and medical staff mainly treat patients infected with Sars-2-Cov-19 because of such dangerous propaganda. Society adopted the term "Epidemic of non-vaccinated people" because of up to 95% of casualties comes from these people. Slovakia is according to Covid-automat divided to 6 levels of coloured region. The worst black regions are ruling within 3rd degree of threat. They must apply the most rigorous measures. People are covering the upper respiratory tract with a respirator, drape, scarf, or shawl. It is mandatory indoors, including public transport and taxis. It is also mandatory at mass events, even outdoors. Mass events with participation of up to 100 vaccinated persons. Restaurants and public catering facilities are closed. There is an exemption for restaurants who may re-dispense food through the window or delivery it in packet to the consumers. Business owners fear the worst. They say that if this sale lasts a long time, they will not survive the third wave. Most of the companies switched to window sales. They set the service tables in the door. People could buy coffee or lunch, but it had to be hygienically packed. This situation will bring a lot of economic damage in the coming period

1 Literature review

The COVID-19 epidemic has fundamentally affected routine functioning in various areas of society. Following the restrictive measures, the governments of the individual countries adopted measures to support the economy, which were

mainly aimed at mitigating the negative consequences caused by the emergency. At the end of March 2020, the Government of the Slovak Republic approved several measures aimed at mitigating the economic impacts of the COVID-19 pandemic. The government has approved new types of social benefits in the form of pandemic sickness and nursing. Later, it also approved direct aid measures to maintain jobs within the so-called "First aid" for employees, entrepreneurs and the self-employed.

According to the data of the Ministry of Labour, Social Affairs and Family of the Slovak Republic, the drawing of funds within the measures to mitigate the effects of the COVID-19 pandemic as of 29 June 2020 reached the level of 352.9 mil. EURO. Entrepreneurs had the opportunity to draw aid for the first time in March 2020. In the first month, the drawdown of aid amounted to 81.9 mil. EURO, which was significantly behind the expected drawdown of aid. A more significant drawdown of aid occurred in April, when the number of contributions paid for entrepreneurs paid amounted to 169.4 mil. EURO. According to preliminary data, the drawdown of funds for the month of May amounted to 101.6 mil. EURO. In total, the share of small and medium-sized enterprises (0-249) in the total drawn aid reached more than half (56.7%). (Mzdové účtovníctvo a personalistika. 2021)

Graafland (2020) summarizes, that in scientific literature on the relationship between gender diversity in management and sustainability of large companies has reflected mixed results. As women's presence in management is higher in small businesses than in large companies a focus on small business might help to better identify the effect of gender on environmental responsibility. Since Rubio-Andrés at al. (2019) found that the increase in the SME's sustainability rises regressively with the share of women in management and that sustainable performance is optimal when the share of women equals 54% (which is more than twice the current share), the company should seek to create a balanced management team that mixes male and female managers. As our study does not support critical mass theory for small business, legal requirements that set minima quota for the share of women in executive management levels in small business seem to be too restrictive, as they reduce the SME's freedom to employ the managers that best fit their needs in the context in which they are operating. If the results would have confirmed critical mass theory, setting minimum gender quotes at the critical mass level would have been advisable.

Anderson et all. (2019) presented a theory of how a rational, profit-maximizing firm would respond to pressure for gender pay equity by strategically distributing raises to reduce the pay gap between its female and male employees at minimum cost. Using formal analysis and pay data from a real employer, they showed that employees in low-paying jobs and whose pay-related observables are similar to those of men at the firm are most likely to get raises; counterintuitively, some men may get raises, and giving raises to certain women would increase the

pay gap; and a firm can reduce the gender pay gap as measured by a much larger percentage than the overall increase in pay to women at the firm.

2 Women entrepreneurs of SMEs

From 2010 to 2019, the share of women in the total number of individual entrepreneurs in Slovakia ranged from 27% to 29%. Due to the general trend of a decrease in the number of individual entrepreneurs in Slovakia after 2008, there is also a decrease in women entrepreneurs. Over the past decade, the number of women individual entrepreneurs has decreased by 13%, while the total number of FO entrepreneurs has decreased by 15%.

Women maintain their predominant representation within the individual legal forms only among persons doing business in the form of the liberal professions. Their share has been oscillating around 54% for a long time. In other years, women made up more than a quarter (approximately 27%) of self-employed people. Least women are represented among individual entrepreneurs doing business as self - employed farmers. Their share decreases over time. (Slovak Business Agency, 2021)

Controlling firm and owner attributes, majority women-owned businesses were underrepresented as SME suppliers to government in some, but not all sectors. Women-owned SMEs in Wholesale and Retail and in Other Services were, ceteris paribus, half as likely as to be government suppliers as counterpart SMEs owned by men. Among Goods Producers and for Professional, Scientific and Technical Services SMEs, there were no significant gender differences in the propensity to supply the federal government. “Complexity of the contracting process” and “difficulty finding contract opportunities” were the obstacles to contracting cited most frequently. (Orser et al., 2021) From a sectoral point of view, women succeed in promoting themselves, especially in the service sectors, which are characterized by low capital intensity. The highest representation is achieved by women, self - employed, in Slovakia in the sector of other services (section SK NACE P to S), while the given sectors are the only ones characterized by a long-term increase in the representation of women. In 2019, there were women in the industry two-thirds of the total number of self-employed. Significant differences can be observed in the sectoral structure of self-employed persons by sex.

2.1 Diversity of women individual entrepreneurship through the country

While among self-employed persons, industries such as business services (33%), trade (27%) and other services (20%), in the case of a sectoral structure of self-employed men, construction is one of the most important sectors (34%), industry (20%) and trade (16%). Women in self-employment achieve higher representation as men in areas such as ancillary activities in insurance and pensions (64%) and in outpatient and dental activities (61%).

From a regional point of view, women's entrepreneurial activity reaches the highest level in the Bratislava region. In 2019, women accounted for more than a third of the total number of natural persons entrepreneurs only in the Bratislava region (37%). Almost a third of the women were the individual entrepreneurs from the Košice region (32%). Higher representation of women in the Bratislava and Košice regions it is also related to the sectoral structure in the given regions, which is characterized by above-average significance the service sector, where women primarily develop their business activities. In the long run the representation of women increases primarily in the Bratislava region and in the regions of western Slovakia. On the contrary this trend occurs mainly in the Prešov region.

The highest number of individual entrepreneurs – men per 1,000 economically active men was in 2019 in the Žilina Region (222), Prešov Region (194) and in the Nitra Region (177). In the case of women, it seemed most individual entrepreneurs (103) per 1000 economically active women in the Bratislava region. The highest the disproportion between the entrepreneurship of men and women according to the recalculation to the number of EAOs in individual regions of the Slovak Republic is recorded in the Prešov Region (2.9 times more entrepreneurial men than women to the number of Economically Active Persons (EAPs) and in the Žilina Region (2.6 times more businessmen than women per EAPs). According to Eurostat data, Slovakia has long been below the EU average in terms of women's representation in the total number of entrepreneurs. Women entrepreneurs currently make up one third (33% in 2019) of the total in the EU and their activity is gradually increasing. The low entrepreneurial activity of women in Slovakia results from the low self-confidence of entrepreneur's skills, or insufficient perception of suitable business opportunities, but also more significant one's fear of failure. Women are often constrained in business by both institutional and market failures. For these reasons, it is necessary to develop existing and create new support instruments designed to support women's entrepreneurship at national and regional level, with an emphasis on less developed regions of Slovakia. Small and medium enterprises (SMEs) need to create shared value to compete in a global environment. Reputation is the result of the good work carried out by SMEs regarding their main stakeholders, given their condition as a small - or medium-sized enterprise. Rather than drawing on conventional financial performance, we propose an innovative sustainability model using shared value creation as the main endogenous variable. (Rubio-Andrés at al., 2019) Barbara Orser at al. (2021) refers that their findings indicate that among SMEs, the propensity to supply government differs significantly by industry sector, firm size, gender of business ownership and other firm and business owner characteristics. Majority women-owned SME suppliers were relatively more likely to cite resource-demanding obstacles, including difficulty in finding contract opportunities, as barriers. Informed by the literature and findings, recommendations to improve procurement programs (PP) benchmarking

are advanced, including development of indicators and assessment criteria which gauge the impact of procurement programs.

3 Research methodology

We started our work by gathering the data about people employment and unemployment mainly in 2 last years. The reason for that was Sars-2-Cov-19 Disease that caused epidemic. The government took serious measures (both unpopular and very strict) to prevent the health and lives of people. Reducing the movement of inhabitants and lock down of majority of businesses touched down efficiency of whole economy. Some of the short-term impacts and medium-to-long-term impacts seem correlated. For example, lower sales and an increase in expired products certainly reduce the ROI. Future research should consider these interrelationships, which may provide important directions when it comes to formulating robust action plans. (Chowdhury, 2020) The situation is changing with 3rd wave of Delta variant of Sars-2-Cov-19 because government doesn't take measures like during 1st and 2nd wave of epidemic, even the number of infected people is high. This is possible thanks to vaccination and people's way of adopting style in living and dealing with this horrible disease.

We collect data and study governmental steps and evaluate significance of measures that helped to preserve employment state and running the businesses mainly in field of shopping and services. Then we compared the data and formulated positive and negative facts on women individual entrepreneurs and formulated some recommendations.

4 Findings

By the end of August 2021, almost € 2.5 billion of the total reserve created to address the negative effects of the Sars-2-Cov-19 pandemic had been released. The initial reserve of more than € 1 billion was increased to € 3,840,438,168 in 2021. The largest item in the management of budgetary reserves in 2021 in connection with the pandemic is the financing of a project to support the maintenance of employment in times of declared emergency, state of emergency or emergency and the elimination of their consequences in the total amount of € 1.24 billion. In total, € 1.33 billion was set aside for the Ministry of Labour, Social Affairs and Family of the Slovak Republic from the reserve, which is the highest among all ministries. The Ministry of Health of the Slovak Republic, as the second in terms of the amount of available funds, had almost € 476 million available for comparison. (Slovenská tlačová agentúra, 2021)

In the coming months, the unemployment rate in Slovakia should fall slightly. According to Horňák (2021), the decisive factor for the further development of the unemployment rate is the coming third wave of Sars-2-Cov-19 epidemic, which may again wave the service sectors and bring new unemployed to the labour market. Further development will depend on how much it strikes Slovakia, how further measures will be taken and what level of vaccination we will achieve

before its complete outbreak. Situation is very bad. gets wrong Up to now less than half of Slovak population authorised for vaccination got their shots.

The problem with chips also plays a role because Slovak automotive industry is very sensitive to their lack. It should, based on previous experience, increase the unemployment rate only in tenths of a percentage point, with a gradual decline after its announcement. The problem with chips can bring redundancies in the industry, if this shortcoming were more permanent, what also plays a role.

Unemployment in Slovakia fell again, and thousands of people found a new job. However, according to the available information, there is not strong believe it continues. On average, according to our estimates, the registered unemployment rates this year should reach 7.8 percent. The registered unemployment rate in Slovakia in June fell by 0.16 percentage point month-on-month to 7.76 percent. This follows from data published by the Offices for Labour, Social Affairs and Family of the Slovak Republic. At the end of June, labour offices registered 212,635 available jobseekers. Compared to May this year, this is a decrease of 4,527 people.

The unemployment rate calculated from the total number of jobseekers in June this year was 8.37 percent. Compared to May this year, it fell by 0.10 percentage points. In June, labour offices registered a total of 229,394 unemployed people, which is 2,835 fewer than in May this year. According to the Labour Office, almost 15,000 unemployed found a job during the last month, which was 1,622 more than in May. Compared to June 2019, when Slovakia did not feel the effects of the pandemic, it is even an increase of 2,003 people. In June, labour offices removed 19,962 jobseekers. Vacancies are also being added. Labour offices offered more than 73,000 of them last month. This is a clear signal that the labour market is recovering for the third month in a row.

In such changeable environment raising the profile of women in business is needed throughout society. In addition to the already mentioned proposed initiatives by stakeholders, the Entrepreneur of Slovakia competition, which was founded in 1999, is also of significant importance. It is a competition of all entrepreneurial women, whose examples inspire future entrepreneurs. Entrepreneurship forms the basis of any healthy economy and therefore the Slovak Business Agency (SBA) as the organizer of the competition is looking for women who are doing business or starting a business and look at profit as something that has, among other things, benefits for society. Therefore, the aim of the competition is to highlight and appreciate the business success of beginning and established entrepreneurs in the market. (Veselská & Holák, 2020).

In the coming months, the unemployment rate in Slovakia should fall slightly. According to Horňák (2021), the decisive factor for the further development of the unemployment rate is the coming third wave of Sars-2-Cov-19 epidemic, which may again wave the service sectors and bring new unemployed to the labour market. Further development will depend on how much it strikes Slovakia,

how further measures will be taken and what level of vaccination we will achieve before its complete outbreak. Up to now less than half of Slovak population authorised for vaccination got their shots.

The problem with chips also plays a role because Slovak automotive industry is very sensitive to their lack. It should, based on previous experience, increase the unemployment rate only in tenths of a percentage point, with a gradual decline after its announcement. The problem with chips can bring redundancies in the industry, if this shortcoming were more permanent, what also plays a role.

Unemployment in Slovakia fell again, and thousands of people found a new job. However, according to the available information, there is not strong believe it continues. On average, according to our estimates, the registered unemployment rates this year should reach 7.8 percent.

The registered unemployment rate in Slovakia in June fell by 0.16 percentage point month-on-month to 7.76 percent. This follows from data published by the Offices for Labour, Social Affairs and Family of the Slovak Republic. At the end of June, labour offices registered 212,635 available jobseekers. Compared to May this year, this is a decrease of 4,527 people.

The unemployment rate calculated from the total number of jobseekers in June this year was 8.37 percent. Compared to May this year, it fell by 0.10 percentage points. In June, labour offices registered a total of 229,394 unemployed people, which is 2,835 fewer than in May this year. According to the Labour Office, almost 15,000 unemployed found a job during the last month, which was 1,622 more than in May. "Compared to June 2019, when Slovakia did not feel the effects of the pandemic, it is even an increase of 2,003 people," the labour headquarters pointed out. In June, labour offices removed 19,962 jobseekers. Vacancies are also being added. Labour offices offered more than 73,000 of them last month. "This is a clear signal that the labour market is recovering for the third month in a row.

Fabian Hilgartová (2021) examines Gender Inclusion and Diversity in Firms. She researches and map the situation of gender equality in the environment of Slovak and Czech companies. From her point of view the topic of inclusion and diversity is becoming more and more frequent in the business environment. Under diversity, we can, in simple terms, imagine teams of colleagues who are differentiated – men, women, different ages, nationalities or different family backgrounds are represented among them. This differentiation offers a wider range of perspectives on one problem or business task and helps to achieve a more efficient and better result. Inclusion is the concept of bringing diversified colleagues together, providing everyone with a suitable work environment and creating the conditions for joint overall performance. Diversity within the company increases performance and profitability. Mixed teams, not only based on gender, but also ethnicity or culture of origin, are better able to reach a wide range of customers with their outputs. Their view of the solved problem or product

includes just the necessary mixture of opinions and attitudes so that the result is adapted to all target groups.

Conclusion

Gender equality should be seen as part of all policies, and not just part of the social, family or employment policy. The gender perspective should be considered not only in the specific equal opportunities legislation, but in all relevant laws and policies strategies, in particular social policy reforms. It is possible to amend the legislation to support gender equality within the Slovak legal order different ways and 'intensities'. In practice, their adoption always depends on "political will", which has hitherto been lacking in the field of gender equality. That is why we are translating various proposals for measures, which can be interconnected and modified according to political reality, not to have a negative impact about women and thus de facto exacerbate gender inequality. (Pietruchová & Magurová, 2011).

We know from experience in other countries as well as in Slovakia that such an approach can be abused - and sometimes very effectively abused - to undermine positive actions and promote the interests of the so-called male interest groups. Of course, such interests are also relevant and should be promoted, but it is important to ensure that they do not have a negative impact about women and thus de facto exacerbate gender inequality. Article 12 of the Constitution of the Slovak Republic guarantees equality regardless of "gender, race, color, language, religion and religion, political or other opinion, national or social origin, nationality or ethnic group, property, gender or other status "and states that "none of these reasons, harm, favor or disadvantage. "These formal equal rights" are however, often in conflicts with the facts. The declarative nature of the provision does not automatically mean that there are also mechanisms to ensure opportunities for women to participate at all levels and in all areas of decision-making. Conversely, unless the constitution clearly defines the obligation to actively promote gender (and other) equality, the formal enshrinement of the equal treatment clause ("no one may be favored or disadvantaged for these reasons") may serve as a ground for refusing compensatory measures to oppose gender equality / affirmative action, which is incorrectly presented as "positive discrimination".

Effective promotion of gender equality and redress of existing disadvantages is necessary to amend the provisions of Art. 12 par. 2 of the Constitution and to commit the state and public administration to active promoting gender equality and eliminating discrimination.

Acknowledgement

The paper conducts research in area of Economic correlations of the share of women in management positions at specific companies in the Slovak Republic and was supported by the sources of the frame of VEGA project No: VEGA č. 1/0363/20.

References

1. ANDERSON, D. BJARNADOTTIR, MV., DERSO, CL., ROSS, DG. 2019. On a Firm's Optimal Response to Pressure for Gender Pay Equity. By View Web of Science ORGANIZATION SCIENCE, Volume 30, Issue 1, Page214-231, DOI 10.1287/orsc.2018.1248. ISSN1047-7039
2. CHOWDHURY Md, T., SARKAR. A., SANJOY KUMAR, P., MOKTADIR Md, A. 2020. A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. In: *Operations Management Research*. Early Access: SEP 2020. 13 pp. Available online at: https://doi.org/10.1007/s12063-020-00166-9.
3. DLŽNÍK.SK. 2021. Nezamestnanosť – Slovenská republika stav k 30. 9. 2021. Published on Wednesday, November 17, 2021. Retrieved from: https://dlznik.zoznam.sk/nezamestnanost/slovenska-republika.
4. EUROPEAN UNION. 2021a. Európska únia - Európsky fond regionálneho rozvoja, Operačný program Integrovaná infraštruktúra 2014 – 2020, Ministerstvo dopravy a výstavby SR, Ministerstvo hospodárstva SR. 2021. Ženy podnikateľky sú najaktívnejšie v okresoch na západe a severe Slovenska. [Cit. 2021-10-10] Bratislava, 23. februára 2021. In: Monitoring podnikateľského prostredia. Retrieved from: http://monitoringmsp.sk/2021/02/23/zeny-podnikatelky-su-najaktivnejsie-v-okresoch-na-zapade-a-severe-slovenska/
5. FABIAN HILGARTOVÁ, E. 2021. Ako vyzerá inklúzia v slovenských firmách? In INDEXMAG 4. marca 2021 [Cit 2021-11-11]. Available at: https://indexmag.sk/2021/03/04/ako-vyzera-inkluzia-v-slovenskych-firmach/
6. GRAAFLAND, J. 2020. Women in management and sustainable development of SMEs: Do relational environmental management instruments matter? [Cit. 2021-10-08] In: Corporate Social Responsibility and Environmental Management, Volume 27, Issue 5, Page 2320-2328, DOI10.1002/csr.1966. ISSN1535-3958, eISSN1535-3966. Current Publisher WILEY111 RIVER ST, HOBOKEN 07030-5774, NJ. Retrieved from: https://onlinelibrary.wiley.com/doi/10.1002/csr.1966

7. HORŇÁK, M. 2021. Analytik predpovedá Slovensku klesanie nezamestnanosti, situáciu môže skomplikovať tretia vlna koronavírusu. [Cit. 2021-10-10]. Slovenská tlačová agentúra. WEBNOVINY. Retrieved from: https://www.webnoviny.sk/analytik-predpoveda-slovensku-mierne-klesanie-nezamestnanosti-situaciu-moze-skomplikovat-tretia-vlna-koronavirusu/
8. MARCONATTO, D.A.B., TEIXEIRA, E.G., PEIXOTO, G.A. & FACCIN, K. (2021), "Weathering the storm: what successful SMEs are doing to beat the pandemic", [Cit. 2021-10-10]. In: Management Decision, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/MD-11-2020-1507, ISSN0025-1747, eISSN1758-6070, Current Publisher: Emerald Group Publishing Ltd, Howard House, Wagon Lane, Bingley Bd16 1wa, W Yorkshire. Early Access JUL 2021. Retrieved from: https://www.emerald.com/insight/content/doi/10.1108/MD-11-2020-1507/full/html
9. MZDOVÉ ÚČTOVNÍCTVO A PERSONALISTIKA. 2021. Nezamestnanosť v máji poklesla, prácu si našlo najviac nezamestnaných v tomto roku. [Cit. 2021-10-10] Bratislava, 21.6.2021. [in Slovak]. Retrieved from:
10. https://www.mup.sk/33/nezamestnanost-v-maji-poklesla-pracu-si-naslo-najviac-nezamestnanych-v-tomto-roku-uniqueiduchxzASYZNYgghOvcPhx_IQaSHac3xA51UWBS0tlgLw/
11. ORSER, B., LIAO, X.(D)., RIDING, A.L., DUONG, Q. AND CATIMEL, J. (2021), "Gender-responsive public procurement: strategies to support women-owned enterprises". [Cit. 2021-10-10], Journal of Public Procurement, Vol. ahead-of-print No. ahead-of-print. ISSN: 1535-0118. Open Access. Article publication date: 16 August 2021. DOI: https://doi.org/10.1108/JOPP-11-2019-0078 Retrieved from: https://www.emerald.com/insight/content/doi/10.1108/JOPP-11-2019-0078/full/html
12. RUBIO-ANDRES, M., RAMOS-GONZALEZ, M.D. M., SASTRE-CASTILLO, M. Á., & DANVILA-DEL-VALLE, I. (2019). Exploring sustainability, good governance, and social responsibility in small and medium enterprises. [Cit. 2021-10-10]. In: Corporate Social Responsibility and Environmental Management, 27 (2), pp. 852– 869. Retrieved from: https://doi.org/10.1002/csr.1849 , Online ISSN:1535-3966.
13. SLOVAK BUSINESS AGENCY. 2020. Analýza rodovo-vekového zloženie FO podnikateľov. [Cit. 2021-10-10] Bratislava, 2020. Retrieved from: http://monitoringmsp.sk/wp-content/uploads/2021/01/Rodove-a-vekove-zlozenie-FO_2019.pdf

14. SLOVAK BUSINESS AGENCY. 2021. Atlas of SMEs in Slovakia. Mapping the development of SMEs in Slovakia. [Cit. 2021-10-10]. Slovak Business Agency, Bratislava, 2021. Retrieved from: http://monitoringmsp.sk/wp-content/uploads/2021/01/Atlas-MSP.pdf
15. SLOVENSKÁ TLAČOVÁ AGENTÚRA. 2021. Z rezervy na riešenie pandémie štát minul dve tretiny, najviac zhltlo udržanie zamestnanosti. [Cit. 2021-10-10]. Slovenská tlačová agentúra. WEBNOVINY. Retrieved from: https://www.webnoviny.sk/z-rezervy-na-riesenie-pandemie-stat-minul-dve-tretiny-najviac-zhltlo-udrzanie-zamestnanosti/
16. VESELSKÁ, L., HOLÁK, M. 2020. About the competition of Entrepreneur of Slovakia 2020. [Cit. 2021-10-10]. Slovak Business Agency 2020. Retrieved from: https://podnikatelkaslovenska.sk/o-sutazi/
17. PIETRUCHOVÁ, O. & MAGUROVÁ, Z. 2011. Metodická štúdia sledovania legislatívnych úprav rodovej rovnosti vo vybraných krajinách EÚ a aplikácia v právnom poriadku SR. [Cit. 2021-11-11]. Available at: https://www.gender.gov.sk/wp-content/uploads/2012/06/studia_final_august2011.pdf

About the author

Michal Pružinský
University of Economics in Bratislava
Faculty of Business Economy with seat in Košice
Tajovského 13, 04130 Košice, Slovak Republic
Phone: +421 55 722 3231
e-mail: michal.pruzinsky@euba.sk

Michal Pružinský is lecturing for more than 40 years at the different universities in Slovakia and abroad. He participated on dozens of international scientific conferences and is known within academics in several European universities and in some overseas universities. He chairs the Department of Economics and deals with economics, marketing, logistics and operational research issues.

COMPARISON OF DIGITAL TOKENS VOLATILITY AT DECENTRALIZED EXCHANGES AND CENTRALIZED CRYPTOCURRENCY EXCHANGES DURING COVID-19: USING GENERALIZED AUTOREGRESIVE CONDITIONAL HETEROSKEDASTICITY (GARCH)

POROVNANIE VOLATILITY DIGITÁLNYCH TOKENOV NA DECENTRALIZOVANÝCH BURZÁCH S CENTRALIZOVANÝMI BURZAMI KRYPTOMIEN POČAS OBDOBIA PANDÉMIE COVID-19: VYUŽITIE VŠEOBECNEJ AUTOREGRESNEJ PODMIENEJ HETEROSKEDASTICITY (GARCH)

Jakub SIEBER

Abstract
The aim of the paper is to evaluate the accuracy of volatility prediction using the general autoregressive conditional heteroskedasticity (GARCH) model during COVID-19 pandemic. In the paper, the GARCH model is applied to selected digital tokens - Terra and Binance Coin, which are traded in the highest volume of digital tokens due to their markets - decentralized and centralized. The application of the GARCH model is performed on a sample of 732 observations covering the time interval from 15 October 2019 to 15 October 2021. Due to the COVID-19 pandemic and sharp fluctuations in financial markets, the conventional S&P 500 index is analyzed in the same way. on the differences between the volatility prediction between decentralized financing (DeFi) tokens and exchange-traded tokens.

Keywords: decentralized financing, digital token, cryptocurrency, GARCH, volatility

Abstrakt
Cieľom príspevku je zhodnotiť presnosť predikcie volatility s využitím modelu zovšeobecnenej autoregresnej podmienenej heteroskedasticity (GARCH) počas pandémie COVID-19. V príspevku je model GARCH aplikovaný na vybrané digitálne tokeny – Terra a Binance Coin, ktoré sú v rámci digitálnych tokenov obchodované v najvyššom objeme vzhľadom k svojim trhom – decentralizovaným a centralizovaným. Aplikácia modelu GARCH je vykonaná na vzorke 732 pozorovaní, ktoré pokrývajú časový interval od 15. októbra 2019 do 15. októbra 2021. V dôsledku pandémie COVID-19 a prudkých výkyvov na finančných trhoch je rovnakým spôsobom analyzovaný aj konvenčný index S&P 500. Výsledky príspevku poukazujú na odlišnosti medzi predikciou volatility medzi tokenmi decentralizovaného financovania (DeFi) a tokenmi obchodovanými na burzách.

Kľúčové slová: decentralizované financovanie, digitálny token, kryptomeny, GARCH, volatilita

Introduction

Global pandemic of COVID-19 brought a new paradigm into world order. Businesses had to get creative in the various ways of approaching their activities such as sales strategies, financing, management, marketing, etc. Innovations

became a crucial tool for competitiveness. Financial innovations derived from cryptocurrencies has started to play a major role in such activities of entepreneurs.

The classical financial system is greedy in many ways, and despite the fact that there is more and more wealth in the world, a large part of the population has no chance of achieving it. This gap between poverty and wealth is still growing. The crypto world has a vision from the beginning to establish a new financial system (Nakamoto, 2008), where there will be far better and fairer supervision of projects, transactions, or individual participants. Cryptocurrencies still belong to a largely unexplored territory, nevertheless it belongs among the most rapidly evolving sectors in business. Essentials for technical background of cryptocurrency functioning is described in existing literature as follows: "*Primarily known for its use with digital currency, this technology has various applications that extend way beyond the financial and economic realm, including supply chain management, trade, health, and government services* "(Ghilal and Nach, 2019). Technically, blockchain is a decentralized and secure database of transactions based on decentralized nodes (Glaser, 2017).

As described by Tapscott and Tapscott (2016) the technology behind blockchain is complicated and the word blockchain is not exactly sonorous, the main idea is simple. Blockchains enable us to send money directly and safely from one node to another, without going through an intermediary. Rather than the Internet of Information, it's the Internet of Value or of Money. Blockchain was readily embraced by the industry, which led to exaggerated expectations during the hype while the interest in exploring profitable use cases of blockchain has continued unabated. When it comes to supply chain solutions, industry giants with different roles in extensive value networks such as IBM, Maersk, Carrefour, and Walmart all explore how blockchain can lead to more transparency, faster processing, and the elimination of paperwork in an industry that is plagued by fraud and suffers from substantial inefficiencies (O'Brien, 2019). At its most basic, it is an open-source code: anyone can download it for free, run it, and use it to develop new tools for managing transactions online (Tapscott and Tapscott, 2016).

Primary objective of this paper is to compare the predicting power (accuracy) of the GARCH model to predict volatility of digital tokens. Secondary this paper aims at accuracy of GARCH model in times of high volatility caused by COVID-19 pandemic and resulting restrictions, panic at financial markets and so on. As a benchmark level to compare accuracy of GARCH model for digital tokens (assets) is used index of S&P500, as a conventional asset in comparison to cryptocurrency.

Structure of this paper is as follows: first chapter describes the essentials of decentralized finance (DeFi) and also concerns brief literature review about initial coin offering and relation of e-commerce and digital tokens. Second chapter deals with methodology of this paper – describing basics of GARCH model and method of maximum likelihood. Third chapter contains results of GARCH model and its

predicting accuracy during COVID-19 time period. Conclusion summarizes the main findings of this paper.

1 Literature Review

Abbreviation DeFi stands for "decentralized finance", meaning the term for a variety of financial applications in cryptocurrencies or blockchains aimed at subverting financial intermediaries. As stated by Kraft (2020) "*The most widespread services that can be find in DeFi so far are alternatives for classic financial products such as loans or investments*". The most obvious difference is that there is no single entity that verifies the credibility of the customer, as in the case of a loan application from a bank, where customers undergo and audit of their financial stability and only based on the evaluation of the bank they can or cannot use the service. In DeFi is no such authoritative entity. As stated by Schär (2021) architecture of DeFi can create an "*immutable and highly interoperable financial system with unprecedented transparency, equal access rights, and little need for custodians, central clearing houses, or escrow services",* as most of these roles can be assumed by "smart contracts." As argued by Chohan (2021) the decentralized nature of these smart contract-based approaches is that they can be programmed to work in conjunction. Therefore, it is possible to develop mechanisms that can execute financial service requirements of ever greater complexity. In comparison to DeFi, there is also a centralized exchange. As described by Pacella (2021) centralized cryptocurrency exchange has to re-create the entire financial infrastructure we experience in stocks or bonds, all within one service. This is the price you pay when your market is built upon tokens which in themselves look to create entire financial ecosystems in their own operation and code. As suggested by the name, centralized cryptocurrency exchanges act as a third-party between a buyer and a seller (Arora, 2021). Approximately all of the crypto transactions go through centralized exchanges since they offer more reliability. As referred by Benedetti and Nikbakht (2021) in most public equity markets, investors do not trade directly with each other, but through intermediaries that interact in a centralized marketplace (the securities exchange). Such a centralized marketplace is itself supported by a centralized custodian and a centralized clearing-and-settlement entity, all of which are overseen by one or more regulatory institutions. In contrast, blockchain–enabled tokens, by design, do not require a central entity to process and settle transactions. This is the central element that makes it possible to remove intermediaries from peer-to-peer token transactions. Peer-to-peer token transactions are possible, however, only if users/investors already hold tokens to trade. Difference between centralized and decentralized exchange (DEX) can be described according to Renaudin (2020) Centralized exchanges rely on a private infrastructure to match supply and demand, which is managed internally in their own servers. In contrast, DEXs bring buyers and sellers together. Most are permissionless, meaning that anyone can access them and trade without intermediaries. Transactions are carried out

with open smart contracts. Without third-party involvement, users maintain full control over their cryptocurrencies throughout the trading process.

Unlike centralized exchanges, DEXs are fully transparent. Volumes cannot be faked, and the technology powering DEX smart contracts is open source and auditable by anyone. Smart contracts have a large range of instructions and are thus very flexible. They may also hold crypto assets and act as a custodian for them, with completely configurable criteria for how, when, and to whom these assets can be delivered. This opens the door to a wide range of new applications and blooming ecosystems (Schär, 2021), such as digital tokens (Fisch, 2019), lending (credit) platforms (Arora,2021). One of the popular forms of DeFi that connects borrowers with cryptocurrency creditors is credit markets. One popular platform, Compound, allows users to borrow cryptocurrencies or offer their own loans. Users can earn interest by borrowing their money. The composition determines interest rates algorithmically, so if the demand for a cryptocurrency loan is higher, interest rates will be shifted higher.

1.1 Initial Coin Offering

Raising of funding capital in an Initial Coin Offering (ICO) is comparable to crowdfunding (e.g., Ahlers et al., 2015; Mollick, 2014), there are significant differences that are unique to the ICO setting. According to Fisch (2019) ICOs represent an innovation in entrepreneurial finance. As argued by Cerezo Sánchez (2017) process of ICO is similar to crowdfunding in two aspects: both require a minimum funding threshold to be reached; and both are in a way engaged in testing the market demand for their product. ICOs enable startups to raise large amounts of funding with minimal effort while avoiding compliance and intermediary costs (Kaal and Dell'Erba, 2018; Sameeh, 2018). Avoiding intermediary or agent middleman appears to be the most encouraging part of ICO process for ventures.

In an ICO, investors buy tokens directly from a new venture. Tokens are intended to become functional future units of the venture's project (e.g., utility function, right to ownership, royalties). In the subscription process, the participant is generally required to transfer virtual asset to the issuer—typically to one or more designated addresses (an online reference for virtual assets similar to an account number) or online wallets belonging to the issuer. The majority of ICO tokens are utility tokens, which are a digital medium that allows for the exchange of benefit. Other forms of tokens, such as reputation or reward tokens, have usefulness, and additional token types are expected to develop in the future (Hill, 2017). Cryptocurrency, often known as a coin (hence the term "initial coin offering"), is a digital medium of value exchange. Many businesses establish their own cryptocurrency by issuing tokens that are meant to be used as a currency within the company's ecosystem. In examining term "initial" it is important to distinguish the term. As stated by Momtaz (2021) the term "initial" in "Initial Coin Offering" is misleading, as there cannot be a "seasoned coin offering". For

instance, generic token offering is based on a smart contract, which establishes that an investor wiring amount *x* to the token issuer receives *y* tokens (where *x*/*y* is the exchange rate) up to a maximum token amount *Y* that can be issued under the smart contract. It is also important to note that *Y* is fixed *ex ante* in immutable terms on the blockchain. Token issuers cannot subsequently increase the token supply (Iansiti and Lakhani, 2017).

Unsurprisingly, this emerging fundraising mechanism has attracted scammers and gamblers (Zetzsche et al., 2017). Unlike cryptocurrencies which are subject to asset and securities laws, the regulatory framework for utility tokens is undefined (Howell et al., 2018). Hence, utility token offerings are conducted in a legal grey zone, with the level of investor protection being at a minimum (Kean, 2018). The observed novelty of these types of fundraising is that the asset is frequently sold with the promise that the offeror will accept it in an emerging e-commerce ecosystem where the virtual asset is the sole accepted means of payment (Venegas, 2017). Because of mentioned intended utility function of tokens, cryptocurrencies can be described as a subcategory of utility tokens even though they are sometimes also referred to as a distinct category. Moreover, cryptocurrencies play an important role in ICOs because ventures sell tokens and accept other cryptocurrencies as payment (Fisch, 2019). As of 2021, a multitude of decentralized exchanges exist that enable investors to trade tokens against traditional FIAT currencies or other tokens. Nevertheless, because the tokens sold often have no counter value or utility at the time of the ICO and because of the high volatility, ICO investments are often described as high-risk investments (Russo and Kharif, 2017; SEC, 2017).

1.2 Relation of e-commerce and cryptocurrency

Numerous e-commerce payment systems exist, including invoices, credit cards, PayPal, and prepayments, all of which vary in their respective efficiency and transaction costs (Grüschow et al., 2016). The rationale here is simple, the more payment options e-commerce store offers, the wider the appeal it is likely to have. Certain credit/debit card types are not available in all countries, which makes it more challenging for you to reap the benefits of a diverse customer base. Cryptocurrency has the advantage of being available globally and not controlled by any state or country, which makes it a particularly stable option.

E-commerce became a worldwide business model, with retail e-commerce sales amounting to 4.89tn US dollars in 2021 with an expected growth of up to 6.39tn US dollars by 2024 (Statista, 2021). Data implied by blockchains can potentially benefit not only companies, but also customers. According to PayPal survey (2021) 57% of US-based consumers say that major brands should begin accepting cryptocurrency as a form of payment. With major platforms such as Shopify now allowing merchants to accept payments through their online stores, this is a major sign that cryptocurrency is becoming a viable alternative to traditional methods in the eyes of consumers. As referred by Solovieva (2021)

PayPal's cryptocurrency expansion along with other market players like Visa Inc. are likely to create the so-called network effect and faster adoption rates. Launched cryptocurrencies were predicted to increase proportionally to the square of the number of end users (Alabi, 2017). However, recent history has also shown that most cryptocurrencies are used for speculative purposes rather than for making online payments (Cheung et al., 2015; Stix, 2021).

2 Methodology

According to Modern Portfolio Theory (MPT), investment risk is defined by - and measured by - volatility. MPT posits that all investors are rational and operate with perfect knowledge in a perfectly efficient marketplace. Such investors will not accept a known level of risk/volatility unless they receive a return that precisely rewards them for that risk. This means that all securities sell at a market price that is always equal to fair or intrinsic value. But volatility is also important to consider when analyzing metrics other than price. Volatility might be measured by calculating the Standard Deviation (STDEV) of daily (or weekly, monthly, etc.) returns of particular asset. STDEV is a metric that is fundamental to statistical analysis, it measures the variation of sample values around the average (mean) of the sample. The higher the STDEV, the higher the level of volatility around the mean. It is important to realize that STDEV is an absolute measure of volatility for a specific data set. It cannot be compared apples-to-apples with other data sets (Bennett, 2017). Coefficient of variation (COV) is a relative measure of volatility that enables to compare two data sets by relating the STDEV of a data set to the average of particular data set, as follows:

$$Coefficient\ of\ Variation = Standard\ Deviation / Average$$

Unlike STDEV, COV is unitless and should be used instead of STDEV to compare data sets that have different units or different sample averages. As the value of the mean approaches zero, the value of COV will become extremely sensitive to changes in the mean.

2.1 GARCH model and parameter estimation

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models are the most commonly used in the literature for modelling volatility and estimating Value-at-Risk (VaR) and Expected Shortfall (ES) (Caporale and Zekokh, 2019). The ARCH model was developed by Engle (1982) in order to generalize the traditional econometric models that accept a constant one-period forecast variance. Then Bollerslev (1986), based on Engle (1982), attempted to generalize the ARCH model by presenting his own GARCH model.

Since 2017 the increasing interest in cryptocurrencies has brought about a highly proliferating bulk of relevant academic research, such as Chu et al. (2017) and Kyriazis (2019). One of the first studies investigating volatility in digital

currencies was conducted by Katsiampa (2017) and it estimates Bitcoin's volatility by comparing various GARCH models and concludes that AR-CGARCH is the model best describing Bitcoin's volatility.

The calculation formula for the ARCH model is defined as follows: (Engle, 1982)

$$h_t^2 = \omega + \alpha u_{t-1}^2 \tag{1}$$

Formula followed for GARCH model: (Bollerslev,1986)

$$h_t^2 = \omega + \alpha u_{t-1}^2 + \beta h_{t-1}^2 \tag{2}$$

as h_t^2 stands for variance, ω is fixed term, ß is coefficient for variance, h_{t-1}^2 is lagged term and, *u* stands for residuals. Parameters of the GARCH model α, ß, ω are estimated using the method of maximum likelihood. The goal of maximum likelihood estimation is to make inferences about the population that is most likely to have generated the sample (Myung, 2003):

$$f(x \mid \mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right), \tag{3}$$

the corresponding probability density function for a sample of *n* independent identically distributed normal random variables (the likelihood) is:

$$f\left(x_1, \ldots, x_n \middle| \mu, \sigma^2\right) = \prod_{i=1}^{n} f(x_i|\mu, \sigma^2) = \left(\frac{1}{2\pi\sigma^2}\right)^{n/2} exp\left(-\frac{\sum_{i=1}^{n}(x_i-\mu)^2}{2\sigma^2}\right) \tag{4}$$

or also can be written as:

$$L\ (\mu, \omega, \alpha, \beta) = \frac{1}{h_t\sqrt{2\pi}} e^{-\frac{{u_t}^2}{2{h_t}^2}} \tag{5}$$

Above mentioned family of distributions has two parameters:$\theta = (\mu, \sigma)$, thus there is maximized the likelihood over both parameters simultaneously, and if possible, individually. However, this paper deals with digital tokens which are part of cryptocurrency market, thus there is assumption that other than normal distribution would be more appropriate. To counter fact of not normal distribution of errors, estimation of parameters would be done by corresponding probability density function for Laplace distribution (6) and Generalized Normal Distribution of the Error distribution (GED) (7):

$$L\ (\mu, \omega, \alpha, \beta) = \frac{1}{2h_t} e^{-\frac{u_t}{h_t}} \tag{6}$$

$$L\ (\mu, \omega, \alpha, \beta, \gamma) = \frac{\gamma}{2h_t\lceil\frac{1}{\gamma}} e^{\left(-\frac{u_t}{h_t}\right)^{\gamma}} \tag{7}$$

where in case of GED is entering parameter γ gamma, which is estimated shape parameter of distribution, and also Gamma function Γ of the factorial function to complex number. Parameters for GARCH models will be estimated by maximum likelihood method by either assumption of Laplace or GED distribution to fit data.

2.2 Data and variables description

Data used in this paper were collected from various resources:

- data about crypto market, CEXs and DEXs summary: http://coinmarketcap.com/, http://defipulse.com, http://coingecko.com
- data providing historical information, such as opening price, closing price, daily minimum and maximum about particular tokens were obtained from http://investing.com and http://finance.yahoo.com.

To analyze both types of tokens and changes in their volatility during COVID-19 there was selected time frame containing 732 trading days ranging from October 15th, 2019, to October 15th, 2021.

Another step after selecting timeframe is to identify market capitalization for tokens trading at CEXs and DEXs. List of digital tokens ordered by the total market capitalization as of October 15th, 2021, is illustrated in Table 1. For comparative analysis there is used token Terra (LUNA) and Binance (BNC), as both had been launched and traded at their particular markets in selected timeframe. Token LUNA is used in DeFi, and it is traded at DEXs. In opposite to LUNA, token BNC is the digital token traded at CEXs. As illustrated in Table 1, the relative share of biggest digital tokens significantly differs. At CEXs it is almost 77 billion USD locked in BNB, as the total market capitalization of CEXs is at 104 billion as of October 15th, 2021. Relative share of BNB at CEXs is currently floating around 74 percent.

Unlike the CEXs market, it can be seen on DEXs and DeFi tokens that they are more evenly distributed. Total market capitalization of DeFi tokens is currently at the level of 143 billion USD. Relative share of the largest token of DeFi LUNA is currently at 11 percent.

Table 1 Total market capitalization of tokens at CEXs and DEXs as of October 16th, 2021

Centralized Exchanges		*Decentralized Exchanges*	
Coin	**Market Cap. in billion USD**	**Coin**	**Market Cap. in billion USD**
Binance Coin (BNB)	$ 76.9	Terra (LUNA)	$ 16.40
FTX Token (FTX)	$ 7.06	Uniswap (UNI)	$ 15.24
OKB (OKB)	$ 6.02	Chainlink (LINK)	$ 13.80
Crypto.com (CRO)	$ 4.81	Avalanche (AVAX)	$ 13.79
LEO Token (LEO)	$ 3.04	Wrapped Bitcoin (WBTC)	$ 13.14

Source: Authors processing. According to http://www.coinmarketcap.com/cs/view/defi and http://www.coingecko.com

Table 2 contains list of variables that were used in this paper. Every mentioned variable was noted for both of examined tokens – Terra and BNC. Beside tokens the paper examines the GARCH model for the volatility of the index of S&P500, to compare the model accuracy and reaction to COVID-19 pandemic in relation to asset, which is not as volatile in its nature as are cryptocurrency assets.

Figure 1 describes logarithm of total market capitalization of selected digital tokens Terra and Binance Coin during the COVID-19 crisis. Both types of tokens experienced growth as illustrated in Figure 1. Yellow line represents the beginning of COVID-19 restrictions in continental Europe as of March 12th, 2020. Purple line stands for the peak of the third global wave of COVID-19 related positive cases in accordance with the data of WHO.

Table 2 List of variables

Variable	Description
Op	Opening price of an asset on a day *t*
Cl	Closing price of an asset on a day *t*
Ret (in %)	Daily return of an asset, computed as $\left(\frac{Cl_t}{Cl_{t-1}}\right) - 1$
Res	Residual - difference between the observed value of asset *Ret* and the estimated value μ
lagSqRes	lagged value of squared residual
$CondVar_{t1}$	Conditional Variance in first day of sample as $\frac{\omega}{(1-\alpha-\beta)}$
$Condvar_{t+1,\ldots t+n}$	Variance in day *t* of sample as ω+α*lagSqRes+ß*$CondVar_t$
reVolatility	Realized volatility as squared root of squared Res

Source: Authors processing.

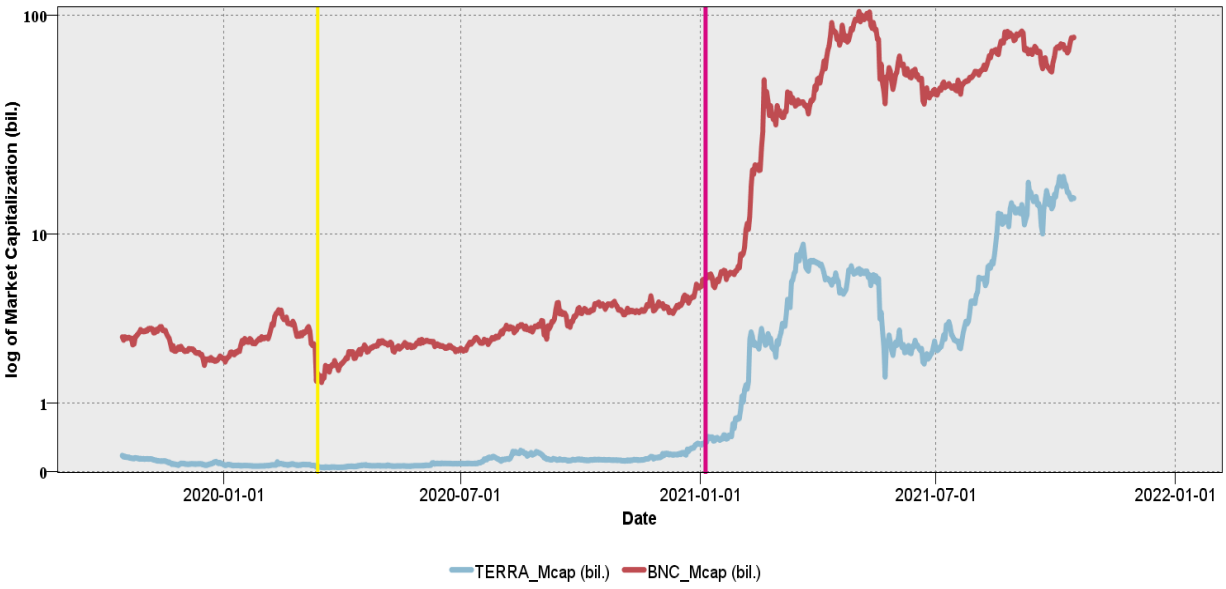


Figure 1 Log of total market capitalization of TERRA and BNC

Source: Authors processing. According to data from http://www.investing.com and http://www.finance.yahoo.com

3 Results

Table 3 provides descriptive statistics of analyzed sample in period of October 15th, 2019, and October 15th, 2021. As illustrated in Table 3, standard deviation of both cryptocurrency tokens daily returns is significantly higher than as in S&P500 index. In accordance with S&P500 as more stable asset than crypto is also the measure of standard error in daily returns comparison. The total observations *N* differ between crypto assets and S&P500 (assume S&P500 as "conventional assets"), as cryptocurrency exchanges are operating also on weekends and national holidays.

Table 3 Descriptive statistics of data sample

	N	Min	Max	Mean		STDEV
				statistics	SE	
Terra-Cl	732	.1253	46.720	5.9975	.3801695	10.2856
Terra-Ret	732	-.3860	.898	.0091	.0033130	.0896
BNC-Cl	732	9.39	675.68	142.388	6.66677	180.372
BNC-Ret	732	-.4189	.6976	.00642	.0023676	.0640
S&P500-Cl	505	2237.40	4536.95	3580.450	24.37965	547.864
S&P500-Ret	505	-.1198	.0938	.000924	.0007215	.01621

Source: Authors processing.

Table 4 Skewness and kurtosis of data sample. Tests of normality – Kolmogorov Smirnov, Shapiro-Wilk

	skewness		kurtosis		K-S test			Shapiro-Wilk		
	stat	SE	stat	SE	stat	df	sig.	stat	df	sig.
Terra-Cl	2.054	.090	3.488	.180	.330	732	.000	.630	732	.000
Terra-Ret	2.457	.090	19.229	.180	.146	732	.000	.817	732	.000
BNC-Cl	1.122	.090	-.129	.180	.353	732	.000	.720	732	.000
BNC-Ret	1.685	.090	24.314	.180	.126	732	.000	.817	732	.000
S&P500-Cl	.095	.109	-1.001	.217	.109	505	.000	.956	505	.000
S&P500-Ret	2.607	.109	34.587	.217	.159	505	.000	.747	505	.000

Source: Authors processing.

As illustrated in Table 4, it is possible to reject null hypothesis at the significance level *alpha* 0.05, that data in sample of closing price (and daily return) are normally distributed. This decision finds also support in coefficients of skewness or kurtosis, as it is overreaching interval of <-1;1>. It is possible to assume that data distribution of daily closing price and returns is highly skewed. Therefore, it is optimal to perform estimation of GARCH parameters when assuming not normal distribution, thus there is used Laplace and GED distribution in maximum likelihood method (equation 6 and 7).

Table 5 presents results of GARCH model (equation 2), when estimation of parameters was done by corresponding probability density function for Laplace distribution (eq. 5), that has slightly heavier tails than the normal distribution function. In all three observed assets in model I. is obtained positive unconditional

variance ω, what is good sign, as ω should be strictly positive. Another assumption of parameters α and ß is fulfilled as mentioned parameters are non-negative and less than 1, as well as the sum of α and ß is not higher than 1. When comparing estimated parameters of model I., it is obvious that impact of conditional volatility ß is at comparable value .7931, .7957 respectively between both tokens Terra and BNC, as well as immediate random disturbance α. Results of GARCH model I. dynamics are illustrated in Figure 2 and 3 at the end of this chapter.

Table 5 GARCH model I. Terra, BNC, S&P500– Laplace distribution

	Terra	BNC	S&P500
Average_Ret	0.9122%	0.6424%	0.0926%
STDEV_Ret	8.9635%	6.4057%	1.6215%
Variance	0.0080	0.0041	0.0003
Constant μ	-0.1241%	0.2192%	0.1140%
Unconditional variance ω	0.0001	0.0001	0.0001
ARCH α	0.1041	0.0851	0.0918
GARCH ß	0.7931	0.7957	0.7877
α+ß	0.8972	0.8808	0.8795
long-run volatility	2.98%	2.53%	2.36%
RMSE	7.03%	4.68%	1.25%
Log likelihood	946.1356	1199.8569	1417.917

Source: Authors processing.

Table 6 GARCH model II. Terra, BNC, S&P500 – GED

	Terra	BNC	S&P500
Average_Ret	0.9122%	0.6424%	0.0926%
STDEV_Ret	8.9635%	6.4057%	1.615%
Variance	0.0080	0.0041	0.0003
Constant μ	0.0346	-0.0137	0.0335
Unconditional variance ω	0.0001	0.0028	0.0012
ARCH α	0.187688312	0.2598	0.1179
GARCH ß	0.01367644	0	0.0148
α+ß	0.201364752	0.2598	0.1326
long-run volatility	0.97%	6.18%	0.39%
RMSE	7.64%	5.28%	1.01%
Shape parameter γ	0.1107	2.5873	0.7812
Log likelihood	3.4931E+05	1.7672E+308	2.1399E+249

Source: Authors processing.

In Table 6 the results of GARCH model were obtained by estimating corresponding probability density function for Generalized normal distribution of the error distribution (eq. 6). Based on results from Table 6 it is observable, that parameter of immediate random disturbance α has increased for both digital tokens, as well as index S&P500. Similarly, the coefficient of conditional volatility ß has decreased in all three observed assets. Increase of an α results into assumption, that parameter of immediate random disturbance is being more important, as well as its impact when analyzing observed tokens with parameters

estimated under GED by maximum log-likelihood. Log-likelihood values obtained through model I. and model II. cannot be used alone as an index or measure of fit, because values are a function of sample size of observed assets, but it can be used to compare the fit of different coefficients.

When comparing values of log-likelihood, it is observable that values of log-likelihood has increased in model II., thus the estimated parameters by eq. (6) are a better fit for this particular data. However, it is important to also observe the root mean square error (RMSE), as it compares the difference of volatility predicted by a model and the observed values. This measure of accuracy, to compare forecasting errors might lead to assumption that volatility of both digital tokens is less correctly predicted in model II (Table 6). Increase in log-likelihood does not show improvement in RMSE in case of BNC, as its value changes by 0.5%. In case of Terra there is increase in RMSE by 0.61%. In case of benchmark asset of index S&P500, there is beside the increase of log likelihood also the decrease in RMSE by 0.24%.

In model II. there is also observed change in long-run volatility (LRV), what represents how assuming a correct distribution for error term leads to significant estimation result. In case of Terra and S&P 500 LRV decreased in model II, in Terra by 2.01% and S&P500 by 1.97%. However, the LRV of digital token BNC significantly increased by 3.65%, thus we can assume that in observed period during COVID-19 pandemic, the distribution of error terms to estimate parameters of GARCH model by maximum likelihood estimation method is better with assumption of Laplace distribution than as GED.

Model II. in Table 6 also contains estimated parameter γ, that shows the shape parameter. The lower the parameter γ is, the fatter the tails are. Assuming the γ is equal to 1 is corresponding with Laplace distribution, and γ is equal to 2, the distribution should be considered normal. In accordance with results in Table 6 it is possible to state, that volatility of digital token BNC is far closer to normal distribution, than Defi digital token Terra in selected time period.

Figure 2 compare the dynamics of GARCH model during pandemic for digital token Terra. It is observable that model containing estimated parameters with GED is tracing the realized volatility more precisely than model with parameters estimated with Laplace distribution. Obvious is primary the accuracy of predicting the lower bound and its tracing when comparing models for Terra. Unlike in case of Terra, GARCH model of volatility of digital token BNC is less accurate, when using GED to estimate parameters (Figure 3).

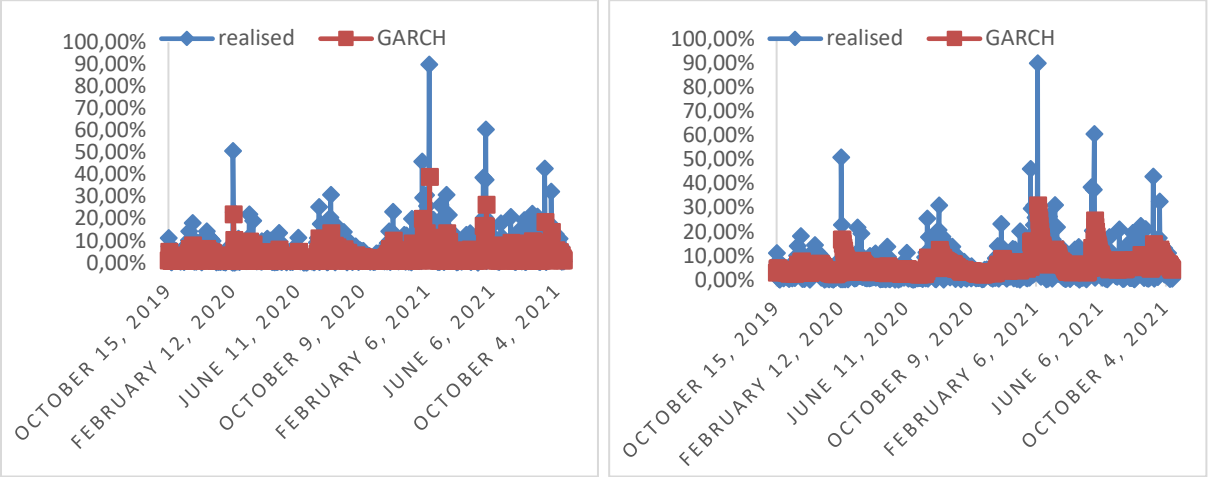


Figure 2 GARCH model I. and II. for token Terra – GED on the left, Laplace on the right

Source: Authors processing.

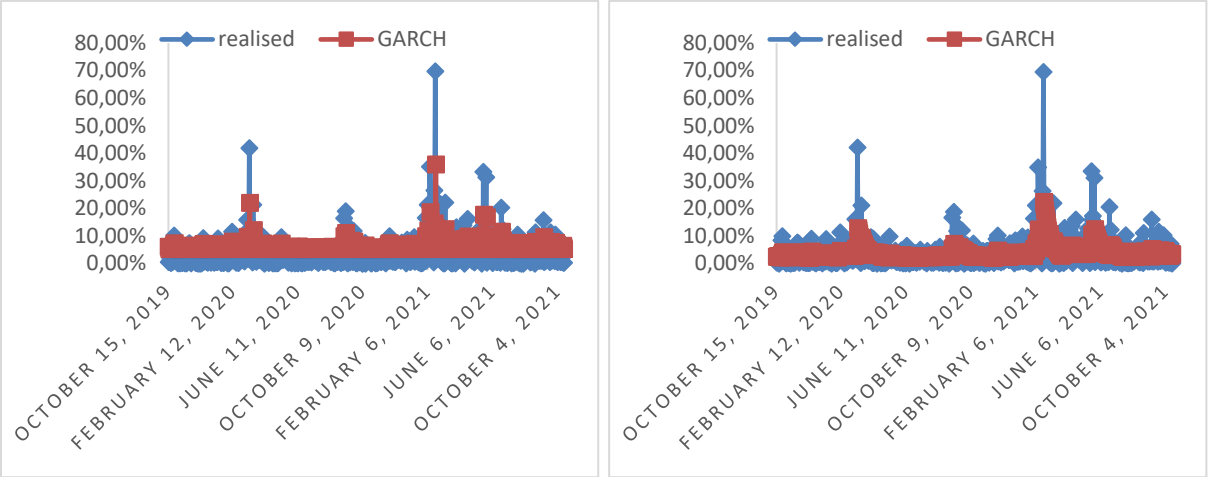


Figure 3 GARCH model I. and II. for token BNC – GED on he left, Laplace on the right

Source: Authors processing.

Conclusion

In this paper the GARCH model was applied at two different types of tokens. First observed digital token Terra, traded at DEXs exchanges with largest market capitalization. Second observed token was BNC, traded at CEXs with largest market capitalization. As a benchmark to compare the accuracy of GARCH model during COVID-19 pandemic was used index of S&P500.

From the results of this paper, it is possible to assume that token BNC is showing its daily volatility closer to normal distribution than it is in case of Terra. Best fit for the GARCH model of BNC parameters were obtained using Laplace distribution. In contrast with Terra where the best fit was realized under GED.

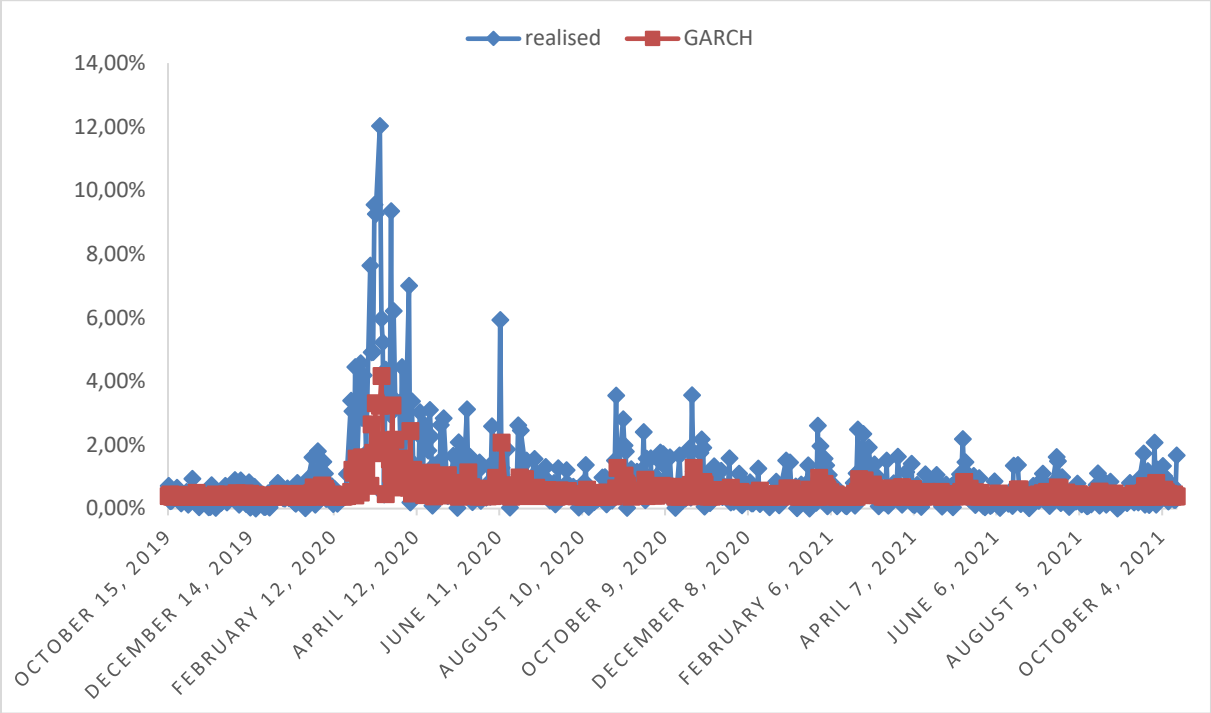


Figure 4 GARCH Model II. – GED for S&P500

Source: Authors processing.

Assuming the results, it is possible to state that DeFi token Terra is showing evidence of existence of fat tails, when comparing the values of parameter γ of both observed digital tokens. As a benchmark to compare the predicting power of GARCH model was used index S&P500 (Results in Figure 4). Comparing achieved results, it is possible to state that GARCH model of Terra GED is similarly tracing the lower bound of daily volatility in time series. Root mean square error of benchmark S&P500 is in GARCH model slightly over 1%, while in case of digital tokens it has not declined under value 4.68% (BNC). When comparing the peaks of particular models (Figure 2, 3 and 4), it is obvious that GARCH models could not capture the high volatility shocks in date of March 12th, 2020, as a result of shock in conventional financial markets and also cryptocurrency related markets.

References

1. Ahlers, G.,K., Cumming, D., Guenther, C., Schweizer, D. 2015. Signaling in equity crowd-funding. Entrepreneurship Theory and Practice, 39(4), 955–980.
2. Alabi, K. 2017. Digital blockchain networks appear to be following Metcalfe's Law. Electron. Commer. Res. Appl. 24, 23–29.
3. Arora, K. 2021. Centralized and Decentralized Cryptocurrency Exchanges. Retrieved from: http://www.analyticssteps.com/blogs/centralized-and-decentralized-cryptocurrency-exchanges. Last accessed: October 18th, 2021.
4. Benedetti, H., Nikbakht, E. 2021. Returns and network growth of digital tokens after cross-listings. Journal of Corporate Finance 66 (2021) 101853.

5. Bennett, Steve. 2017. Coefficient Of Variation: A Better Metric To Compare Volatility. Dividend strategy. Retrieved from: https://seekingalpha.com/article/4079870-coefficient-of-variation-better-metric-to-compare-volatility. Last accessed: October 21st, 2021.
6. Bollerslev, T., 1986. Generalized autoregressive conditional heteroskedasticity. J. Econom. 31 (3), 307–327.
7. Caporale, G., M., Zekokh, T. 2019. Modelling volatility of cryptocurrencies using Markov-Switching GARCH models. Research in International Business and Finance Volume 48, April 2019, Pages 143-155
8. Cerezo Sánchez, D. 2017. An optimal ICO mechanism. MPRA paper 81285. Germany: University Library of Munich. University Library of Munich.
9. Cheung, A., Roca, E., Su, J.-J. 2015. Crypto-currency bubbles: An application of the Phillips–Shi–Yu (2013) methodology on Mt. Gox bitcoin prices. Applied Economics, 47(23), 2348–2358.
10. Chohan, U. W. 2021. Decentralized Finance (DeFi): An Emergent Alternative Financial Architecture (January 26, 2021). Critical Blockchain Research Initiative (CBRI) Working Papers.
11. Chu, J., Chan, S., Nadarajah, S., Osterrieder, J. 2017. GARCH modelling of cryptocurrencies. J. Risk Financ. Manag. 10 (4), 17.
12. Engle, R.F., 1982. Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica: J. Econ. Soc. 987–1007.
13. Fisch, Ch. 2019. Initial coin offerings (ICOs) to finance new ventures. In Journal of Business Venturing, January 2019.
14. Ghilal, A., Nach, H. 2019. La technologie de la chaîne de blocs: Fondements et applications. In M. Ertz, D. Hallegatte, & J. Bousquet (Eds.), La reconfiguration de l'echange marchand. Tour d'horizon, enjeux et perspectives (pp. 113e131). Quebec, Canada: Les Presses de l'Universite du Quebec.
15. Glaser, F. 2017. Pervasive decentralisation of digital infrastructures: A framework for blockchain enabled system and use case analysis. In Proceedings of the 50th Hawaii international conference on system sciences (HICSS-50).
16. Grüschow, R.,M., Kemper, J., Brettel, M. 2016. How do different payment methods deliver cost and credit efficiency in electronic commerce? Electron. Commer. Res. Appl. 18, 27–36.
17. Hill, B. 2017. ICOs and token types for dummies: a buyer's guide to crypto-tokens. Retrieved from: http://hackernoon.com/icos-token-types-for-dummies-an-buyers-guide-to-crypto-tokens-b6edea16776e. Last accessed: October 18th, 2021.

18. Howell, S.T., Niessner, M., Yermack, D. 2018. Initial coin offerings: financing growth with cryptocurrency token sales. In: Working Paper. National Bureau of Economic Research.
19. Iansiti, M., Lakhani, K., R. 2017. The truth about blockchain. Harv. Bus. Rev. 95, 118–127.
20. Kaal, W.A., Dell'Erba, M. 2018. Initial coin offerings: emerging practices, risk factors, and red flags. In: Moeslein, F., Omlor, S. (Eds.). FinTech Handbook, forthcoming.
21. Katsiampa, P. 2017. Volatility estimation for Bitcoin: a comparison of GARCH models. Econ. Lett. 158, 3–6.
22. Kyriazis, N., A. 2019. A survey on efficiency and profitable trading opportunities in cryptocurrency markets. J. Risk Financ. Manag. 12 (2), 67.
23. Kean, B. 2018. Don't believe the hype. Five largest ico "exit scams. In: Technical report. Retrieved from: http://cointelegraph.com/news/dont-believe-the-hype-the-fivelargest-ico-exit-scams-expert-take. Last accessed: October 18th, 2021.
24. Kraft, V. 2020. Intorduction to DeFi. Retrieved from: http://www.kurzy.cz/zpravy/556357-uvod-do-defi/. Last accessed: October 18th, 2021.
25. Mollick, E. 2014. The dynamics of crowdfunding: an exploratory study. Journal of Business Venturing, 29(1), 1–16.
26. Momtaz, P., P. 2021. Entrepreneurial Finance and Moral Hazard: Evidence from Token Offerings. Journal of Business Venturing 36 (2021) 106001.
27. Myung, I., J. 2003. Tutorial on Maximum Likelihood Estimation. *Journal of Mathematical Psychology*. 47 (1): 90–100.
28. Nakamoto, S., 2008. Bitcoin: a peer-to-peer electronic cash system. In: Technical report.
29. O'Brien, C. 2019. How Blockchain is Changing Supply Chain Management. Retrieved from: http://innovator.news/how-blockchain-is-changing-supply-chain-management-685bf349e4eb. Last accessed: October 18th, 2021.
30. Pacella, M. 2021. Understanding Centralised Crypto-Currency Exchanges. Retrieved from: http://masonstevens.com.au/understanding-centralised-cryptocurrency-exchanges/ Last accessed: October 18th, 2021.
31. Renaudin, H. 2020. Decentralized and Centralized Exchanges: Who Will Win the Race? Retrieved from: http://www.nasdaq.com/articles/decentralized-and-centralized-exchanges%3A-who-will-win-the-race-2020-11-05. Last accessed: October 18th, 2021.
32. Russo, C., Kharif, O. 2017. The hottest ICOs are the ones that have done the least amount of work. Retrieved from: http://www.bloomberg.com/news/articles/2017-12-12/want-to-issue-a-red-hot-ico-rule-no-1-is-do-very-little-work. Last accessed: October 18th, 2021.

33. Sameeh, T. 2018. ICO basics – security tokens vs. utility tokens. Retrieved from: https://www.cointelligence.com/content/ico-basics-security-tokens-vs-utility-tokens. Last accessed: October 18th, 2021.
34. Schär, F. 2021. Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets. Review of Economic Research of Federal Bank St.Louis, Second Quarter 2021, Vol. 103, No. 2.
35. SEC. 2017. Investor bulletin: initial coin offerings. Retrieved from: http://www .sec.gov/oiea/in-vestor-alerts-and-bulletins/ib_coinofferings. Last accessed: October 18th, 2021.
36. Solovieva, V. 2021. PayPal (PYPL) Goes After 'Crypto-Curious' Customers. Retrieved from: http://www.investopedia.com/paypal-pypl-goes-after-crypto-curious-customers-5113214. Last accessed: October 18th, 2021.
37. Statista, 2021. Global retail e-commerce market size 2014-2024. Retrieved from: http://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/. Last accessed: October 18th, 2021.
38. Stix, H. 2021. Ownership and purchase intention of crypto-assets: Survey results. Empirica 48 (1), 65–99.
39. Tapscott, D., Tapscott, A. 2016. Blockchain revolution: How the technology behind bitcoin is changing money, business and the world. New York: Penguin portfolio, 2016. ISBN: 9781101980132
40. Venegas, P. 2017. Initial Coin Offering (ICO) Risk, Value and Cost in Blockchain Trustless Crypto Markets. In Economy Monitor 2017.
41. Zetzsche, D. A., Buckley, R. P., Arner, D. W., Fohr, L. 2017. The ICO Gold Rush: It's a Scam, It's a Bubble, It's a Super Challenge for Regulators. Law Working Paper Series, Paper number 2017-011

About the author

Ing. Jakub Sieber
Ekonomická univerzita v Bratislave,
Podnikovohospodárska fakulta v Košiciach
Tajovského 13, 041 30 Košice
tel.: +0421(0)55 / 722 31 11
e-mail: jakub.sieber@euba.sk

ENVIRONMENTAL TAXES IN COUNTRIES V4

ENVIRONMENTÁLNE DANE V KRAJINÁCH V4

Jana SIMONIDESOVÁ – Stanislav RUDÝ

Abstract
In this study, we will focus on assessing the impact of environmental taxes in the V4 countries and point out their importance in relation to the environment and economic growth. The European Union environmental policy is geared towards a high level of environmental protection. Sustainable economic growth in EU countries is linked to the quality of life of the population and an acceptable environment. The EU's commitment to combating climate change towards green growth also has a significant impact on the economy.

Key words: environmental taxes, environment, economic growth

Abstrakt
V tejto štúdii sa zameriame na zhodnotenie vplyvu environmentálnych daní v krajinách V4 a poukážeme na ich významnosť vo vzťahu k životnému prostrediu a hospodárskemu rastu. Politika Európskej únie v oblasti životného prostredia je orientovaná na vysoký stupeň ochrany životného prostredia. Udržateľný ekonomický rast je v krajinách EÚ prepojený s kvalitou života obyvateľov a prijateľného životného prostredia. Značný a výrazný vplyv na ekonomiku má aj záväzok EÚ v boji proti klimatickým zmenám smerujúci k zelenému rastu.

Kľúčové slová: environmentálne dane, životné prostredie, hospodársky rast

Introduction

Apart from the coronavirus pandemic, protecting and maintaining the environment today is one of the biggest political and legal challenges. The European Union's internal market is uniform and the definition of economic principles helps to a large extent to meet environmental objectives.

Table 1 Revenues from ET in EU countries in millions of euros

2014	2015	2016	2017	2018	2019
346 766,83	362 934,56	368 499,36	372 484,46	381 695,86	389 406,79

Source: own processing according to Eurostat

Table 2 Percentage expression of the share of ET in GDP in EU countries

2014	2015	2016	2017	2018	2019
2,46	2,44	2,46	2,41	2,39	2,36

Source: own processing according to Eurostat

Revenues from environmental taxes throughout the European Union are rising over the period under review, and we can look for a link to economic growth in the EU, production and consumption have demonstrably increased revenue from environmental taxes in EU countries by more than 40 million euros. However, we can notice that the share of these taxes in the GDP of countries has been

decreasing in recent years, the reason is also the growth of the EU economy in the field of services, but the number of inhabitants (consumers) will not increase significantly.

Environmental taxes can manage economic and environmental changes, and with the right prevention approach, they can also reduce and adjust the impact on the environment. Economic growth and more resource intensive activities can produce revenue increases like those resulting from changes in tax rates and regulations. According to the European Commission, most countries do not do enough to change the tax burden and reduce the contribution of environmental tax revenue to gross domestic product. The possibility to change the tax rate and regulation as a tool to support internal goals has helped to maintain economic development, increase competitiveness and growth, but also at the cost of side effects such as pollution from the use of natural resources. (Andreoni, 2019)

Miller and Vela (2013) argue that environmental taxes serve as a major tool to alleviate environmental problems. These instruments are mechanisms based on incentives to keep pollution at a socially accepted level. Although environmental taxes help reduce negative externalities, there is no single formula for their implementation Based on tax revenues, we can distinguish how environmental taxes differ in different countries and what environmental policies are preferred in countries. Studies have shown that there is a link between environmental tax revenues and the performance of different types of environmental variables. The amount and size of environmental taxes have an impact on the quality of the environment.

1 Environment and economic growth

In advanced economies, the demand for and consumption of energy is constantly growing, which brings many serious environmental problems, such as the greenhouse effect.

They evaluate economic growth and its limiting factors in their work Naščáková, et al., (2015) when they point out selected problems associated with quality of life and economic growth.

The modelling of economics versus environment relations in the context of selected indicators is addressed in the study Hajduová - Andrejovský - Beslerová (2014) and Andrejovský - Hajduová - Lacko (2020) when they point to selected problems related to quality of life.

The aim of environmental tax reform in Europe has been to discourage environmental damage by increasing costs, but also to preserve and protect natural resources and systems not only for today but also for future generations. The European Environment Agency - EEA (2011) further states that these were reforms of the national tax system, where the tax burden is shifted to environmentally harmful activities. Proceeds from environmental taxes are to be recycled in to produce positive social as well as economic results. Policy makers

need to understand the impact of environmental taxes and treat them with care, not only affecting a cleaner environment, but also affecting job creation, inflation and higher prices for certain goods.

In to protect human health and revitalize energy intensity, it is necessary to strive in countries to change the energy structure to a cleaner one, in to eliminate the alarming situation of excessive energy consumption. Some countries have energy plans to improve the energy structure, but the current rate of improvement is not sufficient. Therefore, it is necessary to make more use of clean production technologies and to influence or appeal to clean production and production through political interventions and proposals. Countries should use the resources at their disposal and strive to use clean resources, starting with water, wind and solar energy and biomass. (Hui, et al., 2015)

Today, businesses are responsible for the environment and consumers prefer responsible companies that prefer sustainable strategies. Sustainability is one of the biggest trends that will shape the future and provide environmental and social solutions, so it should be one of the most important factors leading to green innovation activities of companies. According to Bekmezci (2015), the goal for companies with a negative impact on the environment is to identify and implement sustainable innovation that, in addition to protecting the environment, can provide competitive advantages and provide added value for society and the environment.

2 The circular economy and sustainable growth

A circular economy based on circular cycles of reduction, reuse and recycling is a real alternative to economic, environmental and social development, to which governments, businesses and people should contribute. The circular economy is an economic system that represents a change in the way society is connected to nature and aims to prevent the depletion of all resources, close material and energy circuits and create sustainable development for businesses. To achieve this, eco innovation must be developed, the aim of which must be to protect natural capital, and this can only be achieved by promoting the use of renewable resources, expanding the use of materials through reuse and recycling. (Mura, et al., 2020)

According to Guštafíková, et al., (2019) environmental pollution is a cross border problem and has a global character. The models of economic growth do not respond to the current problems, and the response must be to use resources in a more sustainable and intelligent way, as a reflection of the solution to emerging problems. The Agenda for Sustainable Development until 2030 is a United Nations document whose essence is to ensure sustainable consumption and production through innovation, the development of new technologies and changes in production models. The aim of the circular economy is to minimize waste, prolong the life cycle and restore the resources used. The circular economy will help achieve material savings, increase competitiveness and lay the foundations for sustainable, smart and inclusive growth. If a product is at the end of its life

cycle, the resources from which it was made will not be excluded but will be used to create a new market value.

Studies by the European Environment Agency - EEA (2019) show that construction and demolition waste is one of the largest waste streams in the European Union, and it is the circular economy that can help prevent waste, increase recycling and meet targeted waste policies. At present, the linear model, which assumes that natural resources are readily available and inexpensive, is no longer sustainable. The circular economy has an important regenerative nature and its most important goal is to maintain the usefulness of materials, components and products for as long as possible while maintaining value. With the current reduction of environmental pressures, it thus not only helps to reduce the environmental pressures associated with waste management, emissions and resource extraction, but also minimizes the need for new materials and energy.

Understanding that the way we live, what we produce, is deeply linked to the environment in a complex network of interrelationships (what natural resources we obtain, what pollutants we release, how we disrupt the functioning of the climate, ecosystems, etc.). The task of the European economy is to fulfil the goal of long-term sustainability and with it the vision of the Seventh Environmental Action Program until 2050, the essence of which is focused primarily on living within the limits of our planet. Furthermore, according to Viaud (2019), a healthy environment and prosperity are based on an innovative circular economy, where natural resources are managed in a sustainable way, biodiversity is protected and nothing is wasted. The seventh vision of the EAP 2050 is a vision of sustainability, is fully in line with global goals, its principles are at the heart of sustainable development and is one of the key frameworks for achieving protection and improving the quality of the environment.

3 Environmental taxation in V4 countries

In addition to the various pollution charges associated with environmental protection, there are several effective economic instruments aimed at creating a system in the European Union designed to prevent negative effects on the environment. Environmental taxes are divided into four groups:

1. energy taxes,
2. transport taxes,
3. pollution taxes (a form of payment for environmental pollution),
4. resource taxes (a form of payment for drawing and excessive consumption).

3.1 Czech Republic

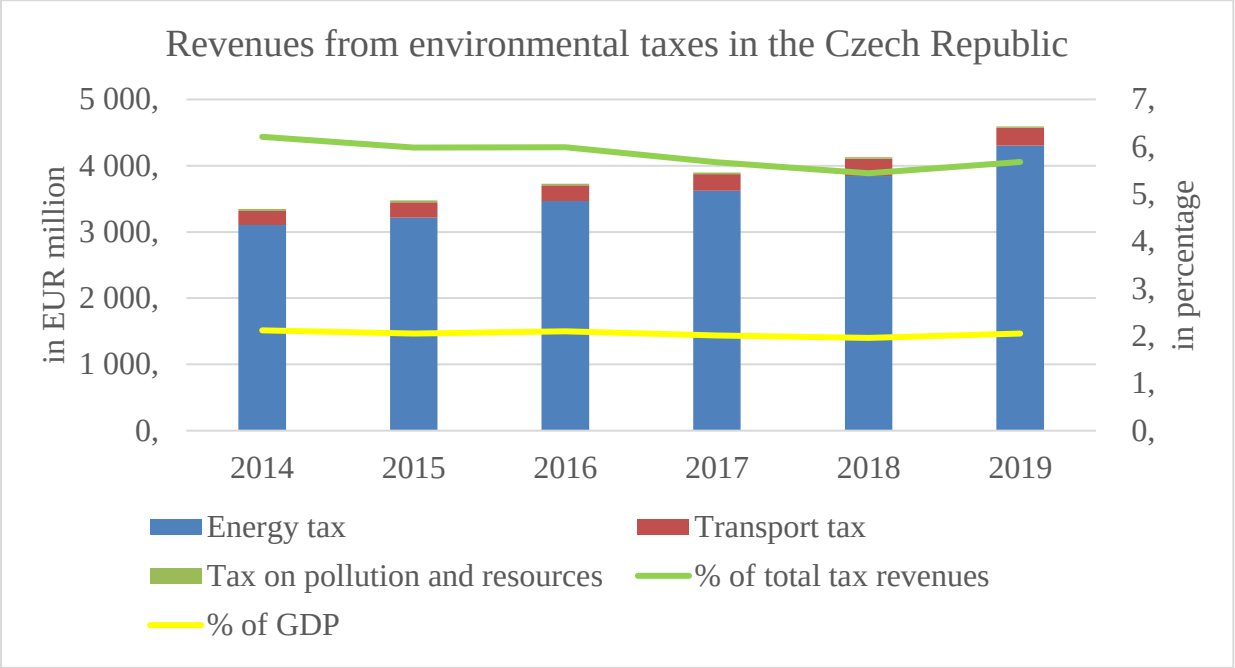
According to Hogg, et al., (2014) in the Czech Republic, consideration is given to increasing the focus on the implementation of environmental taxes in to establish the best methods for discouraging harmful behavior for the environment. Although these taxes are also not important in terms of total tax revenues, their role is increasing and the country is trying to implement new environmental policies. Environmental taxes include energy taxes and transport taxes. Taxes on pollution and resources take the form of charges (for example, charges for air pollution, charges for discharging wastewater into underground sources, charges for waste disposal and others). The system of environmental taxes and charges remains complex and the administrative costs of administration are high. In recent years, the situation in the Czech Republic has significantly improved, as environmental taxes discourage harmful behavior for the environment and effectively increase the use of natural resources.

Table 3 Revenues from environmental taxes in the Czech Republic

Czech Republic	2014	2015	2016	2017	2018	2019
Energy tax	3 103,17	3 217,57	3 465,15	3 621,55	3 841,35	4 301,44
Transport tax	214,52	228,78	237,26	253,06	262,76	269,38
Tax on pollution and resources	29,27	30,98	25,97	22,37	25,03	24,04
% of total tax revenues	6,21	5,98	5,99	5,67	5,44	5,68
% of GDP	2,12	2,05	2,1	2,01	1,96	2,05

Source: own processing according to Eurostat

In the last year 2019, when we have data available, revenues from environmental taxes were 2.05% of GDP, which represents 5.68% of total tax revenues. The total revenue in 2019 from environmental taxes amounted to EUR 4,594.86 million and the largest share of 93.61% was represented by energy taxes in the amount of EUR 4,301.44 million (energy taxes compared to total tax revenues amounted to 5.32% and in percentage terms accounted for 1.92% of GDP). Transport taxes accounted for 0.33% of total tax revenues and accounted for 0.12% of GDP in percentage terms, while taxes on pollution and resources accounted for only 0.03% of total tax revenues and 0.01 % of GDP. The following graph shows the values from the table.



Graph 1 Revenues from environmental taxes in the Czech Republic

Source: own processing according to Eurostat

3.2 Hungary

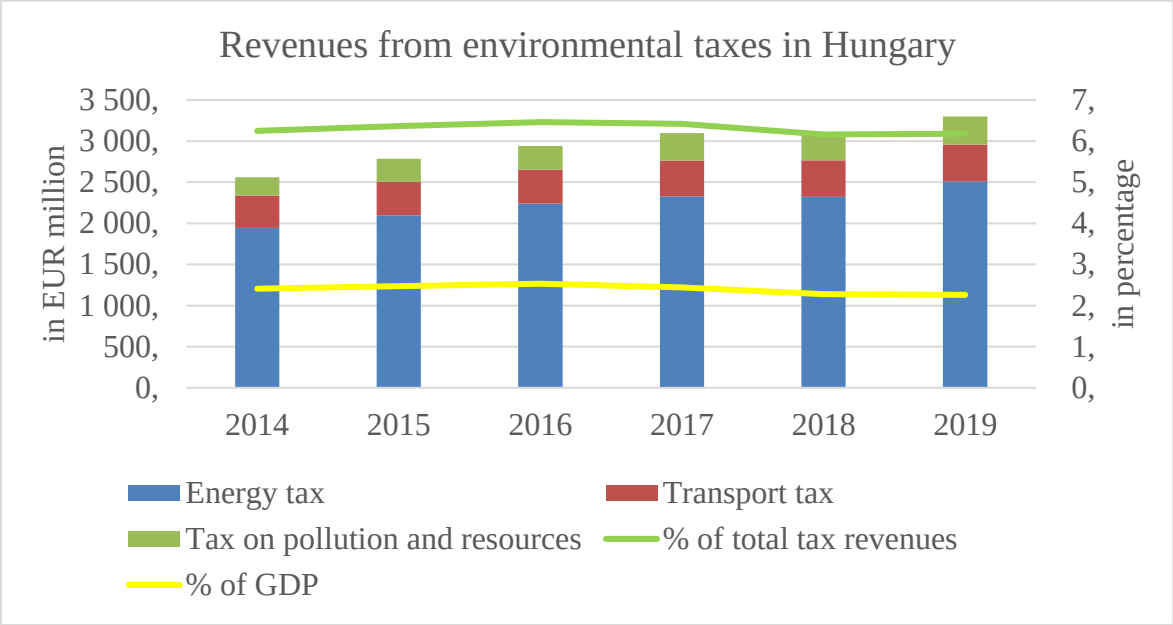
Hungarian environmental tax rates are generally quite low and revenue generation is not particularly high. At present, the income-generating effect dominates and job creation by the Hungarian government remains a key priority. Hogg, et al., (2014) argue that nevertheless, the environmental awareness of the Hungarian population is relatively high compared to the European average, and Hungarians seem willing to pay more for environmentally safe products and services. Most environmental tax rates are relatively low and therefore the potential of environmental tax reform in the country needs to be exploited. Although the Hungarian National Reform Program should have focused on environmental taxes, the policy agenda focuses mainly on the economy and does not address environmental options, despite the potential of environmental tax reform in terms of revenue growth.

Table 4 Revenues from environmental taxes in Hungary

Hungary	2014	2015	2016	2017	2018	2019
Energy tax	1 944,14	2 096,68	2 237,87	2 323,93	2 321,87	2 507,15
Transport tax	392,39	407,19	413,77	435,72	441,66	449,16
Tax on pollution and resources	221,32	280,48	290,14	335,42	330,93	342,55
% of total tax revenues	6,25	6,36	6,46	6,42	6,16	6,18
% of GDP	2,41	2,47	2,53	2,44	2,28	2,26

Source: own processing according to Eurostat

In the monitored year 2019, when we compared the obtained data, revenues in Hungary from environmental taxes represented 2.41% of GDP, which represents 6.25% of total tax revenues. The total revenue in 2019 from environmental taxes amounted to EUR 3,298.86 million, which is more than a 6% increase over the previous year. The largest share of revenues from environmental taxes is represented by energy taxes - energy taxes compared to total tax revenues in 2019 accounted for 4.70% and in percentage terms accounted for 1.72% of GDP. Transport taxes and taxes on pollution and resources together accounted for only a quarter of revenue. Graphically captured values from the tables are shown in Graph 2.



Graph 2 Revenues from environmental taxes in Hungary

Source: own processing according to Eurostat

3.3 Poland

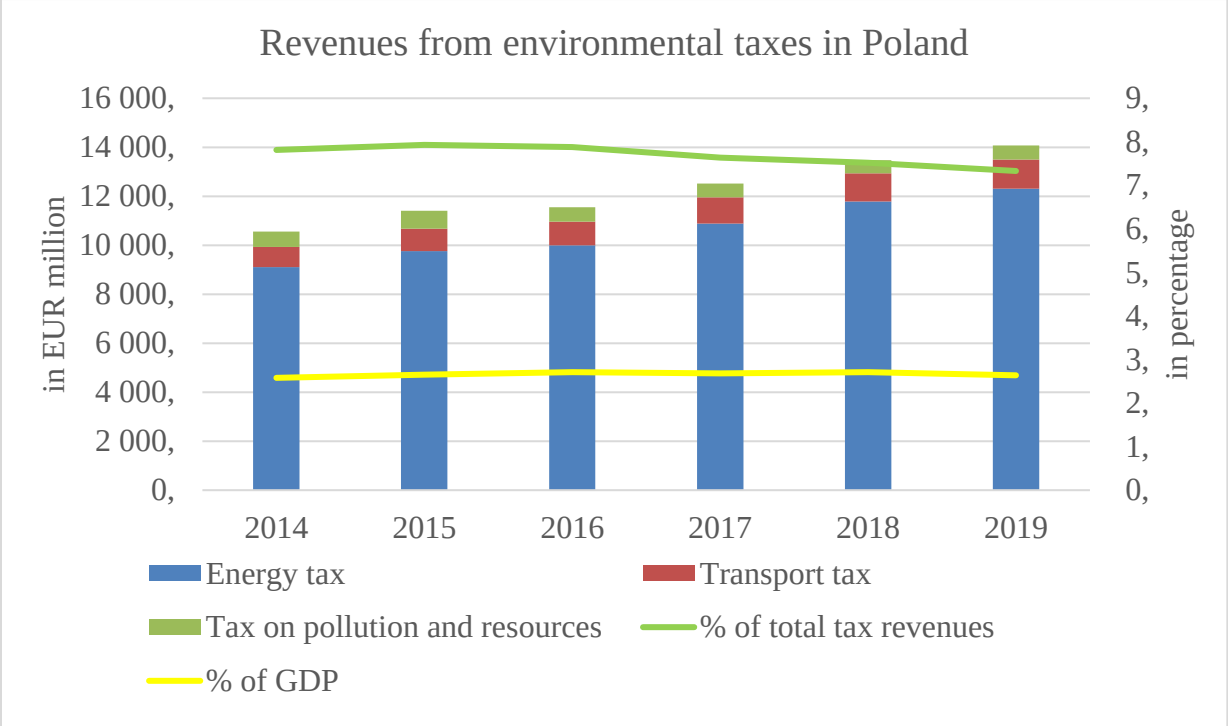
Following the mobilization of economic instruments to strengthen environmental policy in 1989, when environmental funds with independent responsibility for environmental financing were created, government interest in environmental tax reform resumed before joining the European Union in 2004. The aim of this reform was to implement the proposals in line with measures in other Member States. Despite the country's outdated physical infrastructure for electricity and heat transmission, Poland's energy intensity is well above the European Union average. Although the conceptual approach has disappeared in recent years, new reforms have nevertheless been introduced to expand the sources of funding for environmental funds. (Hogg, et al., 2014)

Table 5 Revenues from environmental taxes in Poland

Poland	2014	2015	2016	2017	2018	2019
Energy tax	9 107,86	9 764,82	9 996,1	10 889,12	11 788,81	12 312,45
Transport tax	829,05	911,79	965,58	1 063,89	1 147,01	1 185,31
Tax on pollution and resources	625,19	725,13	594,98	559,08	538,54	572,65
% of total tax revenues	7,81	7,93	7,88	7,64	7,52	7,33
% of GDP	2,58	2,65	2,71	2,68	2,71	2,64

Source: own processing according to Eurostat

Revenues from environmental taxes in Poland represented the largest percentage of revenues from taxes and social contributions in the V4 countries, despite a declining trend. Even thought that these revenues were the highest of monitored countries, in the next part of the study we will show that the country does not meet the potential that it has and per capita in revenues from this group of taxes are below the European Union average. In 2019, revenues from environmental taxes were at the level of 2.64% of GDP, which represents 7.33% of total tax revenues. The total revenue in 2019 from environmental taxes amounted to EUR 14,070.41 million and the largest share was represented by energy taxes in the amount of EUR 12,312.45 million. Pollution and resource taxes accounted for the smallest revenue group, and transport taxes in 2019 generated revenue of € 1,185.31 million. The graph below shows the values in the table.



Graph 3 Revenues from environmental taxes in Poland

Source: own processing according to Eurostat

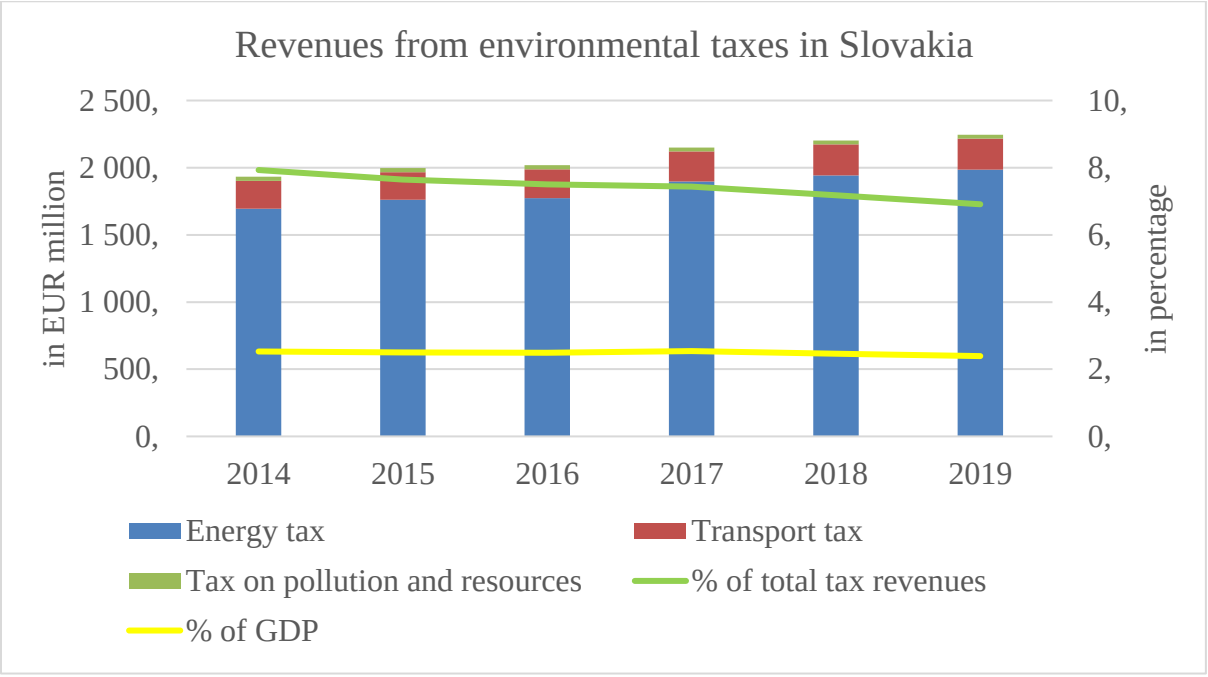
3.4 Slovakia

Hogg, et al., (2014) perceives the structure of types of environmental taxes and fees in Slovakia with a very similar development as in the Czech Republic and consists of two parts - environmental charges and environmental taxes and fees. In the past, environmental taxes were very insignificant within the tax system, but now Slovakia has implemented a large number of European Union tax directives on environmental fiscal reform and on Directive 2003/96/EC on energy taxation. The measures taken were mainly implemented in to meet the legislative requirements of the European Union and their role is primarily fiscal.

Table 6 Revenues from environmental taxes in Slovakia

Slovakia	2014	2015	2016	2017	2018	2019
Energy tax	1 693,76	1 762,18	1 773,7	1 897,15	1 941,51	1 984,19
Transport tax	207,64	203,9	213,51	223,29	232,57	233,09
Tax on pollution and resources	30,91	31,47	32,14	28,59	28,59	28,69
% of total tax revenues	7,93	7,65	7,5	7,44	7,18	6,91
% of GDP	2,53	2,5	2,49	2,54	2,46	2,39

Source: own processing according to Eurostat



Graph 4 Revenues from environmental taxes in Slovakia

Source: own processing according to Eurostat

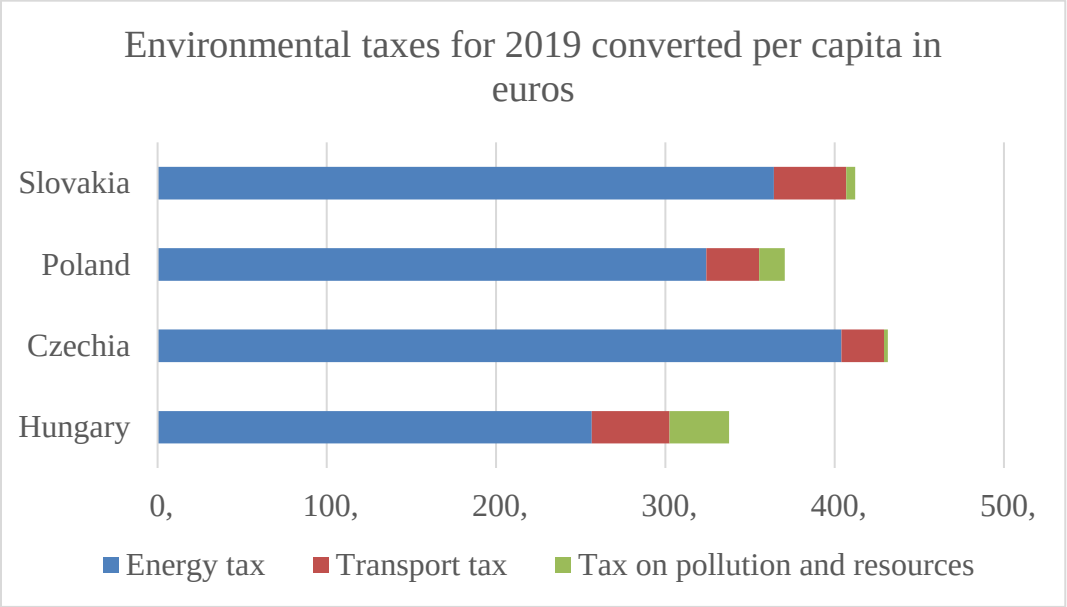
Conclusion

Although the total revenues from environmental taxes from the monitored countries were the highest in Poland, in terms of per capita, it turned out that these revenues are well below the average in the European Union. All the remaining V4 countries are in a similar situation. Even thought that we record an increase in revenues in this group, the legislative and legal regulation of this group of taxes is not captured to such an extent and we can find room for further legal regulation in the monitored countries. The system of payments and charges proves to be less efficient compared to systematic environmental taxes. The captured results are shown in the graph below and in the table.

Table 7 Revenues from environmental taxes expressed in euros in 2019 per capita

Country	Environmental taxes	Energy tax	Transport tax	Tax on pollution and resources
Hungary	337,56	256,54	45,96	35,05
Czechia	431,45	403,9	25,29	2,26
Poland	370,54	324,24	31,21	15,08
Slovakia	412,07	364,04	42,77	5,26

Source: own processing according to Eurostat



Graph 5 Revenues from environmental taxes expressed in euros in 2019 per capita

Source: own processing according to Eurostat

The formulation of policies and strategies by the Member States of the European Union contributes to the dynamism of integration towards sustainable economic growth. The different traditions and regulatory styles of the Member States of the European Union have a great influence on the functioning of environmental taxes. The common function of all types of environmental taxes is

to achieve the same goal, which is to minimize all the harmful effects of human and business activities on the environment. By restructuring the tax system, the European Union is succeeding in part in tackling the growing problem of environmental pollution. The analysis revealed that the state of the domestic economy and the involvement of policy makers in environmental issues play a major role in the revenue from these environmental taxes. Environmental protection policy has a significant positive effect on the use of environmental taxes and helps to achieve countries' environmental goals. Climate and environmental challenges can be addressed by focusing on long term sustainability and the circular economy, which lay the foundations for sustainable, smart and economic growth. In this non-harmonized tax system, the Member States of the European Union can influence the environment precisely through direct and indirect instruments of environmental policy. Environmental taxes are the right tool to meet sustainable development and eliminate environmental problems.

References

1. Andrejovský, P. – Hajduová, Z. - Lacko, R., 2020. *Kvalita života - vybrané problémy.* Zborník príspevkov a abstraktov z workshopu STEP: 13.11.2020, Košice. Bratislava: Vydavateľstvo EKONÓM, 6-12 p. ISBN 978-80-225-4780-2.
2. Andreoni, V., 2019. *Environmental taxes: Drivers behind the revenue collected : Journal of Cleaner Production*. In: Journal of Cleaner Production, p. 17 – 26, ISSN 6959 – 6526.
3. Bekmezci, M., 2015. *Companies' profitable way of fulfilling duties towards humanity and environment by sustainable innovation*, In: ScienceDirect, p. 228 – 240, ISSN 1877 – 0428.
4. EEA. 2019. *Construction and demolition waste: challenges and opportunities in a circular economy*, In: Resource efficiency and waste - Waste management, p. 1 – 8, ISSN 2467 – 3196, doi: 10.2800/229827
5. EEA. 2011. *Environmental tax reform in Europe: implications for income distribution*, In: EEA Technical report, p. 5, ISSN 1725 – 2237.
6. Eurostat. *Environmental tax revenues* [online]. European Union. [cit. 31-08-2021]. Available on the Internet: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_tax&lang=en
7. Eurostat. *Real GDP per capita.* [online]. European Union. [cit. 31-08-2021]. Available on the Internet: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sdg_08_10&lang=en
8. Guštafíková, T. et al., 2019. *OBEHOVÉ HOSPODÁRSTVO – BUDÚCNOSŤ ROZVOJA SLOVENSKA*, In: MŽP SR, p. 8 – 10, ISBN 978-80-8213-002-3.
9. Hajduová, Z. - Andrejovský, P. - Beslerová, S., 2014. *Development of quality of life economic indicators with regard to the environment*. Procedia social and

behavioral sciences: the 2-nd international scientific conference Contemporary issues in business, management and education 2013. In: Elsevier, p. 747-754, ISSN 1877-0428.

10. Hogg, D. et al., 2014. *Study on Environmental Fiscal Reform Potential in 12 EU Member States*, In: Final Report to DG Environment of the European Commission, No 07.0307/ETU/2013/SI2.664058/ENV.D.2, p. 98 – 99, 160 – 161, 218 –219, 256
11. Hui, J. et al., 2015. *Clean generation technologies in Chinese power sector: penetration thresholds and supporting policies*, In: ScienceDirect, p. 2807 – 2812, ISSN 1876 – 6102.
12. Miller, J. S. – Vela, A. M., 2013. *Are Environmentally Related Taxes Effective?*, In: Inter-American Development Bank, p. 2 – 3, No. IDB-WP-467
13. Mura, M. et al., 2020. *Circular economy in Italian SMEs: A multi-method study*, In: Journal of Cleaner Production, p. 1 – 16, ISSN 0959 – 6526.
14. Naščáková, J. et al., 2015. *Ekonomický rast a jeho limitujúce faktory: Economic growth and its limiting factors. Brussels*: EuroScientia, 100 p. ISBN 978-90-818529-6-8.
15. Viaud, V., 2020. *The European environment — state and outlook 2020* (2019), In: EEA - SOER, p. 57 - 58, ISBN 978-92-9480-090-9.

About the authors

Ing. Stanislav Rudý
University of Economics in Bratislava
Faculty of Business Economy in Košice
Department of Corporate Financial Management
Tajovského 13, 041 30 Košice
e-mail: stanislav.rudy@euba.sk

doc. Ing. Jana Simonidesová, PhD.
University of Economics in Bratislava
Faculty of Business Economy in Košice
Department of Corporate Financial Management
Tajovského 13, 041 30 Košice
e-mail: jana.simonidesova@euba.sk

Instructions for authors:

TITLE OF THE PAPER IN ENGLISH (TIMES NEW ROMAN, 16 pt, CAPITAL BOLD)

TITLE OF THE PAPER IN SLOVAK (TIMES NEW ROMAN, VEĽKOSŤ 14 pt, CAPITAL BOLD)

Name SURNAME (Times new roman, italic, 14 pt)

Abstract (Times new roman, 12 pt, bold)
Abstract in English – max. 10 lines. (Times new roman, 12 pt).

Keywords: 5 – 8 key words in English

Introduction (Times new roman, 14 pt, bold)

The editors of the journal welcome empirically (experimentally) founded studies, survey studies, contributions to "Discussion" (personal views and attitudes on controversial issues in economics as science, as a professional hpractice, etc.). Integrative studies documented by relevant data from central and east European regions and member countries of European Union are specially welcomed. Naturally, all contributions should be original. The publishing of the article is free of charge.

The editors accept only contributions written in English (grammatically correct). The manuscript should be no longer than 15 pages, single-space typed, basic text using font Times New Roman 14 pt. Illustrations, i.e. tables, diagrams, black & white pictures; text should mention their placement, numbering and titling. With all figures borrowed from other authors, the authors' names should be listed in figure legends. Please use the following format of the paper in MS Word. Page size A4 (21 cm x 29,7 cm), single spacing, all margins at 2,5 cm.

Table 1 Title of the table (Times new roman, 12 pt)

Source: XYZ (Times new roman, 12 pt)

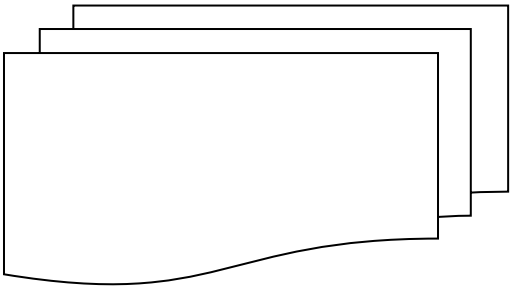


Figure 1 Title of the figure(Times new roman, 12 pt)
Source: XYZ (Times new roman, 12 pt)

1. Title of the chapter, numbered (Times new roman, 14 pt, bold)

Text text text text text text text text text text text text text text text text text text text (Times new roman, 14 pt).....

1.1 Title of the subchapter, numbered (Times new roman, 14 pt, bold)

Text text text text text text text text text text text text text text text text text text text (Times new roman, 14 pt).....

Conclusion (Times new roman, 14 pt, bold)

Authors should submit their paper as an e-mail attachment (in MS Word or Rich Text Format) to: acta@euke.sk. Submission to *Acta oeconomica cassoviensia* implies that the paper is not submitted to any other journal at the same time. Manuscripts are not returned to the authors.

References (Times new roman, 14 pt, bold)

Citations, including the author's name and year of publication should be in parenthesis; for instance: (Smith, 1990) or P. S. Smith (1990). The relevant works that are referred to in the text must be consistently quoted and included in the bibliography in alphabetical order). Authors should follow the norm STN ISO 690.

About the author

The author (authors) should give their first name and surname as well as the full address of the center where the work was originated. The information about the author, 50 words maximum, must be given at the end of the article.

ACTA OECONOMICA CASSOVIENSIA

ISSN 1337-6020 (print)
ISSN 2585-8785 (online)