



CONFERENCE PROCEEDINGS

EDAMBA 2019

INTERNATIONAL SCIENTIFIC CONFERENCE
FOR DOCTORAL STUDENTS
AND POST-DOCTORAL SCHOLARS

EMPOWERING ACTIONS TO ACHIEVE GLOBAL GOALS:
IMPLICATIONS FOR ECONOMICS, BUSINESS,
MANAGEMENT AND RELATED DISCIPLINES

UNIVERSITY OF ECONOMICS IN BRATISLAVA, SLOVAK REPUBLIC

23 – 24 OCTOBER 2019

EDAMBA 2019

**International Scientific Conference
for
Doctoral Students and Post-Doctoral Scholars**

**Empowering Actions to Achieve Global Goals:
Implications for Economics, Business,
Management and Related Disciplines**

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Andrea Petianová

Paula Puškárová

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Foreword

Current economic research over the past decade has been struggling to find market solutions to achieve UN-adopted Sustainable Development Goals (SDG). At the eve of their assessment, global community still appears to lack new bright ideas that would help to *inter alia* efficiently tackle global poverty, mitigate the impacts of climate change, boost economic growth. The last Nobel Prize awards only accentuated this global search.

The University of Economics in Bratislava as the leading Slovak university in economics has attempted to contribute to this search by organizing the 22nd International Scientific Conference for Doctoral Students and Post-Doctoral Scholars titled “Empowering Actions to Achieve Global Goals: Implications for Economics, Business, Management and Related Disciplines“ on 23rd through 24th October 2019 in Bratislava, Slovakia. The aim of the conference was to bring together particularly young eager bright minds with their innovative insights into research questions surrounding the concept of sustainable development goals and discuss their ideas to help the economic research in the post-SDG era that is still going to face the SDG challenges.

Proudly we present herewith the proceedings of the conference and hope that yet diverse portfolio of studies collected here might find its way into the heart and work of their readers. The papers collected in the proceedings were presented in six rather diverse parallel sessions of the conference, namely:

- 1) Economic theory, economic policy, finance & banking
- 2) Accounting, business informatics, statistics, actuarial science, econometrics & operational research
- 3) Financial management, business economics & management, corporate social responsibility
- 4) Marketing & business management, trade & services management, international business management
- 5) Global economics, international economic relations, and
- 6) Language & culture in business environment.

We wish you an enjoyable reading.

Paula Puškárová

*Conference Chair
Vice-Rector for Research and Doctoral Studies
University of Economics in Bratislava*

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FOREIGN TRADE COOPERATION OF SLOVAKIA WITH KAZAKHSTAN AND KYRGYZSTAN AND OPPORTUNITIES FOR SLOVAK EXPORTERS

Natália Barinková

University of Economics in Bratislava
Faculty of Commerce, Department of International Trade
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
Natalia.barinkova@euba.sk

Abstract. Slovak companies are looking for new markets outside of the EU as markets of the EU countries are already saturated. As Kazakhstan and Kyrgyzstan are still developing countries, which economies are dependent on the import of technologies and products as these countries do not have the capacity and knowledge to produce necessary products by themselves. The aim of the article is to examine the position of Kazakhstan and Kyrgyzstan in Slovakia's foreign trade relations and according to the last available statistical data and calculations based on Trade Intensity Index, the current bilateral trade and the importance of these two countries in the external economic relations of Slovakia will be evaluated. Finally, priority sectors of cooperation and prospective areas of trade cooperation between the countries concerned will be outlined.

Keywords: foreign trade, Kazakhstan, Kyrgyzstan

JEL classification: F 19

1 Introduction

Kazakhstan and Kyrgyzstan are two developing economies at different stages of development, representing opportunities for Slovak exporters. The countries belong to Central Asia, which was of strategic importance in the past, as the Silk Road passed through it. Both Kazakhstan and Kyrgyzstan are rich in raw materials, especially oil, natural gas, gold and uranium. The raw materials are also a major factor in economic development of individual countries, as well as their foreign policy instruments (Teleuova, 2015). At present, both countries are primarily of geopolitical importance, especially for ocular states. Russia seeks to increase its influence, particularly in the political and energy fields. For China, the region is important from the perspective of the New Silk Road Belt and Road (Peyrouse, 2016). The region is of interest to the US in order to

promote its energy interests in the region. For the EU, the region is of particular geopolitical importance for maintaining stability at the European-Asian borders (Šimko, 2016). For Slovakia, both countries represent potential for export of Slovak products.

Slovakia's trade relations with both countries are subdued. Mutual trade cooperation is low. Although trade exchange is gradually increasing, it does not reach the level that cooperation opportunities offer (Drieniková, Kašťáková, 2016). Exported commodities from Slovakia to these two countries are products of traditional industries, which have a long tradition in Slovakia but so far only a few Slovak companies have succeeded in these markets. Both countries offer several opportunities for the export of Slovak products, as the market is not yet saturated with European products and the economies of both countries do not have sufficiently developed industrial or technology production. Finding a suitable partner, asserting itself on the market and conditions for importing goods are more difficult, but companies can make high profits. However, Slovak companies are still reluctant to export to these countries because of not knowing the possibilities and conditions offered by the markets.

1.1 Methodology

The aim of the article is to examine the position of Kazakhstan and Kyrgyzstan in the foreign trade relations of Slovakia, on the basis of the analysis of mutual trade exchange and trade intensity to evaluate the importance of these countries in the external economic relations of Slovakia and to outline current opportunities for Slovak exporters.

Several theoretical methods were used to achieve this goal and were used in the form of general methods (synthesis, analysis, induction, deduction and comparison). Graphs and tables are used to make foreign trade data more transparent. In the section dealing with the brief characteristics of the economies of these two countries, the synthesis method is used to combine information on the current economic situation in the countries concerned. Foreign trade exchange between Slovakia and two selected Central Asian countries is analyzed on the basis of data from the Statistical Office of the Slovak Republic and the Trade Intensity Index. In order to draw conclusions about the prospective areas of cooperation and possible opportunities for Slovak companies, the method of induction and deduction is used.

The Trade Intensity Index (TII) is used to assess whether the trade volumes between two countries are larger or smaller than it would be expected on the basis of their world trade position. It is defined as the share of one country's exports going to a partner divided by the share of world exports going to the partner. (World Bank, 2010)

It is calculated as:

$$TII_{ij} = \frac{(x_{ij}/X_{it})}{(x_{wj}/X_{wt})} \quad (1)$$

where:

- x_{ij} represents the value of export from country i to country j ;
- X_{it} represents the value of total exports of country i to world;
- x_{wj} represents the value of total world exports to country j ;
- X_{wt} represents total value of the world exports.

TII values range from 0 to $+\infty$. If the index value is 1, it means that the exporting country i exports to country j exact ratio of exports, which is a matter for country B considering its share in world import. If the index value is higher than 1, the business flows between examined countries are on a higher level, as it would be expected in view of the world economy. This means, that country i exports to country j in a ratio of more goods than to the rest of the world. It is thus an intense trade relationship. If the value is less than 1, then the intensity of trade is at a level lower, than it would be expected. (World Bank, 2013).

An important source for this research was the Statistical Office of the Slovak Republic and the Ministry of Economy of the Slovak Republic, who provided data for the analysis of foreign trade between Slovakia and selected countries. Data necessary for TII were used from UNCTADSTAT statistics.

2 Specification of Kazakh and Kyrgyz economies

Central Asia is a large raw material-rich area and therefore the economy of the countries of the region is focused primarily on the mining industry. Some countries have successfully established their economies in mining and processing of raw materials, while others have not taken the advantage of the availability of natural resources. Such examples are Kazakhstan and Kyrgyzstan. Although both countries have access to raw materials, they are at the different stages of development.

The most developed country of the Central Asian region is the Republic of Kazakhstan. Kazakh Republic is an inland state with an area of 2 724 900 km² and population of approximately 18.6 million. (Czech Trade, 2018). Kazakhstan belongs to the one of the 10 largest states in the world but it has one of the smallest population densities. The country has undergone significant economic development in recent years. Since 2015, it has been one of the founding states of the Eurasian Economic Union, which also influences to some extent the focus of Kazakhstan's foreign trade on the region. Kazakhstan's economy is focused primarily on the mining industry, as the country has a wealth of oil, gas, uranium, gold and silver. Oil revenues account for up to 50% of the country's national budget (Czechtrade, 2019). In recent years, Kazakhstan has been trying to diversify its economy and reduce its dependence on mineral exports (Drieniková, 2018). Kazakhstan's economy is dependent on foreign trade, thanks to exports of mineral commodities, the country achieves a long-term active trade balance. The One Belt One Road (OBOR) project, which should be used to transport Chinese goods to the EU and should contribute to the development of both the Chinese and Kazakh economies, comes to the forefront. Kazakhstan has an important logistics and transport hub - the largest dry port in the world - the Khorgos Gateway, strategically located on the Kazakhstan-China border. Both countries are connected by a railway line (Drieniková, 2018). By 2020, 2 million containers should be transported through Kazakhstan, which should bring 5 billion euros of transit charges for the Kazakh economy (Gotev, 2018). Another factor in the development of trade relations between Kazakhstan and China will be the completion of the highway that runs from the western border of China to the western border of Kazakhstan and will continue until St. Petersburg.

Kyrgyzstan is one of the least developed countries of the post-Soviet region. In the Focus Economics assessment, Kyrgyzstan ranked 10th among the countries with the lowest GDP per capita in 2018 (MZVaEZ SR, 2018). The shadow economy accounts for more than 50% of the country's GDP. An important moment for the Kyrgyz economy was the country's integration into the Eurasian Economic Union in 2015, thereby strengthening Kyrgyzstan's trade relations with its members. The high level of corruption and the underdeveloped infrastructure cause the country's low competitiveness and hinder the influx of investments and the development of further trade relations. The country's economy is heavily dependent on the extraction of mineral resources. The country has a rich supply of gold, coal and tungsten. Kumtor Mine is considered to be one of the largest gold deposits in the world and accounts for 40% of the country's exports (Czechtrade, 2019). Other important industries are food and textile. An important role in the economy is also played by the agricultural sector, which employs more than 50% of the working population (MZVaEZ SR, 2018). The country's economy depends on technical and development assistance from international organizations such as the UN, the EU, the IMF, the World Bank and bilateral assistance from countries such as China and Turkey.

The economic development of the whole region is more often mentioned in connection with the Chinese project of restoration of the ancient Silk Road. Its geographical location and untapped economic potential predetermine its strategic position as a crossroads of political and economic interests (Drieniková, 2018).

2.1 Foreign trade of Slovakia with Central Asia with focus on Kazakhstan and Kyrgyzstan

Foreign trade has a significant position in the economy of the Slovak Republic, because it is largely involved in the country's economic growth, gross domestic product creation (Kašáková, 2018). In 2018, Slovakia's foreign trade reached 157.147 bln. euro. Of this, exports amounted to 79.785 bln. euro and import 77.326 bln. euro (MH SR, 2019). Compared to 2017, this represents an increase of almost 11 bln. euro. The most important trading partner of Slovakia is the EU for a long time. In 2018, EU countries accounted for 76.5% of Slovakia's foreign trade. The most important trading partners of Slovakia outside the EU include the US, Russia, China and EFTA countries. Five countries of the Central Asia accounted for 0.13% of Slovakia's foreign trade with third countries.

Central Asian countries accounted for 0.031% of Slovakia's foreign trade. The largest share of these 5 countries has long been Kazakhstan and the smallest Tajikistan. In 2018, Slovakia had an active trade balance with all countries. The data is shown in Figure 1.

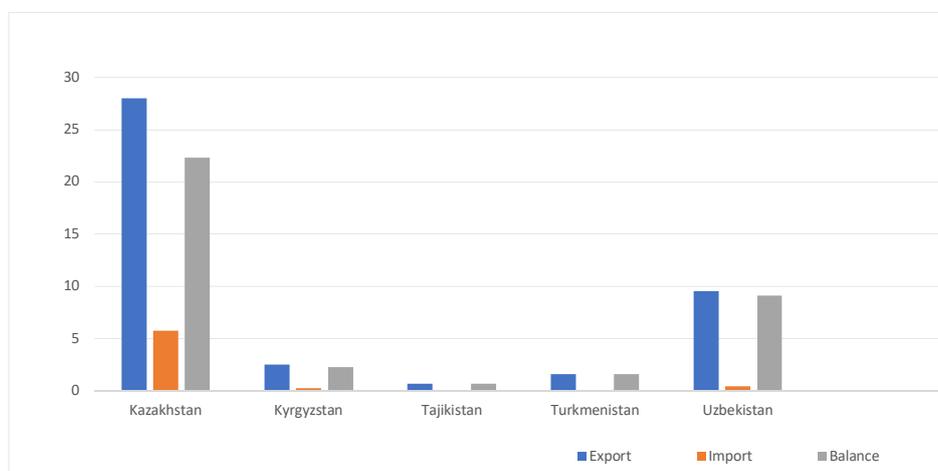


Fig. 1. Trade balance of Slovakia with Central Asian countries in 2018 (mil. euro). *Source: processed by authors according to data from MH SR*

Total exports of Slovakia to Central Asian countries in 2018 amounted to 42.121 mil. euro. Of this, exports to Kazakhstan amounted to 29 mil. euro and Kyrgyzstan 2.449 mil. euro. Total import of Slovakia from these countries was realized in the amount of 6.358 mil. euro. From this import from Kazakhstan in the volume of 5.706 mil. euro and Kyrgyzstan 243 ths. euro (MH SR, 2019). The share of Kazakhstan and Kyrgyzstan in Slovakia's foreign trade in 2018 was only 0.024%.

Kazakhstan

Trade balance of Slovakia with Kazakhstan has been active for a long time. The positive balance of mutual trade is influenced by the fact that Slovakia is not a significant importer of energy raw materials from Kazakhstan. The development of foreign trade between Slovakia and Kazakhstan can be seen in Figure 2. In 2018, Slovak exports to Kazakhstan reached 28 mil. euro, which represents an increase of 2.084 mil. euro (MH SR, 2018). The overall trade balance of foreign trade with Kazakhstan was 33.706 mil. euro. In 2018, Kazakhstan was the 66th most important export partner of Slovakia and 77th most important trading partner. Slovakia has had the largest turnover in Central Asia with Kazakhstan for a long time.

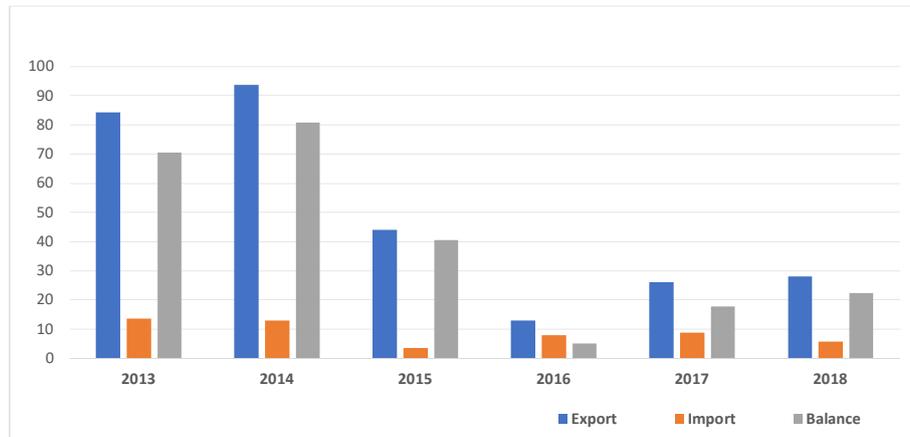


Fig. 2. Foreign trade between Slovakia and Kazakhstan in 2013 - 2018 (mil. euro). *Source: processed by authors according to data from MH SR*

Table 1. Exported and imported commodities from Slovakia to Kazakhstan in 2018 (HS4)

HS4	Export commodities	euro	%
8703	Motor cars and other motor vehicles	10 077 138	40
8407	Reciprocating or rotary internal combustion piston engines	2 862 136	10,5
9018	Instruments and appliances used in medical sciences	2 596 610	9,5
HS4	Import commodities	euro	%
2711	Petroleum gases and other gaseous hydrocarbons	4 245 827	74,4
7202	Ferroalloys	450 720	7,9
7402	Copper	232 223	4,1

Source: processed by authors according to data from ŠÚ SR

Slovak exports to Kazakhstan are diversified and represent a cross-section of the main sectors of the Slovak economy. The most important goods groups of Slovak exports to Kazakhstan according to HS4 in 2018 were cars, engines and medical instruments. The main import items from Kazakhstan under HS4 were petroleum gases, whose import accounted for almost 75% of total imports, as well as ferroalloys and copper (ŠÚ SR, 2019). A more detailed structure of exported and imported commodities is shown in Table 1.

Slovakia participated in the foreign trade of Kazakhstan in the amount of 39.65 mil. USD, which represents 0.042% (MH SR, 2019).

Kyrgyzstan

Slovakia's foreign trade with Kyrgyzstan has long been at a very low level. In 2018, however, Slovak exports to this country recorded a more than double increase in comparison with previous year, mainly due to an increase in arms exports from Slovakia (Figure 3).

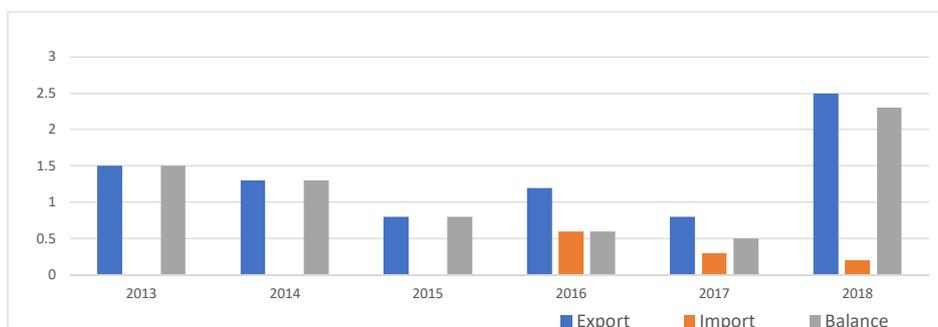


Fig. 3. Foreign trade between Slovakia and Kyrgyzstan in 2013-2018 (mil. euro). *Source: processed by authors according to data from MH SR*

Table 2. Exported and imported commodities from Slovakia to Kyrgyzstan in 2018 (HS4)

HS4	Exported commodities	euro	%
8423	Weighing machines	571 120	23,3
9619	Sanitary towels (pads) and tampons	508 976	20,8
9302	Revolvers and pistols	350 240	14,3
HS4	Imported commodities	euro	%
0802	Nuts (excluding coconuts, Brazils and cashew nuts); fresh or dried	148 307	61
9506	Gymnastics, athletics, other sports (including table tennis) or outdoor games equipment	19 345	8
8521	Video recording or reproducing apparatus	12 573	5,2

Source: processed by authors according to data from ŠÚ SR

Commodity exchange between Slovakia and Kyrgyzstan is diverse. In 2018, the most important exported commodities were: instruments, cars and guns, and more than half of the Slovak import from Kyrgyzstan were nuts exported by Kyrgyzstan to almost all over the world (Table 2).

2.2 Intensity of Slovakia's foreign trade relations with Kazakhstan and Kyrgyzstan

To evaluate the trade between Slovakia and Kazakhstan, Slovakia and Kyrgyzstan, we use the Trade Intensity Index. The Trade Intensity Index (TII) is used to assess whether trade volumes between two countries are larger or smaller than would be expected based on their position in the world economy. A detailed overview of the Trade Intensity Index between Slovakia and Kazakhstan, Slovakia and Kyrgyzstan in 2008-2017 is shown in Figure 4.

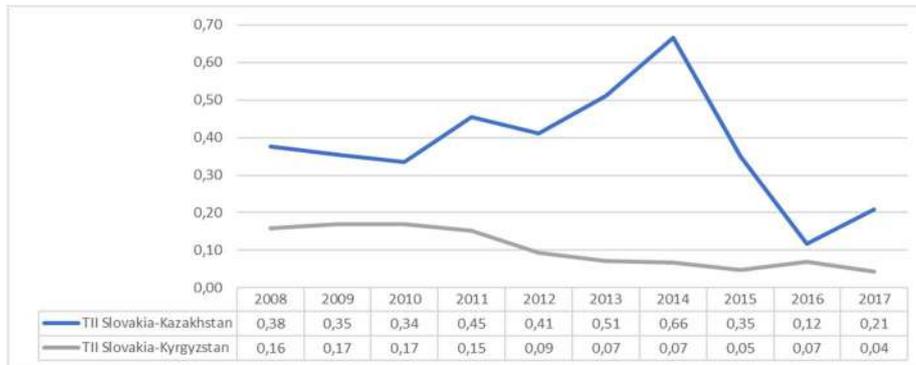


Fig. 4. Development of TII between Slovakia and Kazakhstan, Slovakia and Kyrgyzstan 2008-2017. *Source: processed by authors according to data from UNCTADSTAT*

Based on the results, we can conclude that in 2008-2017 the Trade Intensity Index of Slovakia with Kazakhstan and Kyrgyzstan was below 1 which means that these countries are not significant export partners of Slovakia and speaks of low level of export activity of Slovak exporters to Kazakhstan and Kyrgyzstan. Higher values were reached by TII SK-KZ, which only confirms that Kazakhstan is more important export partner for Slovakia than Kyrgyzstan. TII SK-KZ reached the highest values in 2013 and 2014, when Slovakia's exports were about three times higher than in 2018. TII SK-KG reached values close to 0. The highest values were recorded in 2009 and 2010, when the Slovak export to Kyrgyzstan reached higher figures.

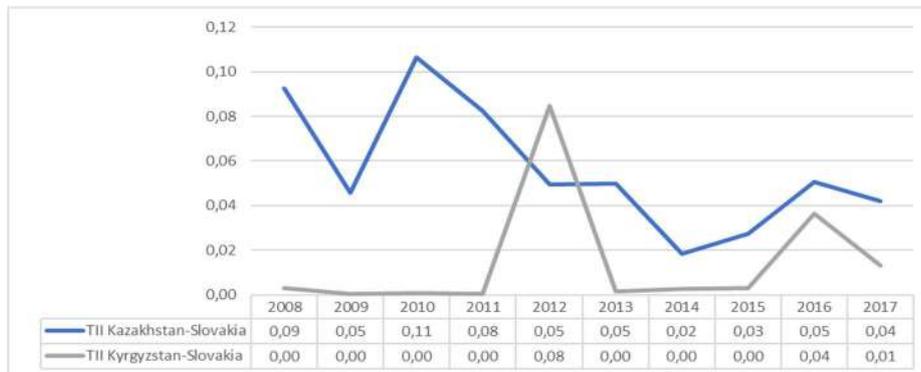


Fig. 5. Development of TII between Kazakhstan and Slovakia and Kyrgyzstan and Slovakia in 2008-2017. *Source: processed by authors according to data from UNCTADSTAT.*

From Figure 5 it is evident that the Trade Intensity Index of Kazakhstan with Slovakia and Kyrgyzstan with Slovakia reached very low values close to 0 in years 2008-2017, which means low intensity of export activity of Kazakh and Kirghiz exporters to Slovakia. Slovakia is not an important export destination of these countries and exports from these countries have been low for a long time. Higher export activity towards Slovakia is recorded by Kazakh companies than by Kyrgyz companies.

2.3 Opportunities for Slovak exporters in Kazakhstan and Kyrgyzstan

Kazakhstan and Kyrgyzstan are currently not a significant trading partners of Slovakia, but as these two countries are in the development phase, they represent potential markets for Slovak exporters.

The Kazakh market is the most promising market for Slovak companies. It is a stable market, several Slovak companies already have experience with export to this country, export can be insured by Eximbanka, which has helped to realize several business cases in this country and Slovakia has the embassy in the country (Hospodárske noviny, 2019). As Kazakhstan has large hydrocarbon reserves, it focuses its energy policy especially on the use of these energy sources. Due to Kazakhstan's interest in exporting energy fuels in the future, the prospective area for Slovak companies could be cooperation in the modernization of power plants. There are several traditional exporters in Slovakia in this area. Kazakhstan has been investing a lot of funds in recent years particularly in the area of construction, road and rail development. Slovak companies can participate in PPP projects, which represent a form of cooperation of Slovak company with a local partner, especially in the area of infrastructure development but also healthcare or education. As the government of Kazakhstan has recently also decided to promote afforestation and building-up green areas, specific opportunities are also offered to state-owned or private companies from field of forestry. Several traditional Slovak companies are already exporting to Kazakhstan. These companies are representing medical technology, energy, wastewater treatment. Based on demand from Kazakh companies, agriculture, energy, healthcare, wastewater treatment, ICT are one of the most promising sectors of cooperation between Slovakia and Kazakhstan. These are sectors where Slovak companies have a long tradition. To conclude, the trade potential that exists between Slovakia and Kazakhstan is untapped and there is a big potential to deepen the cooperation.

Trade exchange with Kyrgyzstan is relatively low. It is quite difficult for Slovak companies to become successful in this market, which may be due to the lack of double taxation agreement or investment protection agreement. In this country, Slovakia has no embassy and the economic agenda is covered by the Embassy of Slovakia in Kazakhstan. Kyrgyzstan is slowly starting to open to foreign investment and joint-venture. Since agriculture plays an important role in the country, and the technologies for cultivating the soil or processing agricultural products are essential for the economy to run. However, as Kyrgyz companies do not produce such technologies, they are imported from abroad. In the field of agriculture, there are also opportunities in the field of fertilizer imports, which are currently imported to Kyrgyzstan at high prices from Uzbekistan and the country is looking for new importers. Based on the direction of the economy, market needs and the possibilities of Slovak exporters, food, medical, energy and mining sector can be considered as other prospective sectors for Slovak exporters.

3 Conclusions and policy implications

Based on the results of the examination of the development and intensity of foreign trade between Slovakia and Kazakhstan, Slovakia and Kyrgyzstan, we came to the following conclusions: The trade balance between Slovakia and Kazakhstan and Kyrgyzstan is relatively low. Total exports of Slovakia to these two countries in 2018 amounted to 31.449 mil. euro. The share of these countries in Slovakia's foreign trade in 2018 was only 0.024%. Slovakia has a long-term active trade balance with both countries, which is mainly due to the low activity of companies exporting from these two countries. In 2018, we saw an increase in foreign trade between Slovakia and Kazakhstan and Kyrgyzstan compared to 2017. Kazakhstan is the most important trading partner of whole Central Asia. According to the results of the development of the Trade Intensity Index, we can claim that the mutual trade between Slovakia and Kazakhstan, Slovakia and Kyrgyzstan is mutually inadequate. Trade Intensity Indexes are below 1. Slovak exporters are less active in this region compared to other regions outside the EU and Slovakia is not an export destination for Kazakh or Kyrgyz exporters. Also based on the results of the Trade Intensity Index, Kazakhstan is more important trading partner than Kyrgyzstan, which may be caused by several factors such as the absence of an investment protection treaty and the avoidance of double taxation treaty between Slovakia and Kyrgyzstan, corruption or protectionism of the Kyrgyz economy. Although both countries are rich in raw materials, they have taken the advantage of being rich in raw materials differently.

The export potential to these countries is not exploited, Slovak companies can compete with products of other European countries in these two countries and also in whole Central Asia. The economy of the countries is undergoing a gradual development, which is also necessary to realize with the help of foreign technologies and know-how. Slovakia has good historical relations with these countries that we try to build on by regular political or business visits. Only a few Slovak companies are active in this region. The most promising sectors for Slovak exporters are the energy industry, mining industry, food industry and water treatment.

Acknowledgement

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PREDICTORS OF SUCCESS OF A NEW PRODUCT ON THE MARKET

Terézia Barlašova¹, Janka Kopčáková², Radoslav Potoma³, Denisa Šeščíková⁴

University of Economics in Bratislava
Faculty of Business Economy in Košice
Tajovského 13
Košice 041 30
Slovak Republic

¹terezia.barlasova@student.euke.sk,

²janka.kopcakova@student.euke.sk,

³radoslav.potoma@student.euke.sk,

⁴denisa.sefcikova@student.euke.sk

Abstract. The rapid development of technologies, the moral obsolescence of products, the shortening of their life cycle, the continual arrival of new solutions and the efforts of businesses to constantly increase their competitive strength require successful product marketing management. The aim of this article is to describe the development of new products on the market, the individual stages of development and the organization and prognosis of the development of new products. When introducing a new product, it is necessary to take into account certain limitations and to choose the appropriate predictive scientific method, resp. model. The article is focused on the use of Bass model, which is one of the possible quantitative methods, aimed at modeling the new product on the market, respectively. predicting the possibility of survival of a new product on the market

Keywords: Bass model, innovations, new product.

JEL classification: C 69, M 31, O 39

1 Introduction

In today's highly competitive markets, successful and prosperous companies are characterized by a continuous and continuous flow of innovation, the development of new products, services and processes. New products must be developed by companies as a result of rapid changes in consumer preferences, technological developments and increased competition. Speed of marketing is key to product success. Significant contributions in the field of marketing and innovation were brought mainly by scientific researches by Rogers E.M. (2003), Bass F. (2004), Ries A., Trout J., (2010), Savčenko I.V., Mitasova E.A. (2010), Jeffrey A. (2010), which provide various insights and solutions to the subject.

2 New product

Innovative product is possible according to author Ochorzina. J.O (2004) to be defined as the result of an innovative activity to satisfy a potential consumer. In his literature "New product - from the introduction of the idea to the realization" Ochorzina. J.O describes the process of developing a new product, which consists of eight stages:

1. *generating ideas* – is a systematic search for new ideas,
2. *choice of ideas* - an analysis of all ideas proposed about a new product with the aim of screening out-of-date development at the earliest stage of development,
3. *development and validation of the concept* - the idea of a new product is transformed into a product concept that is tested on a group of target customers to determine its degree of attractiveness,
4. *development of marketing strategy* - is to determine the marketing strategy for entering a new product market,
5. *business analysis* - Estimating a new product of expected sales values, costs and profits to align with business objectives,
6. *product development* - involves transforming the concept of a new product into a tangible product,
7. *trial marketing* - tests the product and marketing program under real market conditions,
8. *production* -. At this stage in the development of a new product, the manufacturer must select the right time on the market, the sequence and scope of activity, the most effective ways of distributing and promoting the product, and develop a detailed marketing plan. (Ochorzina, J.O., 2004).

2.1 Organization of new product development

Organizing the development of new products is essential to reconcile work to improve overall performance and save time. (Jeffrey, 2010) Sequential or parallel development can be used to develop a new product. Sequential product development is characterized in that each required organizational unit carries out its activity individually, upon completion of which it transfers further product development to another unit. But if an enterprise wants to launch a product faster, parallel product development is faster and more flexible. It is characterized by mutual cooperation of different departments of the company and overlapping of individual steps to save time and increase efficiency. Sequential development is characterized by the autonomy of individual activities and, conversely, by their parallel dependence.

Ochorzina J.O. (2004) states that the existence of a new product on the market depends on whether or not the consumer is prepared to accept a certain innovation. It describes the process of adopting a new product, which includes several phases:

1. getting initial information on news,

2. the emergence of interest;
3. consumer evaluation,
4. testing and decision making.

Fig. 1 illustrates the process of accepting a new product and the relationships of each factors in CLD (causal loop diagram).

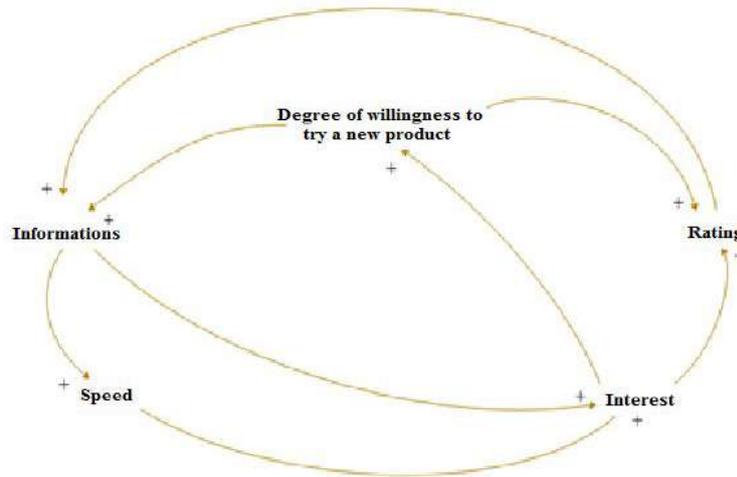


Fig. 1. CLD – new product adoption process. *Source: own processing*

From a given causal cycle it is possible to simulate the cumulative curve of the Bass model, which expresses the relationship between the number of customers and the time of acceptance of a new product. From the causal cycle we have identified 4 functions:

- f1 (degree of readiness, information over time) (Figure 2)
- f2 (degree of willingness, evaluation over time) (Figure 3)
- f3 (interest, evaluation over time) (Figure 4)
- f4 (interest of information over time) (Figure 5)

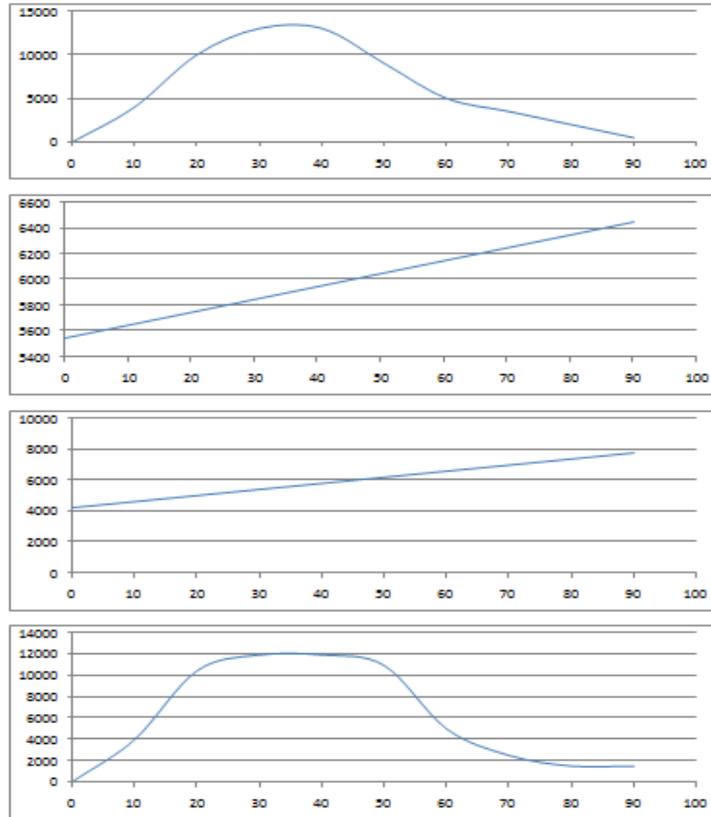


Fig. 2. Fig. 3. Fig. 4. Fig. 5. Simulated functions from causal cycle. *Source: own processing*

From the previous four functions, a fifth cumulative graph of quantity and time was created. (Figure 6)

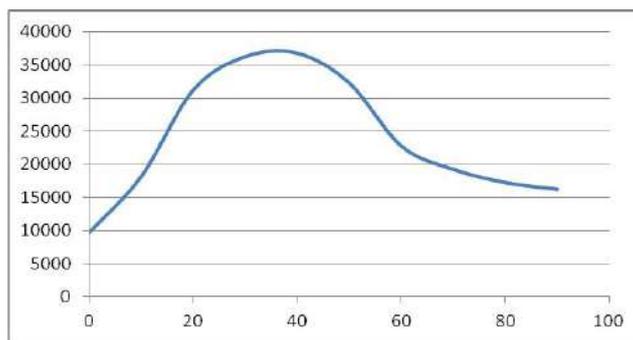


Fig. 6. Cumulative chart. *Source: own processing*

After creating these graphs, it is possible to evaluate that the cumulative curve of the Bass model can be simulated from a given causal cycle

2.2 Forecasting of new products on the market

The process of launching a new product is still closely linked with high risk. Risk reduction can be achieved through a qualitative and quantitative estimate of the success of innovation before a specific product is launched.

Rogers, E.M (2003) states that such a risk can be eliminated through the diffusion process. Diffusion theory shows how the product appears on the market, how it will be accepted

/rejected by the company and how it will be further expanded. The E. Rogers model segments potential customers of innovation based on individual predisposition to perceive innovation, into 5 segments: innovators, early followers, early majority, late majority, delays. Forecasting the success of a new product in the market is according to Trommsdorf, V., Steinhofa, F. (2009) compared to existing products significantly reduced due to:

- non-existent data on past developments,
- ignorance of the market, which entails a high risk of launching a new product,
- slow response in changing market requirements.

In the process of launching a new product, it is therefore necessary to take account of these constraints and to choose appropriate predictive scientific methods, models. An example of a quantitative method for forecasting / modeling a new product on the market is also the Bass model. The model also allows prediction of possible revenue from the new product. There are 2 types of customers:

- Innovators are consumers who bought a product based on news, advertising, and other similar influences.
- Imitators represent consumers who buy the product only after the recommendations, experiences of other consumers.

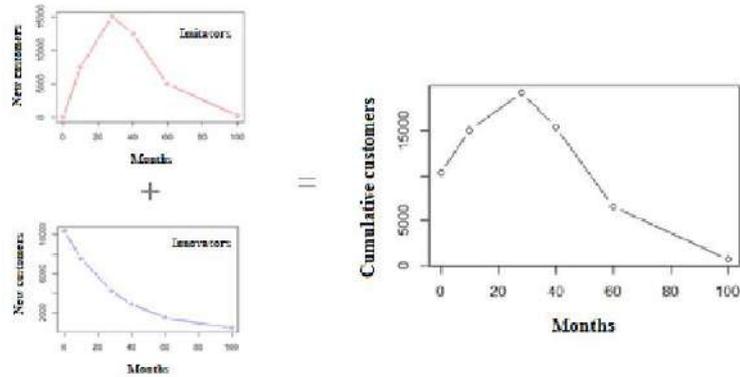


Fig. 7. Innovators, Imitators, Cumulative Customers. *Source: adjusted to Bass F., 2004*

From the cumulative data, a non-parametric Kolmogorov-Smirnov test was performed to confirm the relationship between the graphs for 2 selections. This test tests the consistency of the two sample distributions. The results of this test are:

$D = 0.84316$,

$p < 0,001$

95% confidence level.

This means that the distribution of the graphs is significantly different from each other and it has been confirmed that the data within the graphs is unlikely to come from the same population.

2.3 Development of the curve in relation to the ratio of innovators and imitators

The development of the Bass model curve is influenced by the ratio of innovators and imitators. To demonstrate the effect, the curves were simulated in varying proportions of innovators and imitators.

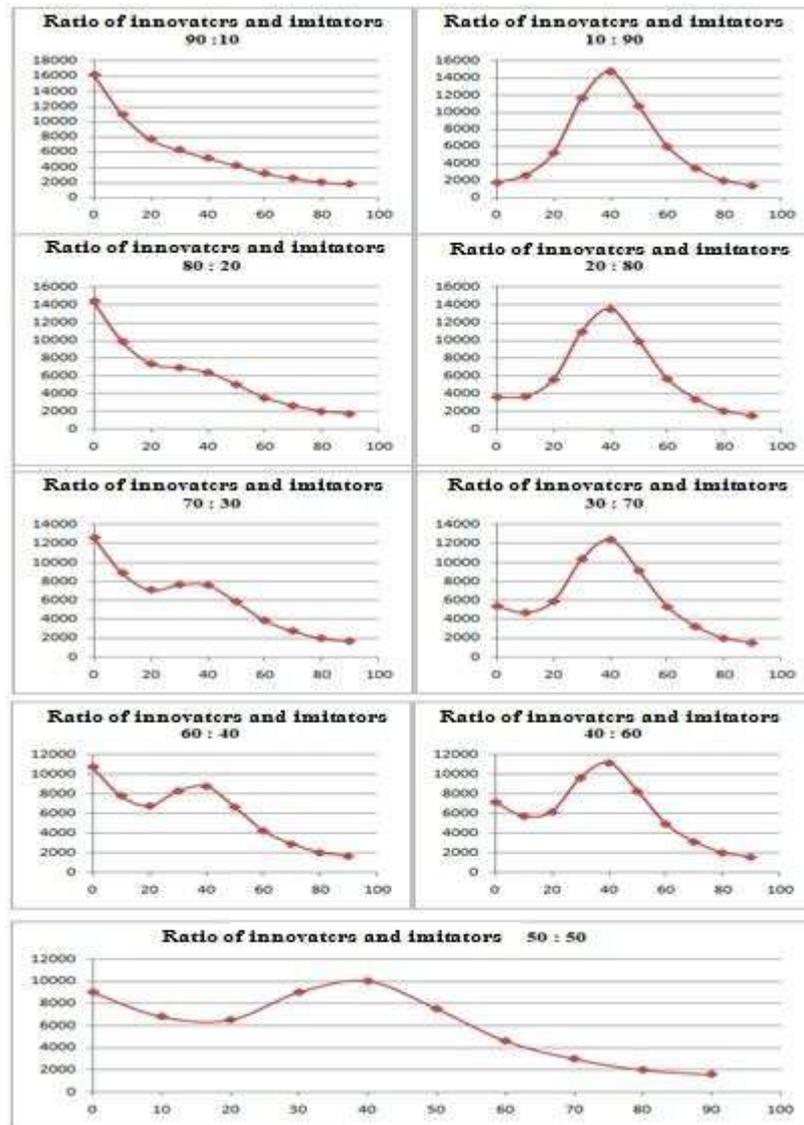


Fig. 8. Ratio of innovators and imitators. *Source: own processing*

The Bass model consists of a simple differential equation that describes the process of receiving new products in the population. This model is a justification for how current consumers and potential users of the new product interact. The model is widely used in forecasting, especially sales forecasts for new products and technology forecasts.

3 Discussion

In the chapter New Product Development Organization, a causal cycle was developed based on the following variables:

- the degree of willingness to try a new product,
- information,
- rating,
- interest
- speed.

The causal cycle was chosen as a tool for graphical representation and analysis of relations and influences between given variables. The diagram consisted of a set of nodes (variables) and arrows that express the relationship between them. From the causal cycle it is possible to read the relation of variables, where the variable at the beginning of the arrow expresses the change of the variable at the end. The plus sign indicates a dependency in which an increase

/decrease in one variable induces an increase / decrease in the other. A causal feedback diagram has been created because one variable affects the other variables that in turn affect the original variable.

Our goal was to find out and prove whether the cumulative bass curve of the model could be simulated from the causal cycle of customer acceptance. Four functions were simulated from the created causal cycle:

- f1 (degree of readiness, information over time),
- f2 (degree of willingness, evaluation over time),
- f3 (interest, evaluation over time),
- f4 (interest in time).

The cumulative curve of the Bass model is given by a function (time, quantity), so we chose variables on the x and y axes that are measured in the same units and simulated the curves. We finally made the cumulative function No.5 (number of customers, time) from the generated curves and proved that from the given causal cycle it is possible to simulate the cumulative curve of the Bass model.

In the chapter on market forecasting, where we analyzed the Bass model and the influence of innovators and imitators on the resulting function, we aimed to determine the evolution of the cumulative curve depending on the ratio of innovators and imitators. The first step was to create a default function where the ratio of innovators and imitators was 50:50.

Subsequent simulations as they change their ratio, we created functions that point to a change in curve development and show how the curve changes when the ratio of innovators or imitators changes.

4 Conclusion

This article analyzes the development of a new product on the market, identifies the determinants of successful development of new products, the key factors of the success of a new product and points out how to eliminate the risk that arises when introducing a new product to the market.

Risk reduction can be achieved through the diffusion process. Diffusion of innovation is the process by which innovation is transmitted in a timely manner through communication channels between members of the social system. Diffusion is an extension of already mastered and functioning innovation in new conditions or places of use. This definition was widely used in marketing based on E. Rogers' work "Diffusion of Innovations" in which he proposed a model describing the process of disseminating innovation. At present, this model is the most common with the F. Bass model. According to E. Rogers, the developing force for the spread of innovation is the relationship between different groups of buyers. Given the fact that some potential consumers participating in the purchase or use of innovations are a source of information for others. The more people know about the new product, the faster the innovation information gets into the attention of new potential buyers. Based on the work of E. Rogers, F. Bass created a mathematical model for the distribution of new products. Bass suggested that the case of buying a new product by buyers is a linear function of the number of former consumers. On this basis, he created a system of mathematical functions that describe the dynamics of selling innovation over time.

Unlike the Rogers model, the Bass model only works with two groups (innovators, imitators) involved in disseminating innovation.

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ASSETS AND MODERN METHODS OF DEPRECIATION OF ASSETS IN AN ENTERPRISE

Terézia Barlašova¹, Janka Kopčáková², Radoslav Potoma³, Denisa Šeščíková⁴

University of Economics in Bratislava
Faculty of Business Economy in Košice
Tajovského 13
Košice 041 30
Slovak Republic

¹terezia.barlasova@student.euke.sk,

²janka.kopcakova@student.euke.sk,

³radoslav.potoma@student.euke.sk,

⁴denisa.sefcikova@student.euke.sk

Abstract. The contribution is a breakdown of the assets of the company, which may be short-term, that is, the company is less than one year or long-term, which each company has to depreciate. It is important that the company is able to correctly classify the fixed assets in the individual depreciation groups, thus ensuring correct depreciation of the fixed assets. The essence is to find the difference between the accounting and tax depreciation that the company must use when depreciating its fixed assets. Nowadays, in addition to the classical and most frequently used methods of depreciation, namely the uniform method and the accelerated method, new modern methods of depreciation are also used

Keywords: fixed assets, accounting depreciation, tax depreciation.

JEL classification: M 41, M 42, G 30

1 Introduction

No company today can adequately produce enough quality products or services without fixed assets. Whether it is a tangible asset or long-term intangible assets, it is essential for each company to secure production and thus a market position from which a competitive advantage also emerges.

The first step that a company needs to make is the right decision about the need for property. Purchases of assets may include fixed assets, non-current intangible assets or long-term financial assets. It is important for the company to be able to correctly distinguish what kind of property it is and to classify it properly. As well as determining whether it will be a short-term asset that will be charged directly to consumption or whether it will be long-term and subject to depreciation, The Company may use accounting and tax depreciation, but it is important that they be accounted for at the end

of the reporting period. Thus, three situations may arise for companies, where the difference between accounting and tax depreciation will increase the tax base, reduce the tax base, or be zero, so that the tax base will not increase or decrease.

At present, companies are introducing new modern methods for calculating depreciation in their companies as a constant depreciation method, a progressive depreciation method, a depreciation method, a cumulative depreciation method and a Dutch depreciation method.

1.1 Type of assets in the enterprise

In terms of time, we divide property into:

- non-current assets - their useful life, agreed maturity or settlement in another way when the accounting case arises is longer than one year in accordance with the Act 431/2002 Coll. on Accounting
- short-term assets - its useful life, agreed maturity or settlement in another way at the occurrence of an accounting case is no more than one year under with the Act 431/2002 Coll. on Accounting (Manová, 2011)

As short-term assets are less than one year under the Company's Accounting Act, this asset is not depreciated. Therefore, we continue to focus on long-term assets and its depreciation. (Basioudis, 2019)

Based on the functioning of the assets in the cycle, long-term assets can be described as non-current, cost-effective. Because it still retains its natural form, it does not consume on a one-off basis.

Long-term assets are actively involved in business activities (such as machines, production equipment, devices) - they help business. The company's long-term assets are those components of the property that serve the business for a long time. The main feature of this type of property is its useful life of more than one year. (Baštinová, 2009); Farkaš, 2006) We know:

1. Tangible fixed assets - tangible assets with an input price greater than EUR 1700. Tangible fixed assets include various types of assets:

- buildings - are tangible fixed assets irrespective of the entry price. These include production halls, warehouses, roads, oil pipelines, gas pipelines, corporate dwellings, and the like,
- separate movables and sets of movable assets - their usage time is longer than one year and their valuation is over 1700 euros. Separate movables are, for example, machinery, apparatus and equipment, means of transport, production line and the like. Separate movables with a cost of EUR 1700 or less may also be included if the firm decides in the internal regulation,
- permanent crops - include crops with a fertility period of more than three years, irrespective of the entry price - such as orchards, bushes, vineyards, hop gardens and the like,

- basic herd and draft animals - are tangible fixed assets irrespective of the entry price, such as pigs, cattle, horse racing and the like,
 - Opening of new quarries, sand, technical reclamation, technical improvement and others. - if they are not included in the input price of tangible fixed assets, eg quarry, access to the service station and the like,
 - land - is a tangible fixed asset regardless of the entry price, such as agricultural land, forests, meadows and the like,
 - works of art (if not part of the works), collections, articles of precious metal - if they are not long-term financial assets, they are tangible assets regardless of the entry price, such as paintings, sculptures, commemorative coin collections and the like.
2. Non-current intangible assets - assets that are intangible and cost more than 2400 euros are different types of assets:
- activated development costs - these are the results of successfully completed development work - design, manufacture and testing of prototypes and models prior to production, technological processes of the recipe and the like,
 - software - computer programs purchased separately, not as part of hardware, or created by self-activity to do business with them, or to use them in the enterprise,
 - valuable rights - these are the results of creative intellectual activity acquired for consideration, namely inventions, licenses, trademarks, copyrights, know-how and the like,
 - other non-current intangible assets - intangible fixed assets with a cost of 2400 euros and less and a useful life of more than one year. This includes, for example, a purchased technological process with a price of, for example, 2000 euros.
3. Long-term financial assets - has a financial character. The company does not use it for its operations but puts capital into it in order to achieve a financial return. Hold or maturity is longer than one year. Long-term financial assets include various types of assets:
- securities and shares - include, for example, shares, bonds, checks, bills, shareholder interests in a limited liability company, and the like,
 - long-term loans provided by the company - have a maturity of more than one year,
 - works of art, collections, objects of precious metals, land procured for the long-term deposit of free cash - property of a tangible nature, the company expects its price to rise in the future, such as the purchase of land, works of art, collections, items from precious metals and the like. (Cenigová, 2012)

Long-term assets can be divided into:

- depreciation - includes all intangible and tangible fixed assets, excluding land, works of art and collections,

- non-depreciable - include land, works of art and collections, financial investments, cultural national monuments. Land and works of art and collections are not depreciated because their market price is increasing.

2 Types of depreciation

The term depreciation of assets constitutes a permanent impairment of assets, that is, that part of the value of the asset in monetary terms that constitutes a depreciation of an asset corresponding to a particular period of time. It is an item which is gradually transferred to tax expenditure in order to secure taxable income.

We know two types of depreciation:

- **Accounting depreciation** - depreciation of non-current assets in accounting represents the allocation of the depreciated value of long-term assets to the costs of individual accounting periods in such a way that the material and temporal relation of costs and revenues is maintained. Accounting depreciation is regulated by Act no. 431/2002 Coll. on Accounting and Measures of the Ministry of Finance on Accounting Procedures. The Accounting Act also allows the application of other depreciation methods than those for tax purposes. Performance and time depreciation methods are generally known. The calculation of depreciation using the performance method is based on actual and anticipated performance. In the time method, the application basis is the purchase price and the depreciation period. A prerequisite for its use is a faster moral wear. An enterprise applies these methods if they take better account of the specific conditions of use of the asset.

Example for calculating accounting depreciation:

In 2019, the Company purchased tangible fixed assets - a passenger car worth € 40,000. The estimated usage time is 10 years. The company has chosen a linear method of depreciation. Monthly depreciation is calculated: $40\,000 / (10 \times 12 \text{ months}) = 333.33$ after rounding 333 €

- **Tax Depreciation** - unlike accounting depreciation, tax depreciation does not reflect the actual level of wear and tear of a given tangible asset and is not determined by the entity upon its decision. Tax depreciation represents a gradual inclusion of expenses that are later used to procure a given tangible fixed asset and a long-term intangible asset. The duty to apply tax depreciation to tax expenses is on the voluntary decision of the taxpayer. The depreciation has the character of the total annual tax expense (expense) and its application is neither conditional on the intensity of the use of the asset, nor on its effectiveness, or the economy of use during the depreciation period. (Fetisovová et al., 2004); (Mintál et al., 2012)

On the basis of Act no. 595/2003 Coll. on Income Tax, as amended, defines exactly which assets belong to which depreciation group. The following table shows examples of which fixed assets belong to the individual depreciation groups.

After assigning tangible assets to depreciation groups, an entity may use:

- the straight-line method of depreciation - Section 27 of the Income Tax Act - to be applied to each tangible asset
- accelerated depreciation method - Section 28 of the Income Tax Act - to be used only for tangible assets included in the 2nd and 3rd Depreciation Groups

The depreciation method chosen is binding for the tangible asset over the entire depreciation period and cannot be subsequently changed.

Table 1. Depreciation period

Depreciation Group	Depreciation period
1	4 years
2	6 years
3	8 years
4	12 years
5	20 years
6	40 years

Source: Act 595/2003 Coll. on Income Tax

2.1 Uniform method

The depreciation method chosen is binding for the tangible asset over the entire depreciation period and cannot be subsequently changed (Indrayani, 2018). According to the Act on Income Tax in § 27 par. 1 it is stated that in the case of a straight-line depreciation, the annual depreciation is determined as the proportion of the input price of tangible assets and the depreciation period provided for the respective depreciation group.

$$\text{Annual depreciation} = \frac{\text{input price of tangible assets}}{\text{the depreciation period of the relevant depreciation group}} \quad (1)$$

In the first year of depreciation of tangible assets, only the proportional part of the annual depreciation calculated according to par. 1, depending on the number of months, starting from the month of its entry into use until the end of this tax period. If during the depreciation period of tangible assets according to § 26 par. 1

- no technical improvement of tangible assets has been made, the unused proportion of this annual depreciation is applied in the year following the year of expiration of the depreciation period of tangible assets according to § 26 para. 1
- the technical improvement of tangible assets was carried out, the non-applied proportion of this annual depreciation is applied according to § 26 par. 5, which states that when performing a technical appreciation or shortening the depreciation period, tangible assets are depreciated up to the entry price, possibly increased by the technical appreciation made by the applicable annual depreciation rate or up to the residual price or increased residual price by the coefficient for the respective depreciation group.

As an example of a uniform method of depreciation, the company set in 2019 a combi steamer purchased in the amount of 11,500 €, while the purchase price was increased by a technical improvement of 500 €. The company included this asset in the third depreciation group. The company calculates depreciation as follows.

Table 2. Uniform depreciation method, convection oven Gastromix 20x

Year	Procedure for calculating annual depreciation	Annual depreciation in €	Residual price in €
2019	11 500+500:8	1 500	10 500
2020	12 000:8	1 500	9 000
2021	12 000:8	1 500	7 500
2022	12 000:8	1 500	6 000
2023	12 000:8	1 500	4 500
2024	12 000:8	1 500	3 000
2025	12 000:8	1 500	1 500
2026	12 000:8	1 500	0
Together	—	12 000	0

Source: Authors calculation

The sum of the input price of the combi steamer and the technical appreciation was the purchase price on which the depreciation was calculated. The annual depreciation method for the straight-line method is determined as the proportion of the cost and depreciation period in years for the specific depreciation group, ie 8 years.

2.2 Accelerated depreciation

According to the Income Tax Act § 28, the following coefficients for accelerated depreciation are attributed to depreciation groups 2 and 3 for accelerated depreciation of tangible assets:

Table 3. Coefficient for accelerated depreciation

Depreciation Group	In the first year of depreciation	In subsequent years of depreciation	For increased residual price
2	6	7	6
3	8	9	8

Source: *Tax and Accounting Advisor to the Entrepreneur*, 2015, p. 252

For accelerated depreciation of tangible assets, depreciation of tangible assets is determined as follows:

In the first year of depreciation of tangible assets, only the proportional portion of the annual depreciation determined as a proportion of the input price and the assigned coefficient for the accelerated depreciation of tangible assets valid in the first year of depreciation, depending on the number of months, starting from the month of its inclusion until the end of that tax period

$$\text{Annual depreciation of 1st year} = \frac{\text{entry price tangible assets}}{\text{coefficient in the first year of depreciation}} \quad (2)$$

In subsequent years of depreciation of tangible assets as a proportion of twice its residual price and the difference between the assigned rate for accelerated depreciation applicable in subsequent years of depreciation and the number of years of depreciation, for the sole purpose of calculating annual depreciation.

- in the second year of depreciation, the residual price of tangible assets is determined as the difference between the initial price of the share of its input price and the attributed coefficient for depreciation applicable in the first year of depreciation, less the proportion of the annual depreciation not applied to tax expense in the first year of depreciation;
- in subsequent years of depreciation, the residual price determined in accordance with the first point will be reduced by tax depreciation of these assets, summarized in tax expense, starting from the second year of depreciation

$$\text{Annual depreciation of subsequent years} = \frac{2 \times \text{residual price of tangible assets}}{\text{Coefficient in other years of depreciation-years}} \quad (3)$$

For the purpose of comparing the depreciation methods, the calculation of depreciation using the accelerated method was used for the purchased convection oven in the amount of 11,500 €, while the purchase price was increased by technical appreciation of 500 €. The values of the accelerated depreciation method are shown in the following table.

Table 4. Accelerated method of depreciation, convection oven Gastromix 20x

Year	Procedure for calculating annual depreciation	Applied coefficient applicable in the relevant year of depreciation	Annual depreciation in €	Residual price in €
2019	11 500+500:8	8	1 500	10 500
2020	(10 500x2):8	9-1	2 625	7 875
2021	(7 875x2):7	9-2	2 250	5 625
2022	(5 625x2):6	9-3	1 875	3 750
2023	(3 750x2):5	9-4	1 500	2 250
2024	(2 250x2):4	9-5	1 125	1 125
2025	(1 125x2):3	9-6	750	375
2026	(375x2):2	9-7	375	—
Together	—	—	12 000	0

Source: Authors calculation

The sum of the input price of the combi steamer and the technical appreciation would constitute the purchase price on which the depreciation was calculated. The annual depreciation in the first year of depreciation would be determined as the ratio of the purchase price to the coefficient of the first year of depreciation. In subsequent accounting periods, the depreciation amount is calculated as the ratio of double the remaining residual price and the coefficient in subsequent years of depreciation.

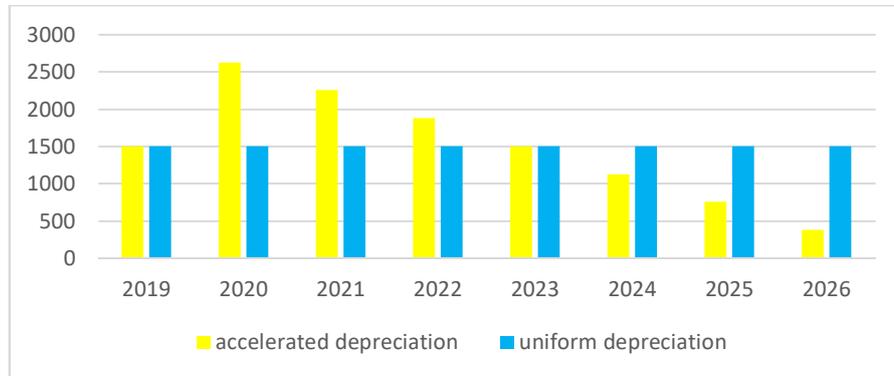


Fig. 1. Comparison of uniform and accelerated depreciation method. *Source: Authors calculation*

Difference between accounting and tax depreciation

There are some differences between the accounting and tax rules that provide for the depreciation of tangible assets. One of them is eg. possibility of changing the method of depreciation. While Act no. 595/2003 Coll. on Income Tax in § 26 par. 3 provides for the obligation to determine the depreciation method for each newly acquired tangible asset and cannot be changed for the entire period of its depreciation, ie. since its inclusion in use until its complete depreciation or disposal, Law No 431/2002 Coll. on Accounting and Follow-up Measures allow an entity to change the method (method) of depreciation in the accounting if it achieves a true and fair view of the facts.

When comparing accounting and tax depreciation, the following situations may occur:

- Accounting depreciation > as tax depreciation = difference is an item that increases the tax base
 - Accounting depreciation < as tax depreciation = difference is the tax base reduction item
 - Accounting depreciation = tax depreciation = no difference, tax base need not be adjusted
- The overall summary of differences between accounting and tax depreciation could be as follows:

Table 5. Depreciation of accounting and tax depreciation

	Accounting depreciation	Tax depreciation
Depreciation	Real	does not correspond to reality
Account	are charged	not charged
Depreciation period	Month	Year
Legislation	Accounting Law	Income Tax Law
Rounding	internal regulation	whole euros up
Interruption of depreciation period	not possible	Possible

Source: Authors calculation

2.3 New non-traditional depreciation methods

From time to time, we can distribute depreciation to:

- constant (linear, even)
- variable (variable)

Constant method of depreciation

This method of depreciation is characterized by the fact that during the entire lifetime of tangible and intangible assets it ensures the amount of depreciation at the same amount. Assuming that the company would consider a longer period of use of the property, such as optimal time, it would incur losses from non-use of the new technology. Otherwise, in the event of the need to dispose of the asset before it is fully depreciated, the enterprise incurs a one-off cost of unrecorded assets. The main advantage of this method of depreciation is simplicity and clarity. (Zuca, 2013)

We further divide the variable depreciation methods into:

- progressive (growing)
- degressive

Progressive method of depreciation

On the basis of the progressive method of depreciation, the depreciation amount increases over the life of the tangible and intangible assets (Vielhouwer, Waegenae, Kort, 2002). This method applies only in exceptional situations, or only in some sectors (eg mining). The disadvantage of the method is the high value of the undisclosed residual price in the event of early retirement. (Sedlák, et al., 2007) We calculate the amount of depreciation as:

$$Dy = \frac{i(1+i)^{t-1}}{(1+i)^n - 1} x Ip \quad (4)$$

Dy – yearly depreciation

Ip – input price of fixed assets

$$\frac{i}{(1+i)^n - 1} - \text{fondovatel} \quad (5)$$

$$(1 + i)^{t-1} - \text{interest rate for } t - 1 \quad (6)$$

Degressive depreciation methods

The amount of depreciation is gradually decreasing over its lifetime. In a market economy, assuming a high pace of science and technology development, degressive depreciation methods are justified primarily because they reduce the risk of a one-off cost burden in an enterprise if un-signed assets are to be completely discarded. The degressive method of depreciation creates the preconditions for a faster creation of funding sources and thus provides the company with better conditions for financing its further development. The use of degressive depreciation methods brings tax savings to

businesses in the first years of asset life (Tsamis, Liapis, 2014). In the following years of depreciation, depreciation is decreasing, profit is increasing, and the company then pays the tax savings. Accelerated depreciation increases the purchasing power of an enterprise in an investment area, allows the enterprise to increase loan repayments, shortens the maturity of the loan, and thereby rationalizes the structure of business needs finance sources (Stungurier, Christausk, 2014). All of this creates the preconditions for businesses to remain competitive, to provide employment for workers, and to expand or change the production business. There are three main variants of the degressive depreciation method:

- residual price,
- cumulative method,
- dutch methods. (Vlachynský et al., 2009)

Residual depreciation method

Based on this method, annual depreciation is calculated using the residual price, ie the tax base is reduced by depreciation each year. (Kozlovska, 2015) Due to the decreasing basis:

- depreciate the residual value of fixed assets by a double depreciation rate calculated for straight-line depreciation and in the last year depreciations by an un-signed balance i. e. the difference between the entry price and the depreciation amount;
- combine the residual method with the straight-line method so that when a significant portion of the entry price is written off, the remainder of the residual price is written off evenly over the remaining years of useful life; i. e. with the same annual depreciation.

Cumulative method of depreciation

Let us calculate the annual amount of depreciation by multiplying the input price of fixed assets by the depreciation rate, which can be calculated on the basis of two ways:

$$\circ \frac{\text{years remaining}}{\text{cumulative sum of lifetime years}} \quad (7)$$

$$\circ \frac{2(n-t+1)}{n(n+1)} \times 100, \text{ where} \quad (8)$$

n – life of fixed assets

t – year for which the depreciation rate is calculated

Dutch method of depreciation

In this method of depreciation, the input price of fixed assets is divided into two parts, which are depreciated differently:

- 1/3 - this portion of the entry price is depreciated over four years over the useful life of the fixed asset, with 10% being depreciated over the first three years and depreciating at 3.33% over the fourth year,
- 2/3 - we depreciate this portion of the input price evenly over the useful life of the fixed asset.

The Dutch depreciation method during the first half for the life of an asset, an entity may increase its annual depreciation by an investment premium of up to 4 % of the cost of intangible fixed assets or intangible fixed assets. (Giudice, Manganelli, Paola, 2016)

3 Conclusions and policy implications

The subject of the first chapter of this paper is a closer understanding and division of short-term assets of the company and long-term assets of the company. The individual items of non-current assets and their breakdown between non-current assets, long-term intangible assets and long-term financial assets are defined in more detail. The paper explains the difference between accounting and tax depreciation.

The idea of Albert Einstein: "Property, visible success, popularity, luxury - for me, these things have always been despicable" almost no company. Development and new innovative methods are not only using traditional methods of depreciation but also new modern methods in the use of depreciation in the enterprise. Nowadays, more and more companies want to try something new, wants to be innovative, differentiate themselves from other companies on the market, and thus ensure a significant position and respect for other competing businesses. Many companies also use modern depreciation methods. This contribution is to bring the modern depreciation methods closer together and to understand their nature and calculation more easily.

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EVOLUTION OF FREIGHT TRANSPORT IN COUNTRIES OF VISEGRÁD FOUR AND REST OF EUROPEAN UNION

Peter Belička

University of Economics in Bratislava
Department of marketing
Dolnozemska cesta 1
852 35 Bratislava
Slovak Republic
peter.belicka.jr@gmail.com

Abstract. Study is aimed at evolution of freight transport types in countries of Visegrád Four compared to European union. The goal is to calculate, how much each freight transport type has increased or decreased in proportion. Main source of data is official European statistical office, Eurostat. All data are of a secondary character. In the article there are graphical visualizations of these calculated outcomes, using figures and tables. By comparing the results, we came to conclusion, transporting goods has not changed the proportions but has decreased overall. 75,9 % of all transport in European union is done by road transport, 6,3 % by inland waterways and 17,8 % by railway transport. The stability of these numbers suggests no future fluctuations. Countries of V4 are following the European trend of increasing road transport share. In conclusion, we consider this trend to be on the negative side, road transport is known for its environmental pollution.

Keywords: freight transport, inland transport, Visegrád Four

JEL classification: N74, O18

1 Introduction

Requirements of industry and businesses for the division of logistics are rising. Businesses prefer higher quality and faster processes with focus on individuality and flexibility. Industries need to be provided goods on time to synchronize all their processes, putting pressure on logistic departments. In this era the changes to transport modes are inevitable.

Each of these methods of transport has unique features and usually when transporting goods, it is necessary to use a combination of these methods.

1.1 Methodology

This article is mainly statistical, therefore data used are of a secondary character. Most of the data found in this article come from the official statistical office of European union, Eurostat.

Data are measured in tonne-kilometre (Tkm), which is standard measurement unit in transport (usually in millions of tonne-kilometre). “One tonne-kilometre represents the transport of one tonne of goods (including packaging and tare weights of intermodal transport units) by a given transport mode (road, rail, air, sea, inland waterways, pipeline etc.) over a distance of one kilometre. Only the distance on the national territory of the reporting country is taken into account for national, international and transit transport.” (Eurostat 2018)

Article’s aim is to compare and visualize shares of each inland transport modes in European union. There are three inland transport methods. Road transport is the most used method of transporting goods. Inland waterways, which is primarily used by countries with naturally river rich environment, such as Netherlands or Belgium. Railway transport is the last one.

The most actual data to this date were used, data for years 2016 and 2017 are not complete yet.

2 Statistical findings for Europe

Road transport has the biggest role in freight transport in Europe. Out of all three inland transport types (road transport, inland waterway transport and railway transport), road transport accounted for 75,3 % in the year 2015, which is 1 770 446 million Tkm total. This share has not changed in the last decade, only by small margin.

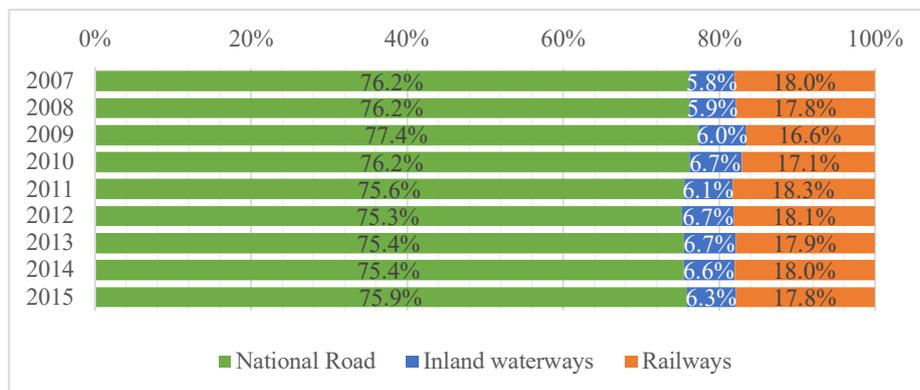


Fig. 1. Evolution of inland transport in EU, 2007 - 2015 (% of Tkm). *Source: Eurostat (2018)*

As shown in Figure 1, there have not been any dramatical changes in the share of each transport type. Railway transport has increased by since the year 2010 and stayed at 18,3 % onwards. In 2015 inland waterways supplied 6,4 % of inland transport, making

it the least used inland transport method of all. 75,9 % of transport was done by road in the year 2015.

The only year with a slight fluctuation is year 2009 where the road transport increased by 1,2 %, which then turned back the next year. Other than that, modal split is very stable.

Table 1. Evolution of inland transport in EU, 2007 - 2015 (millions Tkm)

	2007	2008	2009	2010	2011	2012	2013	2014	2015
National Road	1 914 206	1 890 876	1 699 507	1 756 114	1 745 434	1 694 612	1 721 095	1 727 642	1 770 446
Inland waterways	145 564	147 067	132 739	155 521	141 969	149 987	152 795	150 876	147 471
Railways	451 989	442 763	363 540	393 531	422 096	407 279	407 366	411 469	415 881

Source: Eurostat (2018)

Table 1 shows total number of good transported, it is visible there is decreasing trend in transportation. All modes of transport are decreasing at roughly the same pace, therefore the shares are similar. Only waterway transport had a slight increase of two thousand tonne-kilometres.

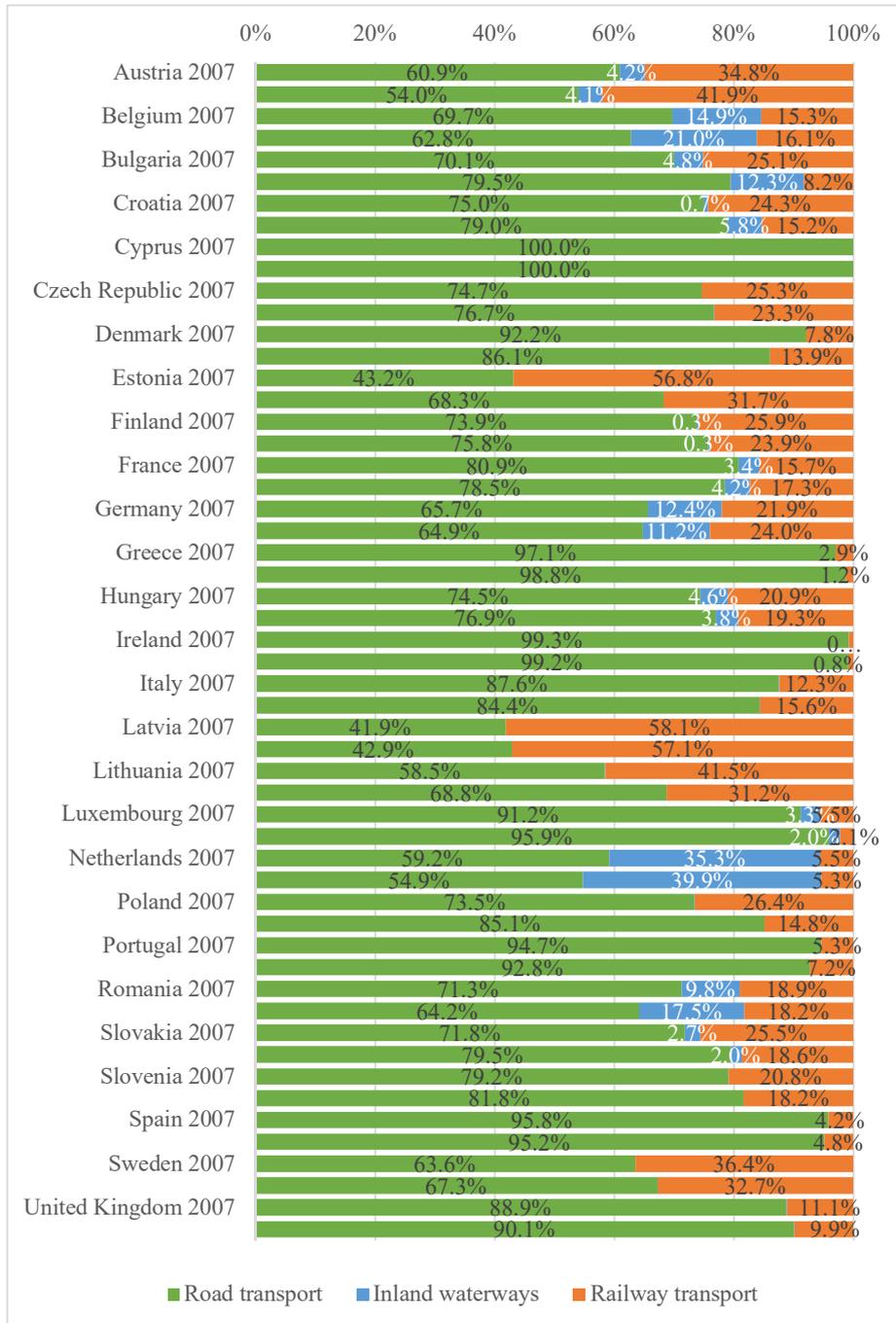


Fig. 2. Modal split of inland freight transport in EU, 2007, 2015 (% of Tkm). Source: Eurostat (2018).

The modal split of each member state is mainly focused on road transport, with some countries reaching 100 % share of road transport due to lack of railways or possible inland waterway transport, Cyprus being one of them. Out of all countries only 17 have useable inland waterways system. Countries with more than 10 % modal share of inland waterways are Belgium, Bulgaria, Germany, Netherlands, Romania. Netherlands is leading country, with its naturally river rich environment, the most current modal share of 45,5 % of inland waterways transport. The rise of waterway transport between years 2007 and 2015 was significant in Belgium where it rose by 6,1 %, Bulgaria 7,5 %, Croatia 5,1 %, Netherlands 4,6 % and Romania 7,7 %.

Railway systems are mostly utilized by Austria, Estonia, Latvia, and Sweden. All these countries have the modal split of railways above 30 %. Biggest changes in railway usage were in Bulgaria with the decrease of railway usage by 16,9 %, Estonia 25,1 % decrease, Lithuania 10,3 % decrease. These countries increased their road transport respectively, only in case of Bulgaria was waterway transport increased.

Biggest overall change Estonia with the increase of road transport at the expense of railway transport and Lithuania with the same changes.

3 Statistical findings for Visegrád Four

Countries of Visegrád Four (V4) are Slovakia, Czech Republic, Poland and Hungary. They form a cultural and political alliance based on historical background, located in the middle of Europe. Since they are neighboring countries, there is an expectation these countries could have similar natural conditions.

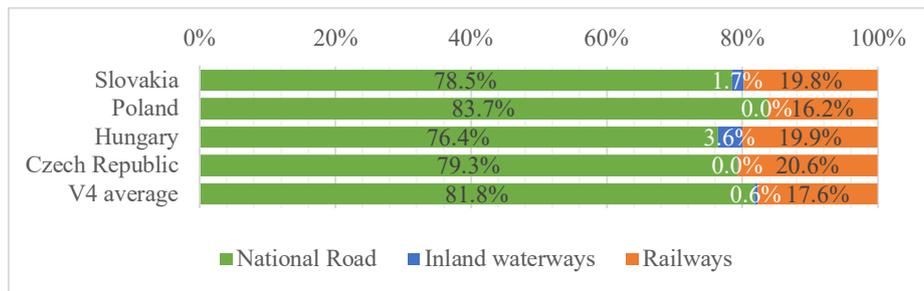


Fig. 3. Modal split of inland freight transport in V4, 2015 (% of Tkm). *Source: Own processing according to Eurostat (2018).*

The average of modal split in countries of V4 is at 81,8 %, therefore only fifth of transport is done by other means than road. Waterways are generally not utilized much, only a small fraction of goods are transported via inland waters, in countries of Slovakia and Hungary. In Slovakia it is 1,7 % and Hungary 3,6 %. It is thanks to the river Danube, which is connecting shipyards in Slovakia and Hungary all the way to Black Sea and North Sea. The biggest shipyards in Slovakia are in Bratislava and Komárno, in Hungary it is in Budapest, Győr and Dunaiváros.

There is a very dense web of railroads, making them suitable for transporting goods. By average 17,6 % of goods are transported by railways in countries of V4, where Poland has the lowest portion of 16,2 % and Czech Republic the highest of 20,6 %.

3.1 Slovakia

Slovakia's modal split has not changed dramatically over the last decade. Waterways usage is averaging around 2,5 %, with a slight drop in year 2015 to 1,7 %. There is an evident trend of utilizing more road transport at the expense of railway transport. Road transport share has increased by 6,7 percental points meaning it is rising by 0,8 % every year by average. Railways usage has decreased by 5,7 percental points between the year 2007 and 2015.

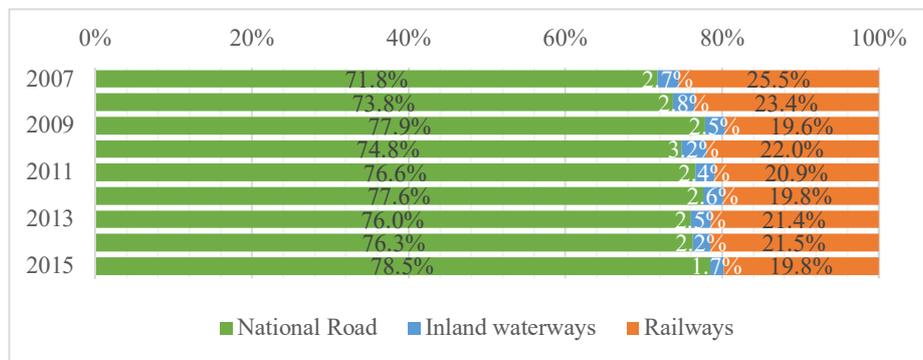


Fig. 4. Modal split of inland freight transport in Slovakia, 2007 - 2015 (% of Tkm). *Source: Own processing according to Eurostat (2018).*

3.2 Poland

Modal split of Poland follows a pattern of rising road transport utilization. Road transport has increased by 10,2 percental points, between years 2007 to 2015. Biggest leap was in the year 2009 where the share increased by 4,6 percental points. By average it is rising by 0,8 % every year, similarly to Slovakia. While Slovakia is utilizing waterways, Poland is using its waterways marginally. It is currently below 0,1 %. Even these marginal numbers tend to drop over time. As road transport is being used more, consecutively railway transport share is dropping.

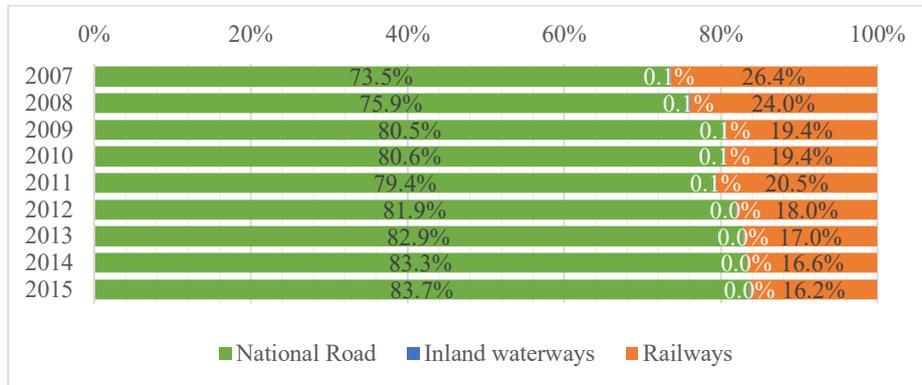


Fig. 5. Modal split of inland freight transport in Poland, 2007 - 2015 (% of Tkm). *Source: Own processing according to Eurostat (2018).*

3.3 Hungary

Hungary has a stable modal split among the years, with only the year 2009 being an exception. From year 2007 to year 2015 the share of road transport has increased by 1,9 percentage points. Waterway usage is averaging by 4,3 %, with a slight drop in years 2014 and 2015. In the year 2015 it was at 3,6 %. Railway transport is stable too, with a slight drop, at 19,9 % in the year 2015.

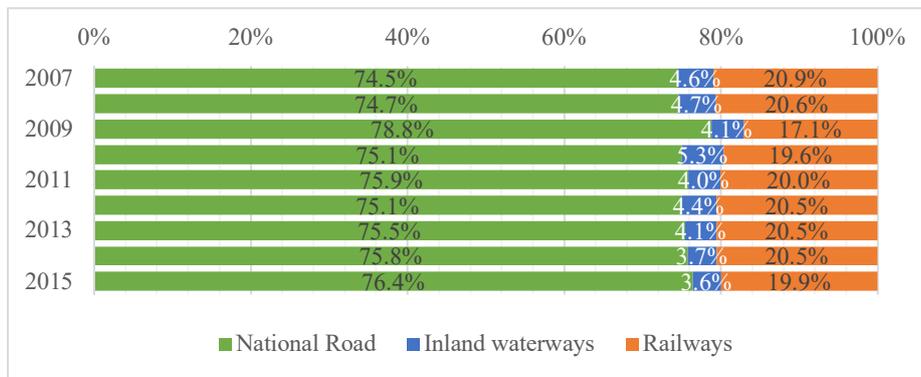


Fig. 6. Modal split of inland freight transport in Hungary, 2007 - 2015 (% of Tkm). *Source: Own processing according to Eurostat (2018).*

3.4 Czech Republic

Czech Republic does not dispose with a usable waterway system, only a minor one. Therefore, the evolution of modal split is very similar to Poland. Currently waterway usage is under 0,1 %. Meanwhile road transport share is increasing and is currently at 79,3 %. Railway transport share on the other hand is decreasing and is currently a

20,6 %, making Czech Republic, country with the biggest share of railway transport out of V4.

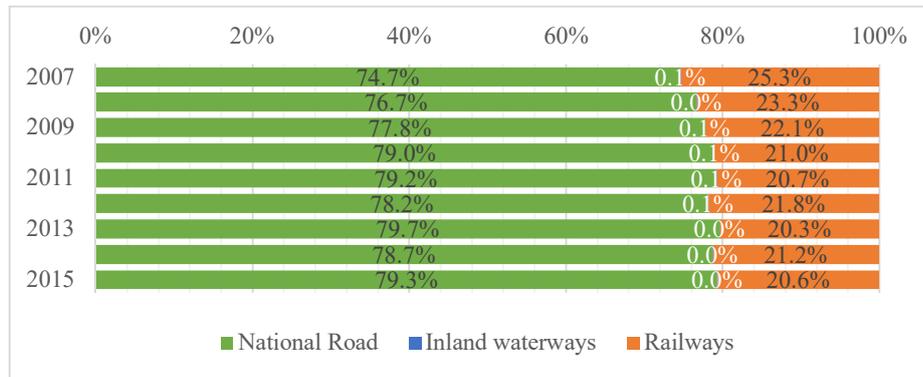


Fig. 7. Modal split of inland freight transport, Czech Republic, 2007 - 2015 (% of Tkm).

Source: Own processing according to Eurostat (2018).

4 Conclusions

Countries of V4 are following the European trend of utilizing more road transport. The most evident rise of share of road transport out of V4 countries was in Poland. Slovakia's road transport share has risen by 6,7 percental points.

In the year 2015 there were transported 1,8 trillion Tkm of goods via road transport. Via waterways 0,15 trillion Tkm goods and 0,4 trillion goods via railways. Or respectively 75,9 % goods by road 6,3% goods by waterways and 17,8 % railways.

It is understandable companies tend to use road transport due to its flexibility. Railways are usually used when transporting goods for longer distances. And waterway usability is very constricted by natural conditions of a country.

We consider this trend to be on the negative side, road transport is known for its environmental pollution. Meanwhile trains are more ecological and can carry much more. Final destination is although always going to be reached by road.

Acknowledgement.

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ENVIRONMENTAL PROBLEMS AND DEVELOPING COUNTRIES

Eva Bikárová

University of Economics in Bratislava
 Faculty of Commerce, Department of Marketing
 Dolnozemska cesta 1
 Bratislava, 852 35
 Slovak Republic
 eva.bikarova01@gmail.com

Abstract. *For majority of people, who live at a close subsistence level, such issues as sustainability must appear to be remote. Their incredible basic must be higher rates of efficiency and expanded utilization, whatever the long-haul ecological expenses. Given the huge generally as yet developing populace in poor nations, this is a scary objective. As of now, the ambushes on nearby conditions have over and over again achieved emergency extents, to such an extent that any supported development in earnings appears to be nearly impossible. Yet, the advantages accessible, in human capital, in wellsprings of financing, in accessible apparatuses of creation, are small, best case scenario, put something aside for India and China, the two of which have an enormous, college prepared workforce. Albeit, the aim of our paper is to analyse how poor nations have attempted to manage ecological issues, and sometimes have needed to do as such, they have come up short on the assets, or the political authenticity, to authorize natural enactment.*

Keywords: developing countries, economic development, population density

JEL classification: F 63, O 15, Q 32.

1 Introduction

It is hard to perceive how poor nations can mitigate a large portion of these issues in the close, or even the inaccessible, future. These run the range of ecological weights: drained energizes, disintegrated land, vanishing backwoods spread, compromised or effectively wiped out species, uncontrolled urban development, dirtied air and water, and a shortage of consumable water or water for water system. Such poor nations have few apparatuses to adapt to such issues. Troubled by obligations, by low market costs for exportable items, by political insecurity, they are everything except vulnerable without real appropriations from rich nations. To a limited extent in view of the exceptionally sponsored and ensured horticulture in the affluent nations, they can't sell most sus-

tenance items on the world market. To make the circumstance significantly progressively unfeeling, they just won't almost certainly remember the ways of monetary development pursued by Europe, America, and Japan. Insufficient effectively accessible or modest assets stay for them to do as such. What's more, regardless of whether they attempt, natural imperatives will before long end such development—frequently not by any shortcoming of their own, but since of the inheritance left by fast development somewhere else. Since 1850, and at a quickening pace since 1950, the industrialized countries have accomplished a degree of generation of merchandise and ventures undreamed of in the human past. In 2000, an enumeration year, the United States represented this wasteful largesse. It delighted in a gross national income (GNI) of about \$10 trillion. In the earlier year, its natives had a dispensable (after devaluation of capital and expenses) salary of near \$6 trillion. Its horticulture was productive to the point that Americans needed to spend a little more than 8 percent of this pay for nourishment utilized at home, or what expenses more than 50 percent of pay in some poor nations. It spent over twice this sum for lodging and family unit activity and on restorative consideration, a third more on its vehicles, and an eighth more for diversion. Americans even spent over \$80 billion on adornments and individual consideration items, for example, makeup. Every American spent, all things considered, about \$2,300 on diversion, or nearly as much as the purchasing power parity (PPP) of India (Keough, 2018).

One key to this expanded profitability has been the substitution of muscle control by different types of vitality, for the most part from the controlled consuming of petroleum products. Another vital condition has been the advancement of new apparatuses and strategies of creation, and consequently ever more prominent efficiency. This has satisfied above all else in horticulture, by a wide margin the most proficient segment in well-to-do nations today (the littlest contribution of work for the yield). Progressively, the wellsprings of energizes, timber, minerals, and tropical nourishments to support this quick development have been the less created zones of the world. For instance, Americans have not just drawn down their assets, for example, oil and gas, however those of the world all in all. Affluent nations less supported by characteristic assets, for example, Japan and Britain, have been totally reliant on such remote assets (Végh, 2013). Poor nations have not been in a situation to oppose the out-shipment of valuable assets, the loss of their regular capital. They have relied upon the salary for developing populaces.

2 Development patterns and labour-intensive production

Without a business opportunity for natural merchandise, few immature nations could start to help their current populace. They are reliant either on exchange or help. One can only wonder what Nigeria will do when its oil runs out, given its engaged populace and immature farming. wonder what Nigeria will do when its oil runs out, given its engaged populace and immature horticulture. Practically all poor nations have attempted to pursue advancement designs that prevailing in the well-off nations, yet just a couple have done what's necessary to improve horticultural generation. Most have attempted to present labor intensive types of assembling, with materials regularly in the

number one spot. Also, to be sure, as estimated by present national pay lists, most previous pioneer countries have delighted in at any rate low degrees of monetary development. Remote guide and the green transformation have kept such economies developing (Bhagwati, 2014). At any rate a minority of the populace has profited, with a level of wealth effectively noticeable in favoured territories of developing urban areas. Regardless of whether generally speaking human welfare has improved is difficult to gauge, however one can harbour questions that it has.

What can poor countries do to advance toward Western expectations for everyday comforts? They can't imitate the previous history of the most industrialized countries. Maybe a couple have the required assets at home, and they can't bear to import them, especially vitality. Populace weights have just obliterated backwoods, disintegrated land, and depleted nearby supplies of fuel notwithstanding for cooking. Hungry workers infringe upon parks and natural life jelly, frantic for land, wood, or game. Others have overfished progressively dirtied streams, even as industrialized countries have joined in overfishing a large portion of the world's seas. Rural change may improve nourishment generation, yet just by dislodging most close subsistence ranchers. Hardly any poor nations have the cash or credit or required aptitudes to create productive assembling, and along these lines need to rely upon remote capital. Modest work is frequently their bait for remote venture. Tropical nations need to send out a couple of economically significant staples, or their lessening stores of timber, oil, gas, or minerals. Progressively, sub-Saharan Africa relies on imported nourishments. Such nations can't stand to take care of creating ecological issues. Over the most recent two decades, the predominant ecological worries in the well-off countries have moved toward worldwide issues (Hickey, 2019). This generally includes the past job of industrialized social orders in making the issues that are presently show in the immature world, and their obligation in relieving such worldwide issues as environmental warming and, with it, environmental change; tropical deforestation and, with it, lost biodiversity; and the probability of expanded starvations in light of debased soils and shortcomings of water and vitality. As it were, the extraordinary general issue for poor nations is proceeded with quick populace development, an issue that affluent nations, with stable or declining populaces, can do little to impact from a separation.

3 Environmental impacts and concerns from economic growth

A Subsection Sample

In many regards, the citizens of the twenty most well-off nations presently appreciate the products of a time of natural alleviation. As they take a gander at their prompt environment, they see issues in abundance, yet nothing to contrast with the even later past. Just forty years back, individuals wherever needed to fear the impacts of atomic aftermath from the testing of more than two thousand bombs by virus war opponents. No more, albeit some still dread mishaps at atomic reactors. In the mid twentieth century, European and American urban communities, in the winter, experienced repulsive exhaust cloud and residue the practically widespread warming by coal. No more, in spite of the fact that the proceeded with utilization of coal for electrical age adds to exhaust

cloud, corrosive downpour, and an unnatural weather change. A century prior practically all human and modern waste was dumped, untreated, in waterways and seas. No more in rich nations, despite the fact that issues of waste transfer still frequent them. In the mid twentieth century, ranchers in the United States were all the while clearing backwoods and expanding the land developed, while disintegration, by wind and water, was overflowing (think about the residue bowl or the red slopes of the Southeast). No more. Regardless of a significantly increasing of populace in the United States since 1900, and a fourfold increment in horticultural creation, the measure of developed land has declined by a third, and the woods spread is currently broader than in 1900 (Lubin, 2018). The general population of the not very developed countries appropriately begrudge the thriving of the industrialized world, which is past their range.

They likewise esteem its capacity to adapt to ecological issues, which is much more past their span. In such a significant number of zones, ecological guidelines and new advancements of creation have moderated natural issues notwithstanding increments in populace and a considerably progressively fast increment in per capita utilization. Not totally, obviously, as present American substances affirm. Americans use vitality more proficiently than before. They have decreased the carbon power of fuel as they moved from wood, to coal, to oil, and to gas (the age of power by flammable gas emanates multiple times less carbon dioxide, per unit of warmth, than a wood-consuming stove). However, regardless they transmit more carbon than any other time in recent memory before. This is a component of increments in populace and, considerably more, utilization. Americans have decreased the outflow of sulphur mixes, and in an exceptionally constrained manner nitrous oxides, however despite everything they experience the ill effects of air contamination and corrosive rain. They have diminished the majority of the dangers of waste transfer, yet they are overpowered with its volume. By extraordinary exertion, they have spared many jeopardized species from annihilation, however some environment misfortunes have viably finished any yet secluded enclaves.

They have expanded, at a rate a lot higher than populace development, the measure of land safeguarded in parks and wild regions, national and state woodlands, and natural life asylums, however nothing can calm the weight of an ever-increasing number of guests to such destinations, a component of numbers, abundance, shoddy transportation, and a substantially more across the board open energy about the outside. At extraordinary exertion and incredible cost, they have improved air quality in many zones of the nation, and water quality in certain regions, however again the sheer numbers and a developing use have risked valuable aquifers and undermined abused streams. In light of a thousand new synthetic substances, and new items, they have pushed at any rate follow measures of new mixes into the air, frequently with obscure dangers. In any case, all in all, naturally caused human mortality is by all accounts at the least level in mankind's history in created nations, no mean accomplishment (in the meantime, death rates for some, different species have gone up) (Cooper, 2017).

4 Transformation of values towards sustainability

Behind any accomplishment, there always is a change in human qualities. In the United States, each survey uncovers expansive open help for ecological enactment, in spite of the fact that not for radical or conciliatory enactment. In a lot of western Europe, the open help is much higher. Individuals require additional push to reuse squander items, battle new urban improvements so as to spare timberlands, and are profoundly worried about undermined species. Obviously, it is simpler to be concerned when the issue is at a separation or when neighbourhood expenses are low. In any case, the hole in comprehension, in frames of mind, between present Europeans and Americans and those of a century prior is profound. It is hard to comprehend individuals who shot buffalo for entertainment purposes, who executed larks as once huge mob, who picked up an abundance for each wolf murdered, who reflexively slaughtered any snake watched, who considered trees to be impediments to advance, or who coolly dumped squanders into the closest stream.

Be that as it may, the high-utilization nations, in a worldwide point of view, have brought about a staggering expense for their pay and even their ecological fixes. They have spent a huge portion of the effectively acquired petroleum derivatives, undermined the defensive ozone layer by their discharge of ozone-exhausting gases, gambled a fast ascent in worldwide temperatures due to ozone harming substance outflows, pushed the degree of contamination in seas to perilous levels, immersed themselves with waste, utilized gigantic amounts of water, misused the most effectively mined of the world's mineral assets, and, in prior hundreds of years, in both Europe and America, stripped away an enormous portion of woods spread (Germano, 2018). By their abundance, they have made an earth that can never again bolster the kind of advancement, in poor nations, that has prompted their wasteful overabundances. They arrived first, and took the best.

The transformation above all else included the measure of work required in farming. Given the expense of work in America, the drive for productivity has generally included work sparing techniques. At times, for example, western wheat, the normal generation per section of land, on semi-bone-dry land, is frequently just a large portion of that in Pennsylvania or in Ireland. In any case, the size of the fields and the very motorized custom planting and joining limit the work expenses and make such wheat more than aggressive on world markets. In every significant yield, the additions have included the substitution of draft creatures and human work by machines, the painstakingly determined utilization of manures, the utilization of bug sprays, fungicides, and herbicides to control creepy crawlies, maladies, and weeds, water the board that includes routine water system as well as supplemental water system even in sticky territories, and sensational upgrades in assortments grown, an increase completely acknowledged through past techniques for plant rearing and hybridizing, however one that may now confront another transformation through direct hereditary control. Equivalent however various efficiencies have changed poultry and hoard creation, and the stuffing of hamburger dairy cattle. The expenses have for the most part included different parts of the earth

and not soil. American ranchers still lose soil to wind and water disintegration. Indeed, even forested land endures some erosion. This is a piece of nature.

Yet, land, as now oversaw in America, isn't an imperilled resource. Techniques are accessible to improve exhausted soil, albeit such can be exorbitant (turning under vegetables quite a long time after year to re-establish vigorously dissolved slopes). Despite the fact that the surface and local supplements (particularly follow components) of soil stay significant, the dirt for a rancher is currently less the wellspring of supplements as a holder for the supplements connected every year to fields. Dissimilar to before, great corn land can be trimmed uncertainly. Vigorously watered soils can't continue farming inconclusively, in spite of the fact that salivated soils can recoup after some time if not edited (Razavi, 2007). Be that as it may, the huge issue in flooded agribusiness world-wide isn't so much soil conditions, however the proceeded with accessibility of water to sustain crops and to drain away salts.

5 The costs of such efficient transformation

The expenses of productive change towards sustainability are many. Ondrovič (2017) argues that *“the institutional structure of human society largely reflects its collective values and they are subject to change. In examining the institutional structure of contemporary Western society, we draw on the historical experience that social institutions are, at times, changeable despite the fact that they may, from a short-term perspective, appear static, given or permanent, as well as natural laws.”* According to Hudec (2016) *“innovation and knowledge have different properties than the conventional economic goods. One of its features is that they are noncompetitive, which means that knowledge can be used without restriction by anyone who knows about them. Another important feature of innovation and knowledge is their, at least temporarily, excluded of consumption. Temporary in the sense that an innovative company can keep this innovation, at least for some time patentable. If innovation and knowledge would not be excludable, companies would likely not invest so much into research, development and innovation”*. Behind every one of the progressions is the substitution of the vitality made by consuming hydrocarbons for the muscle intensity of individuals and draft creatures. At the point when people initially started developing area (a modern transformation of rising above significance), they utilized their hands and basic instruments.

The absolute vitality utilized, reflected in the calories consumed by the specialist, was not exactly the calories present in the collected yields. The net addition originated from the fruitfulness of the earth. In crude farming, the spending of soil supplements before long exhausted the dirt, however when a low populace thickness beat an all-inclusive scene, it was not exactly the yearly gathering of new natural issue and supplements. In this way, individuals essentially moved to new land. This was valid, for instance, for the Native Americans in eastern North America at the season of European contact. Such a farming could give a continued yield until the end of time. At the point when people figured out how to utilize draft creatures to draw furrows and wagons (another incredible modern unrest), they needed to develop more calories to bolster

their animals. This implied a lot heavier interest on soils and, with detonating populaces, the need to consider the long-haul needs of the land. At the point when early developments neglected to locate a supported settlement with the dirt, they endured, confronted starvation, declined, and even at times lapsed.

The learning included revolution designs, the utilization of compost or other waste items, and increasingly amiable types of furrowing and development. Early current agribusiness, or the sort Europeans brought to America, mirrored this settlement. In any case, the inadequate populace in America and the huge abundance of fruitfulness that had gathered throughout the hundreds of years enabled early Europeans to break free of the customary examples and addition riches starting from the draw of soil supplements that appeared to be everything except inexhaustible. This was, clearly, an example that couldn't proceed uncertainly, and along these lines the nineteenth-century changes in American horticulture that arranged the route for the twentieth-century farming upset (Panagariya, 2019). On the off chance that soils were the main basic asset, the United States could verify a bounty of sustenance into the inaccessible future. Actually, given its unused soil or soil focused on non-food crops, it could without much of a stretch twofold nourishment generation throughout the following two decades. In the event that world markets make a high cost for sustenance, it may in truth do only that. Be that as it may, regardless of this reality, it is mixed up to allude to display American (or western European, Canadian, Australian) agribusiness as sustainable. It includes a little, still effectively made up for, draw down of soil supplements, however a considerably more genuine spending of petroleum derivatives and of effectively open phosphates and potassium (Cirera, 2017). Obviously, ranches utilize just a little level of fossil vitality (in the structure of machines as well as the vitality used to deliver nitrates for compost), when contrasted with electrical age, vehicles, and assembling. In this sense, it joins different zones of human creation or transportation attached to a depletable asset.

6 Conclusions and policy implications

On the off chance that one could give an exact significance to supported creation, over an inconclusive future, at that point very promoted farming would need to assimilate the long-haul costs made unavoidable by future substitutions of new wellsprings of vitality. These costs are difficult to assess, however may be exceptionally high. Not at all like before, an effective rancher utilizes a thousand times a bigger number of calories than is contained in the nourishment delivered. The opposite side of natural expenses includes what agribusiness discharges into the earth. Appropriately utilized, a portion of its waste items are significant, recyclable resources, as in the conventional employments of fertilizer by ranchers. That is never again valid for the tremendous tidal ponds of excrement aggregated by present day hoard and poultry manufacturing plants, or made by enormous meat dairy cattle nourishing parcels. These can, and periodically do, saturate groundwaters, with destroying impacts, while the methane radiated by such fertilizer expands ozone depleting substances, and in a couple of cases the sulphur dioxide imperils close-by inhabitants. In the meantime, the phosphates and nitrates that

get from compound composts are, in many regions of the nation, the essential well-springs of stream and lake contamination. Joining these are the build-ups of pesticides, with their potential impact on human wellbeing or on fish, flying creatures, and creatures. Indeed, even the move in creepy crawly ecologies have had unpredicted and harming outcomes (the slaughtering off of useful bugs, and the requirement for an ever-increasing number of synthetic controls). Tractors and joins need a large portion of the contamination controls required on autos, and in this manner contribute more than numbers would show to air contamination.

These expenses, at present, are borne by the bigger open, not by ranchers. A large number of the costs won't be clear until well into what's to come. Today, the debasement of soils, uncontrolled deforestation, and creating nourishment deficiencies are provincial issues. As it were, this has dependably been valid. These issues have intensified in a great part of the immature world during the most recent two decades, with the quick future looking extremely depressing. Just in sub-Saharan Africa has land corruption progressed so far as to safeguard a proceeded with abatement in per capita sustenance generation, and along these lines an uncertain reliance upon nourishment imports. Political insecurity, colossal legislative obligations, low world ware costs (for oil, different minerals, and tropical sustenance), quickly developing populaces (still more than 3 percent a year in numerous African nations, even as birth rates are declining in a large portion of Latin America and in India), shocking administrative polices keyed to assembling advancement instead of horticultural change, lastly the boundary to remote deals due to vigorously sponsored or cost secured farming in industrialized nations—all have made the issue. The issue has two perspectives: deforestation and low rural yield.

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IRAN AS AN EU TRADING PARTNER IN A PERIOD OF THE CURRENT TENSE TRADE-POLITICAL RELATIONS

Zuzana Borovská

University of Economics in Bratislava
Faculty of Commerce, Department of International Trade
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
zuzana.borovska@euba.sk

Abstract Today, the world economy faces several challenges. Due to US sanctions imposed on Iran, the EU is forced to seek new alternative solutions to the realization of mutual trade. In the past, Iran was an important trading partner for EU Member States. Czechoslovak companies exported sugar, machinery and weapons to Iran and imported hand-woven wool carpets. At present, after the unilateral withdrawal of the US from the nuclear agreement, major economies like Germany and France are trying to trade again with Iran. Over the past year, however, we have seen a decline in both European and Iranian exports of goods. In this paper, we decided to identify Iran as a trading partner of the EU, as we see the unused space of this issue in the current tense trade and political conditions. Through the use of Balassa's Revealed Comparative Advantage Index, the author sought to highlight the commodity character of trade between Iran and the EU, as well as the Complementarity Index presented the mutual trade compatibility of both economies. Despite the low complementarity of bilateral trade, EU action is needed to bring their trade trajectory back to pre-sanction level and prevent the decline of mutual trade.

Keywords: Iran, European Union, Iran-EU trade relationship

JEL classification: F 10, F 20, F 51

1 Introduction

The current tense political relations have deepened into the crisis of East-West international economic relations as a result of the protectionism of national economies. Strong US protectionist policies, as well as the EU's timid actions, are aggravating the already weakened world economy. As N. Roubini (2019) even mentioned, the nascent Sino-American cold war is the key source of uncertainty in today's global economy. The sanctions and embargoes imposed are intended to punish states for their behaviour or

functioning, but are they effective? Sanctioned economies do not change their behaviours and, as a result, trade conditions continue to deteriorate. Take Iran¹ as an example, which is currently facing several restrictions. According to MMF (2019), the forecast for 2019 was 0.5 percentage point lower than in the World Economic Outlook from April, all because of the crippling effect of tighter US sanctions imposed on Iran. US foreign policy does not want to relieve even in the foreseeable future after the agreement with Iran has been cancelled. On the contrary, the EU wishes to maintain the agreement and continue to look for possible ways of re-trading European companies with Iranian partners.

Bank limitations make it impossible to finance large business contracts and reduce the chances of their execution. Many European companies have decided to leave the Iranian market under the threat of US sanctions. Despite many limitations, trade between the two economies is still on-going, of course not as much as it used to be. Currently, China (19.5%), the United Arab Emirates (16.8%) and the EU (16.3%) are Iran's major trading partners. The EU was Iran's largest trading partner before the sanction regime (European Commission, 2019). The European Community should thus maintain its unity and use all available procedures to re-increase trade between them.

The current constantly evolving situation creates conditions for deepening research on Iran-EU economic relations. The timeliness of the issue creates scope for an economic analysis of the mutual relations of the two economies and helps to better understand the importance of the EU in the Iranian economic area. The aim of the paper is to analyse Iran as the EU's current trading partner with a view to identifying its trade developments over the last four years as well as to reconcile its trading position through the Balassa's Revealed Comparative Advantage Index (BRCA) and Trade Complementarity Index (TC) in the context of the Iran-European partnership.

1.1 Methodology

In the analytical part of Iran-European bilateral trade, author has used simple analysis and through a linear function, author has created a trend line of Iranian exports and imports. Specific Iranian exports to the EU, and imports from the EU in 2018 were examined through the BRCA index (1) which was firstly used by B. Balassa (1965). Since then the measures has been applied in numerous studies and papers, such as K. Laursen (1998) or S. Bender and K. Li (2002). Measures of revealed comparative advantage (RCA) have been used to help assess a country's export potential. The RCA indicates whether a country is in the process of extending the products in which it has

¹ The Islamic Republic of Iran is the second largest economy in the Middle East with a population of around 80.6 million. people (2017). The main religion in the country is Islam, with the majority of Sunnis prevailing. Iran's GDP reached US \$ 447.7 billion in 2017 (World Bank, 2019a). The country's Supreme Leader is Ayatollah Ali Khamenei with president Hassan Rouhani. Since 2016 is in force the Joint Comprehensive Plan of Action (JCPOA) which has been signed between the US, UK, France, China, Russia and Germany. Under JCPOA, Iran agreed to eliminate its nuclear programme in exchange for dropping imposed sanctions. In 2018, the US, led by president D. Trump, has resigned from the JCPOA. Since then, Iran has been subject to re-imposed sanctions.

a trade potential, as opposed to situations in which the number of products that can be competitively exported is static. It can also provide useful information about potential trade prospects with new partners. Countries with similar RCA profiles are unlikely to have high bilateral trade intensities unless intra-industry trade is involved. RCA measures, if estimated at high levels of product disaggregation, can focus attention on other non-traditional products that might be successfully exported (World Bank, 2010). Mathematically, this indicator is expressed as follows (Baláž et. al., 2017):

$$BRCA = \frac{\frac{x_{ij}}{x_j}}{\frac{x_{iw}}{x_w}} \quad (1)$$

- x_{ij} – export country j in commodity group i,
- x_j – total j country export,
- x_{iw} – world export in commodity group i
- x_w – total worldwide export

BRCA < 1 indicates comparative disadvantages
BRCA > 1 indicates comparative advantages (Balassa, 1965).

In order to identify the complementarity of EU-Iran trade, author has used the Trade Complementarity Index (2). Index can provide useful information on prospects for intra-regional trade in which it shows how well the structures of country's imports and exports match. It also has the attraction that its values for countries considering the formation of a regional trade agreement can be compared with others that have formed or classes to form similar arrangements (World Bank, 2019b). TC index was firstly defined by P. Drysdale (1969). Later, P. Drysdale and R. Garnaut (1982) noted that the trade complementarity index is an appropriate measure to incorporate in the gravity equation to capture the trade structure of countries as it compared, the trade structure of both countries in relation to world trade. Mathematically, the index is expressed as follows:

$$TC_{ij} = 100x(1 - \frac{\sum|m_{ik}-x_{ij}|}{2}) \quad (2)$$

- x_{ij} – share of goods i in global exports of country j
- m_{ik} – share of goods i in all imports of country k

TC = 100 The index is 100 when the export and import shares exactly match
TC = 0 The index is zero when no goods are exported by one country or imported by the other (World Bank, 2010).

2 Analysis of Iranian and EU mutual trade

In the current economic and political climate, we are seeing a decline in Iran's exports of goods to the EU, as shown in Fig. 1. The decline in Iran's exports to the EU is around € 463 mil. (2018). We follow a similar situation in Iranian imports. Despite an upward

trend, Iranian EU imports fell by around € 2.4 billion year on year. The reason for the reduced trade is not only imposed sanctions, but especially the fear of European companies trading in Iranian territory. So far, Iranian and European exporters have not been simplified in terms of their mutual functioning in partner markets, which has resulted in the still unresolved issue of financing larger commercial contracts in Iran. The currently proposed INSTEX², which is a form of barter trade between the EU and Iran, could help increase bilateral trade, but launching it will probably create another wave of political tensions by the US and culminate in another wave of already devastating sanctions, just as much, as when it was announced. Hence, mutual trade must still rely on the courage of some EU traders, as well as on re-exports from neighbouring countries, especially the United Arab Emirates.

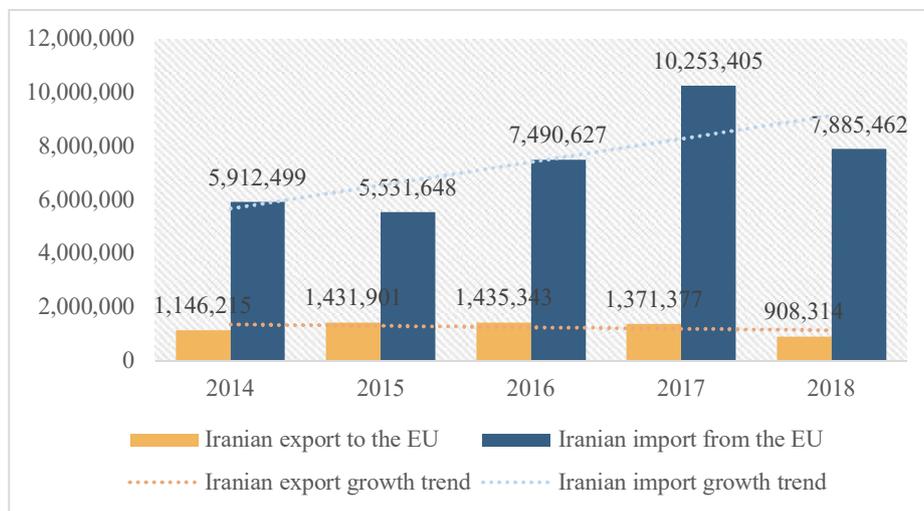


Fig. 7. Iran-EU merchandise trade (2014-2018, € thousands). *Source: ITC, 2019*

Iran has a long-term negative trade balance with the EU. Since 2014, we observe its fluctuation, with the highest deficit in 2017, which amounted to € 8.9 billion. The high trade deficit was due to an increase in Iran's import of goods from the EU of € 2.8 billion (16/17). Currently, Iran's trade balance with the EU is worth -€ 6.9 billion, since Iran's imports of goods from the EU decreased by € 2.4 billion year-on-year.

2.1 Iranian exports to the EU in 2018

Iran is very important for the EU in energy terms since most European imports from Iran consist of oil and gas. Iran ranks second in the world in natural gas reserves and fourth in proven crude oil reserves (World Bank, 2019). The energy industry is very attractive to many investors. However, it should be added that mining industry, as well

² Instrument in Support of Trade Exchanges – payment channel to help continue trade and circumvent US sanctions.

as many others, are largely controlled by the state. The US decision to withdraw from the JCPOA³ and the reintroduction of sanctions against Iran is detrimental to the economic interests of those European companies wishing to conduct trade operations with Iran in sectors subject to US sanctions.

Table 1. Iran's top exported merchandise to the EU and its BRCA values (2018, € thousands)

<i>Product code</i>	<i>Product label</i>	<i>Iran's export to the EU</i>	<i>BRCA</i>
'39	Plastics and articles thereof	192 717	1.69
'72	Iron and steel	137 712	1.85
'08	Edible fruit and nuts; peel of citrus fruit or melons	105 709	2.76
'09	Coffee, tea, maté and spices	72 309	1.57
'57	Carpets and other textile floor coverings	63 932	8.09
'31	Fertilisers	49 001	2.88
'05	Products of animal origin, not elsewhere specified or included	38 324	0.94
'29	Organic chemicals	36 937	1.85
'30	Pharmaceutical products	27 209	0.04
'87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	23 974	0.02

Source: Author's calculations based on ITC, 2019

By analysing Iranian exports at HS2 (Tab. 1), it is clear that Iran has primarily exported plastics and manufactures thereof (HS 39) to the EU, valued at around € 193 mil. Furthermore, Iron and steel (HS 72) worth € 138 mil., Edible fruit and nuts; peel of citrus fruit or melons (HS 08), Coffee, tea, mate and spices (HS 09), Carpets (HS 57), Fertilisers (HS 31), Products of animal origin (HS 05), Organic chemicals (HS 29), Pharmaceutical products (HS 30) and Vehicles (HS 87). Ginger, saffron, turmeric "curcuma", thyme, bay leaves, curry and other spices (HS 0910) had the largest share in the HS 09 category export. It should be added that Iranian saffron has a deep tradition on the European market, as well as Persian woven carpets, which in 2018 exported Iran to the EU market at a value of around € 64 mil.

In the case of an analysis of the BRCA index on the Iranian exports of 2018, the author concluded that, despite the comparative advantages of a larger Iranian export product, the economy also exports commodities to the EU, where it has a so-called. comparative disadvantages. Within the comparative data of the most exported commodities, the economy has the biggest comparative disadvantage in the export of Vehicles (HS 87), Pharmaceutical products (HS 30) and Products of animal origin (HS 05). Despite the low BRCA values in these commodity groups, their exports to the EU in 2018 were noted around € 90 mil.

³ The US withdraw from the JCPOA agreement on 8th May 2018.

2.2 Iranian imports from the EU in 2018

Iran is an immense country with highly unsaturated market. Since it has been externally isolated for decades, the country lacks the latest technology and know-how, and therefore imports most of the goods it cannot produce. Iran imports from the EU mainly machinery and transport equipment (50.9%), chemicals (18.1%) and manufactured goods (8.9%) (European Commission, 2019).

Tab. 2 presents an overview of the ten commodity items that Iran imported into its territory from the EU in 2018 with the relevant BRCA values. In 2018, Iran imported goods worth € 7.9 billion from the EU. As mentioned above, Iran's imports decreased year on year. The reason is not only the unstable internal situation in the country, but mainly due to the difficult financing conditions of Iran's trading partners, as well as the unilateral withdrawal of European companies from business contracts. Tab. 2 confirms, that the most imported was the commodity group HS 84 and thus Machinery, merchandise appliances, nuclear reactors, boilers and its part, worth € 1.8 billion. Further are Cereals (HS 10), Pharmaceutical products (HS 30), Electrical machinery and equipment and its parts (HS 85), Optical, photographic, and other equipment (HS 90), Oil seeds and oleaginous fruits (HS 12), Residues and waste from the food industries (HS 23), Miscellaneous chemical products (HS 38), and Vehicles (HS 87).

Table 2. Iran's top imported merchandise from the EU and its BRCA values (2018, € thousands)

<i>Product code</i>	<i>Product label</i>	<i>Iran's import from the EU</i>	<i>BRCA</i>
'84	Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	1 799 388	0.05
'10	Cereals	945 342	0.03
'30	Pharmaceutical products	728 877	0.04
'85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television	575 908	0.02
'90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical	441 760	0.01
'99	Commodities not elsewhere specified	420 238	0.00
'12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal	397 359	0.05
'23	Residues and waste from the food industries; prepared animal fodder	330 915	0.21
'38	Miscellaneous chemical products	235 807	0.12
'87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	232 232	0.02

Source: Author's calculations based on ITC, 2019

On the basis of the calculations, the author notes that Iran is concentrating on imports of such commodities from the EU, which do not achieve comparative advantages, resp. have comparative disadvantages, which points out to Iran's awareness of its internal production assumptions and the concentration of its imports on such products that the economy does not produce itself, since their production is not beneficial to the economy.

2.3 Complementarity of current mutual Iran - EU trade relations

In order to identify the nature of the trade relationship between Iran and the EU, the author used the Trade Complementarity Index (TC) to analyse the mutual export and import of the compared economies. By applying the export and import data of both countries to the formula (2), we obtained the final value of the TC index between the European Union and Iran. Thus, in 2018, the complementarity index reached 19.99 percentage points. The measured value is therefore closer to the beginning of the scale. We can say that only 1/5 of the export and import share of both economies coincides.

Table 3. Trade Complementarity Index applied on the EU-Iran trade (2018)

<i>Trade Complementarity Index (TC)</i>	<i>Index value</i>
<i>TC between European Union and Iran</i>	19.99

Source: Author's calculations based on ITC, 2019

According to World Bank (2010), a high index may indicate that two countries would stand to gain from increased trade and may be particularly useful in evaluating prospective bilateral and regional trade agreements. In our case, the value of the TC index between the EU and Iran is low, which means that, according to our calculations, the EU nor Iran would gain from deepening mutual trade cooperation and possible bilateral or regional agreement would avoid its effect. However, the outcome of the index can be somewhat distorted, as the EU is economically fragmented and some countries tend to trade more than others. In case of analysing the results of the EU Member States' economies alone, such differences would be noticeable.

3 Conclusions and policy implications

Economic relations between regions and the countries themselves are currently experiencing difficult times. Stronger protectionism by the US also has a negative effect on EU-Iran trade relations. The aim of the paper was to analyse Iran as the current trading partner with a view to identify its trade developments over the past four years as well as to reconcile its trading position through Balassa's Revealed Comparative Advantage Index (BRCA) and Trade Complementarity Index (TC) in the context of the Iran-European partnership. The current tense political situation reflects Iran's trade position as a European partner. Over the past four years, we have been following the downward trend in Iran's exports to the EU. Iran's import of goods from the EU only increased

until last year, in 2018 imports from the EU dropped significantly. No wonder, the conditions for trading Iran's trading partners are more than unfavourable on the European market. Despite efforts to revive at least diplomatic relations with Iran, we note that the EU has not yet taken any concrete steps to help traders continue to trade large with Iran.

Through the BRCA index, the author identified the character of Iranian exports and imports from and to the EU. By analysing the results of the BRCA index on Iran's ten most exported goods to the EU in 2018, we conclude that Iranian exports are largely oriented towards the export of those products that achieve revealed comparative advantages. In Tab. 2, we also observe those goods (not marked in grey) that Iran does not achieve a comparative advantage in exports. However, it is only a minor export of goods. In the context of an analysis of Iran's import of EU goods, the author decided to apply the BRCA index results to the ten most imported commodities in 2018 by Iran.

According to our results, we conclude that Iran focuses on imports of EU commodities that do not achieve comparative advantages in its exports which in short means that Iranian economy imports what is unable to produce under the current conditions. The author identified complementarity between Iranian-European relations through the TC index, whose value was low in 2018, which means that both economies would not benefit by signing a potential trade agreement. The result of the index is interesting, because the mutual cooperation of both economies is experiencing an unfavourable period. Despite such a result, we can observe that there is no need for further deeper cooperation with Iran, but it would be sufficient if the market reaches pre-US financial sanctions and allows companies to continue to trade with each other without significant restrictions. It should also be added, as mentioned above, that the outcome of the index explains the EU's relationship with Iran as a whole. As the EU is internally divided, the Iranian economy does not play the same role in all 28 economies. Therefore, in further research it would be appropriate to apply the TC to those Member States of the Union that need to trade with Iran.

The European Union has several options for taking a position on Iran. It will either realize the importance of this unsaturated market for European exporters and will actively seek out and implement new and effective ways of doing business with Iran, or the US tendencies and the artificially propagated fear from this country will prevail and the EU will not take its chances. It is important to recall the importance of China's Belt and Road Initiative project (BRI), involving Iran and several EU Member States. Participation in the project has already been confirmed by 70 countries, including Belarus, Kazakhstan, Turkey, Thailand and Russia. It should not be forgotten that the successful implementation of the OBOR project will not only strengthen China's Eurasian position, but a growing number of countries linked to these new transport routes will be increasingly more interdependent on China's economy and internal political decisions of its leaders (Baláž et al., 2019). In this case, recognizing Iran as a trading partner of the EU would create a solid basis for future BRI cooperation between countries, as well as setting a trend for increasing trade between them. Due to the protectionist direction of foreign trade policies and the consequent increased regulation of state interventions in our economies, we are seeing an increase in the geostrategic importance of the functioning of the world economy. According to P. Samuelson, "remarkable fact is not how much government does to control economic activity, but how much it does not" (p. 35).

The current state of the world economy needs to steer states into economic activities that uphold the principles of free trade and not protectionism. Only under such conditions can the EU and other economies continue to prosper. However, reality is currently relatively variable. The unpredictability of some world economic leaders creates precarious conditions for the whole world economy. Geopolitical conflicts can break out into trade and political wars at any time and disrupt economic order. According to our calculations, we have reached a few conclusions, but the economic reality may be quite different in the near future. The situation on the world market is uncertain, and it is questionable whether the EU will give into pressure and incline to the US or go against resistance and try to resist US sanctions. However, Member States should be prepared for both options.

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FURTHER FISCAL INTEGRATION IN EURO AREA

Lukáš Burian

Ekonomická univerzita v Bratislave
Národohospodárska fakulta, Katedra ekonomickej teórie
Dolnozemska cesta 1
Bratislava, 852 35
Slovensko
lukas.burian@euba.sk

Abstract. The euro area is the first case in the history of monetary unions, where monetary policy making is centralized under a single central bank, while fiscal policymaking is decentralized by the national governments of the Member States. How should a deeper fiscal integration or even a fiscal union look like? This is the subject of debate among many economists. The aim of this paper is to review literature on fiscal integration and to assess the possible form of deepening fiscal integration in the EU.

Keywords: fiscal union, optimal currency area, euro area

JEL classification: E44, E61, E62

1 Introduction

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

The future of European Union and more specifically euro area institutions was at the center of a heated policy debate during 2011–2012, when the euro-area faced its deepest crisis since its birth. One key event during that period was the publication, on December 5, 2012, of the report "Towards a Genuine Economic and Monetary Union" authored

by the so-called “four presidents” (Van Rompuy, Barroso, Juncker and Draghi) which identified four pillars on which a “stable and prosperous” monetary union could be built (see European Commission 2012).

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

2 Optimal currency area and fiscal integration

Even during the preparation of the monetary union in Europe, opinions have emerged that the EMU can only be successful in the long term only if there is a system of automatic transfer payments between member states, the so-called fiscal federalism. According to P. Kennen who extended theories of Robert Mundell presented in “A Theory of Optimum Currency Areas”(Mundell, 1961) , the theory of optimal monetary area implies several implications for fiscal policy in the monetary union. It is essential to centralize a substantial proportion of national budgets at EU level. A centralized budget allows countries or regions affected by negative shocks to receive automatic transfer payments (Kennen, 1969). It should be borne in mind that budgetary transfers can be used for temporary shocks. A country or region facing a permanent shock (a steady decline in demand for their output) should adjust its wages and prices, or the production factors mobility. However, experience with regional budgetary transfers shows that transfers are very difficult to limit for a transitional period. In the event of negative shocks in the regions, social security transfer payments become permanent payments. Large transfer payments also rise political problems. This experience can also be applied to the European level - if there were a centralized social security system, it would lead to transfers of payments from one country to another and could also create a political problem that could subsequently jeopardize the unity of the European Union. (Muchova, Lisy 2009)

On the other hand, there is a view that if centralization of national budgets would not take place (as is the case with the EMU), fiscal policy at national level should be used in a more flexible way. This means that in the event of a negative shock, there should be a possibility to increase the budget deficit through the built-in budget stabilizers (decrease in government revenues, increase in social spending). This implies that

national fiscal policies should be left with a certain level of autonomy, as monetary union member states lose their economic policy instrument, the exchange rate. However, the question remains to what extent governments can create a budget deficit to absorb negative shocks without leading to unsustainability of these deficits. The use of fiscal policy in offsetting negative shocks cannot be sustainable in the long term. Experience from history points to the fact that large budget deficits quickly lead to unsustainable debt dynamics, which are very difficult for countries to stop and stabilize. (MUCHOVA, 2010).

3 Political compromise in fiscal policy making

In their article, De Grauwe, Foresti (2015) describes that euro area countries face a political compromise between:

1. common rules in fiscal policy;
2. financial stability;
3. financial integration.

The theory of optimal currency areas suggests that in the presence of asymmetric shocks and rigidities in labor markets, rigid fiscal rules make monetary unions suboptimal. When an asymmetric shock occurs and when national fiscal policies are constrained, financial market participants will anticipate major adjustment problems. This in turn can lead to self-fulfillment of crisis that undermine financial stability and can lead to disruption of financial integration. This leads to the conclusion that a monetary union can lead to trade-offs between fiscal rules, financial integration and financial stability. De Grauwe and Foresti tested whether such a trade-off exists in the euro area. They found a compromise after the crisis, but not before the financial crisis. The interpretation of this result is as follows. There appear to be two regimes in the monetary union. When confidence in euro area stability prevails, asymmetric shocks lead to stabilization of capital flows. The need for flexibility in fiscal rules to address these asymmetric shocks is therefore small. Capital markets then assumed a stabilizing role and capital flows are a stabilizing factor. However, when there is mistrust in optimizing monetary union, financial markets lose confidence in sustainability, and the compromise between fiscal rules, financial stability and financial integration becomes binding. In this case, fiscal flexibility is needed to maintain financial stability and financial integration. Thus, the intensive fiscal rules that have been introduced in the euro area following the debt crisis appear to have reduced the capacity of national governments to deal with asymmetric shocks and thus become incompatible with either free capital mobility and / or financial stability.

4 Proposed form or deepen fiscal integration

Fuest and Peichl (2012) describe 5 different elements of how a fiscal union could work under EU conditions. These elements are:

- Fiscal rules, coordination and supervision
- Crisis mechanism
- Common guarantee for government debt
- Fiscal equalization and other transfer mechanisms between countries
- A larger EU budget and a European tax

Fiscal rules are represented in the euro area, for example by the Stability and Growth Pact (SGP). The crisis mechanism is represented by the ESM (European Stabilization Mechanism) and a common guarantee in the form of the now rejected Eurobonds. These elements also include concerns about moral hazard, so that countries do not finance their excessive budgets through these elements. The most interesting are the new elements that would lead to higher fiscal integration in the euro area.

4.1 Fiscal equalization and other mechanisms for transfers between countries

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

4.2 A larger EU budget and European Tax

Finally, the fifth proposed element of a fiscal union would be an enlarged government budget in the EU along with an EU tax. Such an increased central government budget would require a significant transfer of political responsibilities at European level, which raises many questions. From a macroeconomic stabilization perspective in the monetary union, the key question is whether this would improve fiscal shock absorbers in the presence of asymmetric shocks. In order to achieve macroeconomic stabilization, contributions to the central budget should automatically decrease in the presence of negative shocks, while central government spending in the country would ideally increase. Currently, Member States' contributions to the EU budget are approximately proportional to GDP. Given that the EU budget is slightly above 1% of GDP and given that national spending is largely unrelated to macroeconomic conditions, the level of fiscal stabilization it provides is very limited. In principle, there are different ways to reinforce the stabilizing effects of the budget. Firstly, the EU could take on tasks involving countercyclical income measures and expenditure, such as unemployment insurance. Secondly, the EU could rely on EU taxes or be directly linked to individual countries' tax revenues.

4.3 The role of central budget in monetary union

The underdevelopment of the EU budget is a significant shortcoming in the design of EU fiscal institutions because the existence of a large central budget plays a critical role in the working of a monetary area, particularly in a long run perspective. The ultimate reason for this is that the appropriate working of a single currency area requires the attainment of a certain degree of convergence of macroeconomic conditions, of economic policies and of the structure of economic markets and the centralization of key fiscal policy decisions through a central budget promotes this convergence and harmonization across the monetary area.

This occurs through four different channels.

First channel: centralizing and therefore fully harmonizing certain spending and revenue policies helps fostering the convergence of product and factor markets. Let's consider some examples (see also Cottarelli 2013):

- First example: centralizing the corporate income tax helps create a level-playing field for investment decision throughout the whole area.
- Second example: centralizing unemployment subsidies helps make more homogeneous the labor market and, in addition, could become the catalyst for the centralization of other labor market policies.
- Third example: centralizing pension systems would also make more homogeneous the European labor market.

The key point is that the structure of tax and spending policies their specific form and design is a key factor in shaping the working and the evolution of factor and product markets and its full harmonization therefore helps in fostering the convergence in the working of those markets.

The second channel through which the centralization of fiscal policies helps convergence relates to fiscal discipline: centralizing fiscal policy decisions that is assigning to the center responsibility for specific areas reduces the risk that unsustainable fiscal policy decisions are undertaken by single member states. For example, if unemployment benefits were centralized, the risk that unsustainable unemployment benefits are introduced by single members would be eliminated. In other words, the centralization of fiscal policy decisions is the final solution to avoid the risk of free riding in a monetary union. If, in principle, all fiscal policy decisions were centralized, it would not be possible for union members to run unsustainable deficits or to accumulate unsustainable debts.

Third channel: a budget that centralized spending and revenues items that are sensitive to the economic cycle, like the corporate income tax or unemployment subsidies, would imply that it is the center and not the periphery that would run larger deficits in economic downturns. And if we assume that the center can borrow from markets more easily than at least some countries of the periphery particularly during crisis periods as evidenced by the experience of the euro area during the recent crisis centralizing the automatic stabilizers enhances their effectiveness because it is less likely to cause an increase in interest rates. Consequently, member countries and ultimately the whole area become less vulnerable to shocks, including those of idiosyncratic nature. This is the best way to achieve risk sharing, without having to introduce ad hoc transfer across member countries.

Fourth, and related, channel: a larger central budget, again under the assumption that the center can borrow more easily than at least some member states, can also more easily run discretionary counter-cyclical policies.

To sum up, the centralization of key policy decision through a central budget plays a critical role in the good working of a common currency area: it fosters economic convergence because it makes more similar the structure of economic markets, reduces the risk of fiscal free riding, allows a better risk sharing in the presence of shocks through the work of automatic stabilizers, and allows the management of more effective countercyclical policies. (Cottarelli, 2016).

5 Conclusion

The euro area is the first case in the history of monetary unions where monetary policy making is concerned centralized under one central bank, while fiscal policymaking is decentralized in the hands of the national governments of the Member States. This institutional framework is new to economists and policy makers. Economists thus dare to unfamiliar territory, allowing them to hold very different views on the correct fiscal union proposal for the euro area.

National stabilization efforts do not work and introduce an element of instability in the monetary union, mainly because the countries most affected by the shocks of the business cycle cannot stabilize. Thus, when business cycle shocks dominate, a common approach to stabilizing business cycles will have to be followed. This can be done by the budgetary union. By centralizing part of the national budgets into a common budget

managed by a common political body, the different increase in budget deficits resulting from the (common) recession is reflected in the Union-wide budget scheme. As a result, destabilizing liquidity flows between countries will disappear and the Joint Budgetary Authority may allow automatic budget stabilizers to fulfill their role in balancing the business cycle (De Grauwe, Ji, 2016).

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TRENDS SHAPING EUROPEAN MIGRATION

Ivana Dancakova¹

University of Economics in Bratislava
Faculty of International Relations
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
ivana.dancakova@euba.sk

Abstract. International migration is present in any place at any time. In Europe, we can observe a long history of human mobility as the borders open while states come closer in different dimensions of cooperation. Immigration from third countries, outside the European Union, significantly influenced migration flows and composition across European countries. This article aims to analyze and observe the tendencies of migrant movement in Europe during the last five decades. By using a descriptive method, we analyze the European migration network created between nations in the period of years 1965 to 2015, regarding its determinants.

Keywords: international migration, movement, Europe

JEL classification: F 22, O 15

1 Introduction

In 2015, increased migration flows lead to a crisis as it was presented in many political and public discussions. But the European region was influenced by human mobility during ages. In this article, we will mainly focus on the last fifty years as this period is essential for inflows of economic migrants, students and refugees who had to leave their countries. The reasons for migration vary from migrant to migrant. As the approach of accepting countries differs too.

The main aim of the paper is to offer a qualitative study of international migration tendencies and their shaping during the last fifty years at the European continent.

1.1 Current definition

In the context of the European Union (EU), migration is considered as a situation where a person establishes a permanent (habitual) residence in the territory of an EU Member State for a period which is, or is expected to be, at least 12 months if previously has been a resident in another Member State; a third country; or has previously been resi-

dent in the territory of an EU Member State and has terminated his/her (habitual) residence in that State for a period which is, or is expected to be at least 12 months. (EMN, 2018) A broader definition of migration is provided by the International Organization for Migration (IOM) which states that it is 'the movement of persons or groups of persons within the geographical and social space associated with the temporary or permanent change of residence'.

The difference in longitude and also changes in socio-economic conditions lead to population movements, in which the theoretical concepts are formulated, have a significant impact on their later relevance, while the new theories are formulated because of the new conditions. (Stefancik, 2010) Collection of statistical data on international migration thus complicates not only the inconsistency of definitions but also the circumstances leading to migration and their dating. IOM also characterized the concept of immigration which means the process of resettling people to a country of which they are not citizens, to settle in that country for more than one year.

2 International migration tendencies

In the years 1965 to 2015, the level of international migration has changed significantly in terms of size, origin and perception. While the level of global international migration reached two and a half of its size between 1965 and 2005 (with the base year 1965), it exceeded 191 million migrants and rise to 258 million people in 2017, representing 3.4% of the world population. (GCIM, 2005) Europe has faced a more quantitative increase in migration. Based on United Nations data, the number of immigrants on the European continent increased from 23 million to 56 million migrants between 1985 and 2000, representing more than seven per cent of the population at that time. In 2017, immigration rose to 77.8 million people. (IOM, 2018) Almost 37.5 million migrants came to Europe from third countries which represent 7.5% of the European population. (IOM, 2018) In January 2018, 22.3 million people with other citizenship than those of EU Member States'. (Eurostat, 2019) Migration has thus made a significant contribution to the population growth of the population of the Member States of the European Union, which are facing progressively lower birth rates and an ageing population.

The first immigration tendencies lead to unequal distribution and concentration of a significant number of immigrants on the European continent. Over time, we can see an evident increase in migration tendencies. Nevertheless, European states are not considered to be so-called immigration countries, such as Canada and the USA, and therefore there was no increased emphasis on the integration of immigrants. In the following parts, we take a closer look at the dimension of immigration in time and space.

Before the First World War, the first major wave of immigrants went to Western European countries, especially to France, Belgium and Switzerland, where the number of emigrants from the former European colonies was the biggest. The second wave of migration took place in the period after the Second World War when the countries of Northwest Europe experienced economic development, industrial production increased, and at the same time, the migration of higher educated population increased what led to a shortage of labour in some areas, such as agriculture, metallurgy, mining

and cleaning services. The result was the increased level of employed workers from peripheral European countries, who preferred to improve their living conditions by temporary relocation to the countries of North-West Europe, especially Belgium, France, Germany, Luxembourg, the Netherlands and Sweden. They admitted that migrants would be returned to their home countries when the work is done. Therefore, they reserved only a minimum of rights and limited access to state support to improve their well-being. (Penninx, 2013) Most of the migrants came from former colonies (Algeria, Morocco, Tunisia), but also from poor agricultural regions of the countries of South and South-East Europe and their peripheries, (particularly Portugal, Spain, Italy, Yugoslavia, Greece and Turkey) which suffered from lack of job opportunities. (Bade, 2000) Geographical proximity also played an important role in defining migration flows. We can give an example of labour migration from Finland to Sweden, from Ireland to the United Kingdom of Great Britain and Northern Ireland (the United Kingdom), or from Italy to Switzerland. (Van Mol, 2016)

In times of the Cold War, migration from East to West of the European continent was strictly controlled and limited. For this reason, the European countries, to fill the labour market gaps, decided to gradually ease the rules for the admission of foreigners from outside Europe. Until then, the Federal Republic of Germany had attire migrants from Greece, Italy and Spain, as well as from the Democratic Republic of Germany. In 1961, when Germany was divided by the Berlin Wall, the Germans decided to cooperate with other countries and gradually opened their labour market to workers from Turkey, Morocco, Portugal, Tunisia and then Yugoslavia. Similarly, neighbouring countries (Belgium, France and Switzerland) followed their example and signed contracts on the admission of migrants to work within the countries. Sending and receiving countries have benefited from migration equally. Countries that have sent migrants have benefited from easing labour market pressures as a result of high demographic growth, low productivity and incomes, and high unemployment, as reported by Moch and Vilar (2003, 2001). In that period, the positive attitude of the society towards migration prevailed because of its economic benefits.

Another major milestone was the oil shock between 1973 and 1974. Since the 1950s, the countries of north-western Europe have experienced steady economic growth and introduced programs for visiting workers, with many migrants from former colonies arriving in Europe. However, refugee migration also increased, but migration from the south-east to the north-west dominated. The oil shock stimulated economic restructuring, thus limited labour demand. This was followed by a slowdown in migration waves to Europe. The first states to show reduced interest in migration were Sweden and Switzerland, followed by Germany, Belgium and France. Those States have introduced migration policies aimed at controlling and reducing migration, which has led to a transformation of migration flows rather than a cessation of it. The number of immigrants continued to increase as a result of a change in the migration system when circular migration turned into chain migration and brought about an increase in the natural increase of the migrant population. Immigrants who came from third countries and came for work, gradually began to settle permanently, since returning to their country of origin could pose a risk of losing their residence permit in the host country. A new

phase of immigration has started for family reunification. Despite the efforts of governments to reduce the increasing number of migrants, the reunification of migrant families has become a fundamental right enshrined in Article 19 of the European Social Charter (1961). (Hansen, 2003)

In 1975, 80% of the total number of foreign migrants were concentrated in four Western European countries, the United Kingdom, France, Germany and Switzerland. Decolonization brought a further increase in immigration, particularly to countries that were among the most important colonial powers, such as Belgium (from Congo), France (from North Africa), the Netherlands (from Indonesia), the United Kingdom (from Kenya, India and Malaysia) and Portugal (from Brazil). The reasons for the migration of citizens from former colonies varied, some came for economic reasons, others because of the ongoing conflicts and persistent violence in the struggle for independence. Europeans who were returning from the colonies were able to integrate easily into the social structures of the recipient countries thanks to their rapid integration into the labour market. On the contrary, incoming migrants of non-European origin without economic and social background were more difficult to cope with resettlement, while being more often discriminated. (Garcés-Mascarenas, Penninx, 2013)

Between 1950 and 1990, although the east-west migration corridor was limited by the Iron Curtain, almost 12 million people emigrated from east to west, mainly to Germany. As a result of the political crisis, large crowds of migrants went to the west, mainly from Hungary (1956-1957), Czechoslovakia (1968-1969) and Poland (1980-1981), and were considered as political refugees. As we have already mentioned, numerous migrant groups have also gone to the northern regions of Europe, especially from the southern European regions. After stabilizing the situation in the south, several returned to their original homes. Consequently, a significant increase in the proportion of non-European migrants was observed in northern European countries. For example, this happened in Sweden, when in 1970 the share of migrants from third countries accounted for 7.6 per cent of the total number of immigrants, but later in 1999, this proportion increased to 40 per cent of the total population of international migrants living in the country. (Van Mol, De Valk, 2016) Also in this period, we observe a significant increase in the number of immigrants from Turkey and the region of North Africa, where the population has increased sharply and unemployment has increased proportionally.

For this period, it was characteristic that the countries of North-West Europe gradually tightened and controlled the immigration rules. Family reunification was a key factor in facilitating and encouraging immigration. European countries with the largest groups of immigrants have experienced a period of economic recession, which has led to an increase in the unemployment rate, but also an increase in manifestations of racism and xenophobia, which have led to violent protests against immigrants. Migration has become an important issue of political and public affairs. During this phase, the phenomenon of permanent immigration, which has been replaced by a temporary one, is gradually becoming known. The result was the need to shape adequate integration strategies. The period from the fall of the Iron Curtain through the conflict in the former Yugoslavia to the global financial crisis has been characterized by the increasing influence of the EU as well as increased efforts to control migration from third countries

and promote intra-European mobility. It is mobility within the EU that has a positive impact on the 'vitality and competitiveness' of the Member States. (EC, 2013)

The last period is characterized by new geographical migration trends, which include the mobility of workers for transnational corporations and international organizations; qualified workers, including doctors, nurses and volunteers from around the world; refugees and asylum seekers from Africa, Asia, the Middle East, the Balkans, former USSR members; students from China or undocumented migrants. (Garcés-Mascarenas, Penninx, 2013) The current intensive migration tendencies have triggered a new era in the area of migration – the era of mobility. For example, we can mention the twelve countries that joined the EU after 2004 and are significantly influenced by current migration trends. They are experiencing a higher rate of emigration, are serving as transit countries of migratory flows, meanwhile, they are experiencing an influx of immigrants, their migration stock is balanced.

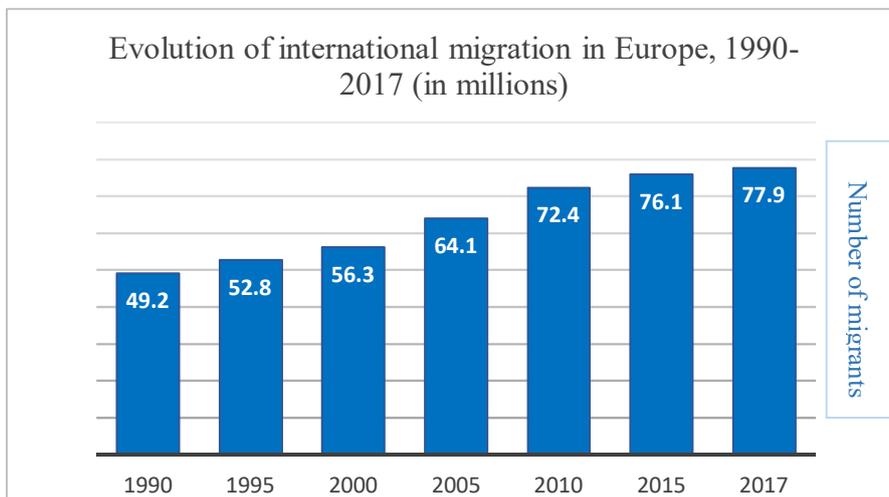


Fig. 1. Evolution of international migration in Europe, 1990-2017 (in millions). *Source: Provided by the author based on data from UN DESA, 2018 and IOM, 2018.*

The historical development of international migration in Europe can be seen in Figure 1, which represents the evolution trends of international migration on the European continent from 1990 to 2017. At present, almost one-third of the world's population of international immigrants live in Europe, which represents 78 million people. More than half of them, nearly 40 million, have roots in one of the European countries but have decided to move to another country within Europe. Based on IOM data, the international migration within the European region, the Europe-Europe Corridor, was the second-largest migrant flow in the world in 2015. The most emigrants went from Latin America and the Caribbean to North America. The number of migrants coming to Europe from third countries was only slightly lower in 2015 compared to intra-European migration, reaching 38.5 million. (IOM, 2008) The figures do not include the number of people born outside Europe but who have already acquired the citizenship of a European country.

We continue with the dynamics of migration tendencies to Europe, within the European continent, as well as emigration from Europe from 1990 to 2015 (Figure 2). In the 1990s, the number of Europeans living abroad equaled the number of migrants arriving in Europe. This was followed by twenty years of decline in emigration and an increase in immigration flows mainly from Africa, Asia, Latin America and the Caribbean. Between 2010 and 2015, emigration is increasing, with Asia and Oceania, they are becoming the main destinations for Europeans in addition to North America. (UN DESA, 2015)

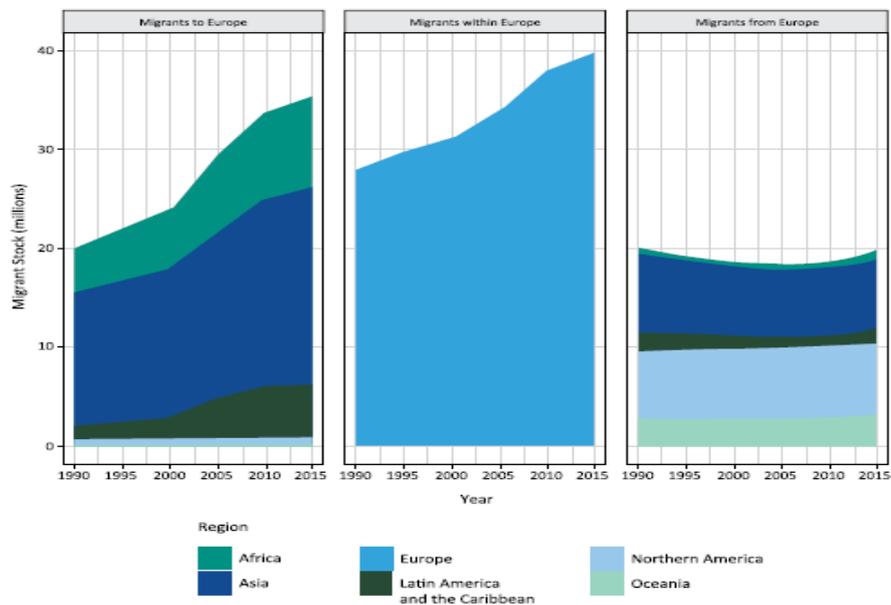


Fig. 8. International migration to/within/from Europe, 1990-2015 (in millions). *Source: IOM. (2018): World Migration Report. UN DESA, 2015.*

In 2015, the United Nations Department of Economic and Social Affairs (UN DESA) published a list of the twenty European countries most involved in international migration flows. Within the European region, most people emigrate from Eastern European countries (Russian Federation, Ukraine, Poland, Romania, etc.). However, the United Kingdom is the country with the third-highest number of emigrants (Figure 3). Bosnia and Herzegovina, Portugal and Ireland are among the states that have a high proportion of the population living abroad compared to their population. As far as immigration is concerned, the most popular immigration destinations are Germany, with immigrants from Poland, Turkey, Russia and Kazakhstan, then France with high immigration rates from the French-speaking countries of North Africa, and the United Kingdom with a significant influx of Indians and Poles. They are followed by Italy and Spain, whose migrants come from other European countries, such as Romania, Germany, the United Kingdom, but also from Morocco and other North African countries. In 2015, Switzerland, Sweden, Austria and Ireland were among the countries with the highest share of migrants in the total population.

One of the reasons for the high level of intra-European migration is the possibility of free movement of citizens of the EU Member States that are part of the Schengen area, representing the territory of 22 EU Member States and four other European countries. Even though Romania is not part of the Schengen area, it has the highest population living in any of the EU countries (3 million) among all EU Member States. Poland comes second, followed by Italy, Portugal and the United Kingdom. (EC, 2018) In 2015, the EU felt the uncertainty, when the influx of migrants from third countries to Europe increased significantly. Main migration routes became the Mediterranean Sea and the Balkan route. The target countries were mainly Germany, Austria and Sweden. Huge uncontrolled migration flows, but also mixed groups of migrants (legal, illegal, voluntary migrants or refugees) have become a problem. As a result, the freedom of movement in the region was temporarily restricted by the introduction of border controls. This has contributed to the reduction of migration flows, but migrants with a persistent ambition to enter the European continent continue to be at greater risk of abuse or smuggling. (FRONTEX, 2016) Other important determinants of international migration are the long-standing negotiations on Brexit and the future position of the United Kingdom in the region, as well as the status of immigrants in the country.

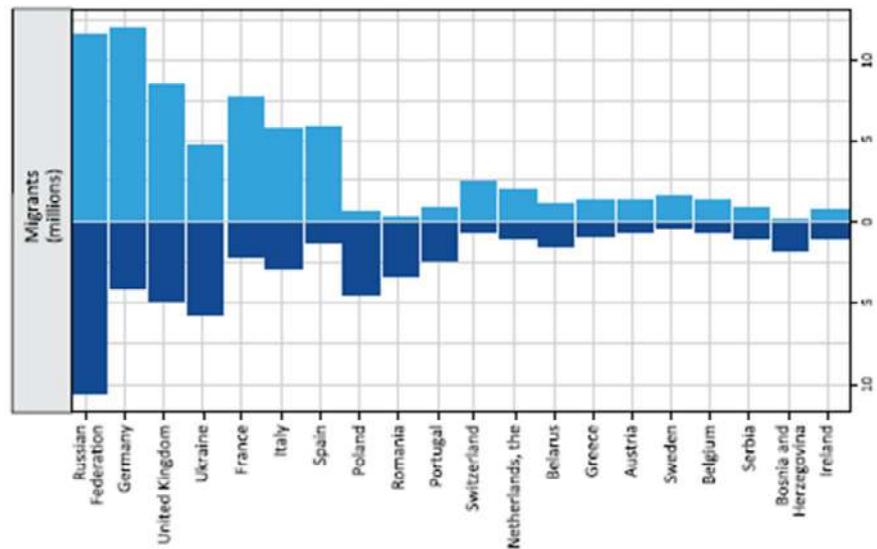


Fig. 3. Top twenty European migration countries in 2015 (in millions). *Source: UN DESA, 2015.*

3 Conclusions and policy implications

Last fifty years, the migration tendencies vary by the level of the development of sending and receiving countries. Nowadays, the biggest challenge for Europe represents the uncontrolled numerous immigration flows of economic migrants and refugees. Due to many violent conflicts and climate change consequences, there is a potential of rising

the stock of refugees. European countries have to deal with these tendencies by developing a new approach to migration governance and integration practices.

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CHANGES IN THE INDICATORS OF CREDIT AND FINANCIAL MARKET ASSESSMENTS IN TERMS OF MACROPRUDENTIAL POLICY

Igor Dvornický

University of Economics in Bratislava
Faculty of National Economy, Department of Finance
Dolnozemská cesta 1
Bratislava, 852 35
Slovak Republic
igor.dvornicky@gmail.com

Abstract. This paper is dealing with the methodologies to determine the final level of the Countercyclical capital buffer in Slovakia, which has become an important method in preventing the impact of possible severe consequences when the financial cycle transitions into a recession phase. We discuss current developments and risks for the national economy, largely dependent on the developments of the global economy. We are looking for specific reasons and means as to why the debts of Slovak households have been the fastest growing of the whole European Union for several years. We examine the impact of excessive competition in the banking sector and consumer behavior in an environment of exceptionally cheap mortgage rates. Currently, these areas as a whole have the largest impact on the stability of the financial system and keep the local regulators on alert.

Keywords: financial stability, mortgage boom, countercyclical capital buffer

JEL classification: G 28, G 41, G 51

1 Introduction

The presence of a sound financial system is precondition for the well-functioning economy and sustainable economic growth. The basic prerequisite of a sound financial system is its stability, a condition where the financial sector is sufficiently resilient to economic shocks, volatility and risks that could disrupt its functioning and thus adversely impact the economy.

The economic cycle of Slovakia is in its expansionary phase, exceeding expectations, meaning that the productive capacity is unable to keep pace with its growing aggregate demand, in economic terms the so called overheating of the economy. Such scenario also applies to the current development of the US economy, which is historically one of the longest cycles in its ascension phase, without interrupting growth, i.e.

peak and subsequent recession. However, these particularly favorable conditions, whether in the domestic or global economic scene, entail risks to their long-term sustainability. Looking at the developments in the Eurozone, the downturn in economic activity still remains. It's largest economy, Germany just narrowly avoided the recession in 2018 after a long-term expansion similar to the above described scenario.

Favorable macroeconomic data, nominal wage growth, but mainly the impact of declining interest rates within our territory had a significant influence on the extraordinary growth of the household indebtedness. The indebtedness of Slovak households reached the highest values among the countries of Central and Eastern Europe. Thus, the willingness of Slovaks to take out loans grew into a phenomenon, of which behavioral economics also refers to as 'herd behavior' of consumers. Moreover, Slovak clients are often provided a higher amount of loan than what they would be able to take out abroad. The high levels of indebtedness bring several risks, the vulnerability of households to possible shocks (loss of income, loss of employment, etc.) increases. Excessive debt also increases the likelihood of financial crises and reduces the potential for economic growth. The current indebtedness of Slovak households is at the level of 45% of GDP (NBS, 2019), which is already in the middle of the tolerance threshold that the IMF considers as having potentially negative impact on economic growth. Moreover, the growth of indebtedness in Slovakia (hereinafter also SR) is far exceeding the growth of the favorable economic fundamentals. At the same time, the annual growth rate of loans provided to households has been increasing in double-digit numbers for over several years, which according to the economic theory, can be defined as formation of a so-called 'bubble'. The most significant risk is related to the possible overestimation of assets, mainly as a result of a long period of low interest rates and quantitative easing.

The persistently low interest rates also increase the pressure on financial institutions' profitability. They decided to compensate the shortfall in interest margins with a rapid aggregation of loan volumes, resulting in a unique mortgage war, the provision of cheap and unusually affordable loans primarily targeted on households. At the same time, this strategy jeopardizes banks' credit risk management in relation to households' loan repayment problems - which may have a particularly toxic 'debt domino effect'. The overheating of the credit market is generally influenced by the real estate market, which also records double-digit dynamics in the Czech Republic on an annual basis, contributing to the generation of a real estate bubble.

One of the responses to the previous global financial crisis, caused by the banking sector, was the emergence of a macro-prudential policy. In our territory, it is implemented primarily by the regulator, the National Bank of Slovakia (hereinafter also the NBS), which applies the recommendations and guidelines of the European Central Bank (hereinafter ECB). Countercyclical capital buffer (CCyB) is a key macro-prudential tool for transferring cyclical risk to banks' lending activities. In the times of prosperity, when high credit growth is occurring, banks are required to have additional and sufficient capital. If the business cycle turns into recession, economic activity slows down or even declines, this buffer may be released, allowing the bank to continue lending to the real economy or having sufficient capital to run its business.

Due to these unique developments in Slovakia, the NBS in the second quarter of 2019 decided to change the methodology of the calculation of the final level of CcyB.

Instead of the reference indicators of the Domestic credit-to-GDP ratio gap based on the credit gap measurement, the main indicator becomes the Index performance for Composite Business Cycle Indicator (composite countercyclical indicator), with the aim of predicting the development of the financial cycle more accurately (NBS, 2019).

1.1 Current rates of CCyB

The rate of the countercyclical capital buffer is expressed as a percentage of the total risk exposure calculated, according to a separate regulation, from 0% to 2,5%, multiplied by 0.25 percentage point. Taking into account the above factors, the rate of the countercyclical capital buffer may be higher than 2.5% of the total risk exposure, calculated in line with § 33j 2. Act no. 483/2001.

Table 1. Values of the CCyB for Slovak exposures

CCyB VALUES FOR SLOVAK EXPOSURES	
Effective period	Measure
1. 8. 2018 – 31. 7. 2019	1,25 %
1. 8. 2019 – 31. 7. 2020	1,50 %
1. 8. 2020 –	2,00 %

Source: self-processed data based on NBS sources, 2019; <https://www.nbs.sk/sk/dohlad-nad-financnym-trhom/politika-obozretnosti-na-makrourovni2/nastavenie-nastrojov/aktualne-nastavenie-kapitalovych-vankusov-v-sr>

The decision on the CCyB rate is binding in Slovakia for all banks, regardless of whether it is a domestic bank, a branch of a foreign bank or a foreign bank conducting transactions on a cross-border basis (NBS).

The CCyB macro-prudential tool is utilised by the most developed countries, as well as outside the European Economic Area. At the same time, its rate of capital formation of banks to their ratio of risk-weighted assets in Slovakia belongs to one of the highest rates in the world. At present, 11 economies in the EU have approved a non-zero countercyclical capital buffer, and other, non-EU countries are Hong Kong with 2.5%, Iceland 2% and Norway 2.5%.

Table 2. Current CCyB rate setting for foreign exposures

Country		30.9.2018	31.12.2018	31.3.2019	30.6.2019	30.9.2019	31.12.2019	31.3.2020	30.6.2020	30.9.2020	Regulator decision
EU	Belgium	0	0	0	0	0	0	0	0	0,5	↑ 0,25 % 1.7.2020
	Bulgaria	0	0	0	0	0	0,5	0,5	1	1	↑ 0,5 % 1.10.2019 1 % 1.4.2020
	Czechia	1	1	1,25	1,25	1,5	1,5	1,75	1,75	2	↑ 1,5 % 1.7.2019, 1,75 % 1.1.2020 2 % 1.7.2020
	Denmark	0	0	0,5	0,5	1	1	1	1	1	↑ 0,5 % 31.3.2019 1 % od 30.9.2019
	France	0	0	0	0	0,25	0,25	0,25	0,5	0,5	↑ 0,25 % 1.7.2019 0,5 % 2.4.2020
	Ireland	0	0	0	0	1	1	1	1	1	↑ 1 % 5.7.2019
	Lithuania	0	0,5	0,5	1	1	1	1	1	1	↑ 1 % 30.6.2019
	Luxemburg	0	0	0	0	0	0	0,25	0,25	0,25	↑ 0,25 % 1.1.2020
	Germany	0	0	0	0	0	0	0	0	0,25	↑ 0,25 % 1.7.2020
	UK	0,5	1	1	1	1	1	1	1	1	
	Sweden	2	2	2	2	2,5	2,5	2,5	2,5	2,5	↑ 2,5 % 19.9.2019

Source: self-processed data based on NBS sources, ESRB, BIS, 2019; <https://www.bis.org/bcbs/ccyb/>

1.2 The activity of the National Bank of Slovakia in assurance of financial stability

Ensuring financial stability by the NBS formally originates from Act no. 747/2004 on the oversight of the financial markets. The main thing, however, what the regulator does in favor of the situation in real life, and how proactive its policy making is. Here is a short list of some activities:

- The NBS was the first in the euro area to raise the CCyB level from zero
- Proactively identified the incompatibility of the proposed Basel III - Basel Gap model for Slovak exposures
- Developed an alternative Domestic credit-to-GDP ratio gap indicator
- Due to the unique evolution of the domestic cycle, it has changed the main CCyB determination indicator to a more comprehensive Composite Business Cycle Indicator
- Continuous increase of CCyB rate
- In addition to the mandatory disclosure of information by the regulator, in August 2019 we can find the Governor's speech on the NBS website referring to the CCyB tool in an article dedicated to the general public
- Stricter conditions for lending to households based on LTV (loan to value), DTI (debt to income), DSTI (debt service to income) limitations

At present, the legislative instruments of Macroprudential policy are logically oriented towards the banking sector. Most of the instruments are directly defined under the Capital Requirements Regulation (CRR) and the Capital Requirements Directive (CRD IV), which is implemented under the Banking Act, in the Slovak Republic. The legislative instruments include, in particular, a set of buffers for capital formation listed in Table no. 3:

Table 3. Current status of macroprudential instruments

Capital buffers applied in Slovakia	Current setting of buffer rate	Approved change of capital buffer level
Capital conservation buffer (Article 33b of the Banking Act)	2.5%	
Countercyclical capital buffer (Article 33g of the Banking Act)	1.5%	CCyB rate to be increased to 2.00% with effect from 1 August 2020 The increase in the CCB rate to 2.00% was announced in a Decision adopted by Bank Board on 23 July 2019
O-SII buffer (Article 33d of the Banking Act)	0.5%-1%	O-SII rate to remain without change from 1 January 2020
Systemic risk buffer (Article 33e of the Banking Act)	1%	SRB rate to remain without change from 1 January 2020

Source: own processing based on EBA, NBS, Act no. 483/2001 Coll., 2019; <https://eba.europa.eu/regulation-and-policy/implementing-basel-iii-europe>

1.3 Changes of the indicators in determination of the CCyB rate

Since 2014, when the NBS began to set the level of the countercyclical capital buffer, it has identified and communicated shortcomings of the Basel regulation that recommended the gap credit cycle indicator and its unsuitability for the purposes of deciding on the level of CCyB for Slovak exposures. For this reason, the NBS constructed and used an alternative indicator, the Domestic credit-to-GDP ratio gap for its decision-making, while being aware of the technical limitations for the use of this indicator. Currently, at a time of continuous expansion of the financial cycle, the limitations of the indicators based on credit gap measurement are becoming increasingly apparent. Due to the continuing expansionary phase of the financial cycle, dynamic credit growth measurements generated by technically restrictive indicators (HP filter) lead to gradual overestimation of their long-term trends. As a result, the reference indicators of credit-gap-based indicators tend to indicate undervalued CCyB levels in these phases of the financial cycle (NBS 2019).

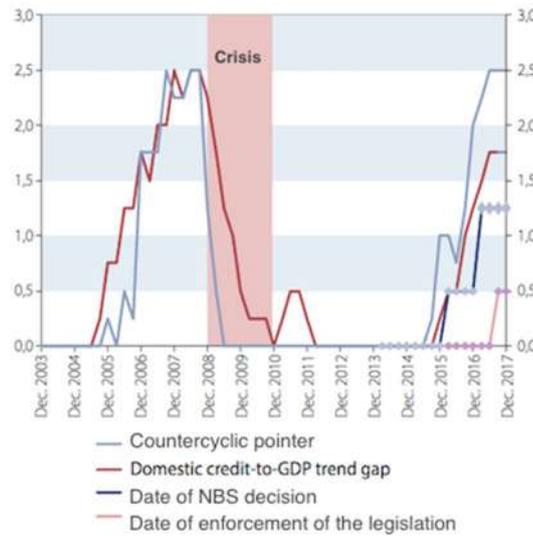


Fig. 1. Rising benchmarks of countercyclical capital buffers and NBS Board decisions (%).

Source: NBS, 2018; http://www.nbs.sk/_img/Documents/_PUBLIK_NBS_FSR/Biatec/Rok2018/03-2018/Biatec_18-3jun_Kalman.pdf

As indicated on the graph, the reference value for CCyB is based on the original Domestic credit-to-GDP ratio gap which is 1.75%, characterized as undervalued versus 2.5% based on the composite countercyclical indicator.

For these reasons, the NBS has decided in its CCyB-level decisions to focus more on the broader factors and indicators contained in the composite countercyclical index, which maps the evolution of the financial cycle more precisely.

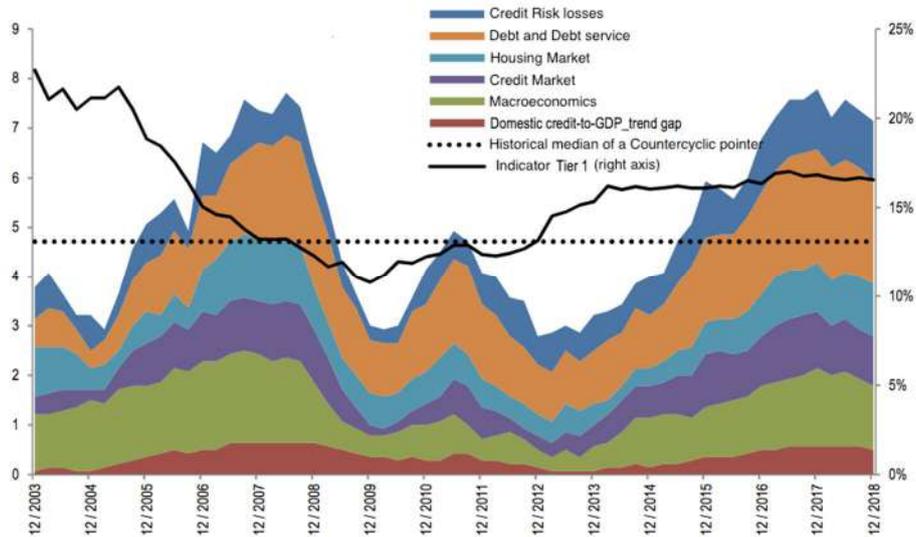


Fig. 2. Composition of indicators. Note: The indicator is calculated in accordance with Section 33g (1c) of the Banking Act and in accordance with Recommendation ESRB / 2014/1, Parts C and D. Source: NBS, SO SR, 2019; https://www.nbs.sk/_img/Documents/_Dohlad/Makropolitika/WEB_Stvrtrocnny_komentar_2019_jul.pdf

It is the complex view of several areas reflecting the development of cyclical risks on the financial market that distinguishes this indicator from the Domestic credit-to-GDP ratio gap indicator, which has technical limitations and focuses only on one area - the credit market.

We therefore appreciate the proactive approach of the regulator for using the third methodology in row to determine the final CCyB level, which could be better adapted to local market conditions.

The disadvantages of the new methodology, in comparison with the previous ones, are not known, since the measurements of the original indicators are still ongoing, in fact they form part of the current composite indicator and are evaluated in the background. Only retail banks could object, as the new index pushes higher levies into mandatory reserves. However, such objections would reflect their irresponsible approach as a financial institution.

Obviously, assuming that the new composite indicator is a perpetuum mobile would be short sighted. Drehmann, et al. (2011) conclude that some degree of judgement, both for the build-up and particularly for the release phase, would be inevitable when setting countercyclical capital buffers in practice.

2 The Mortgage boom in Slovakia as a key period of formation of higher risk factors

For more than seven years, Slovakia has recorded the highest year-over-year growth in volume of loans provided in the whole EU. During this period, the volume has doubled, in contrary to other European countries that recorded a significantly lower increase in the volume of loans.

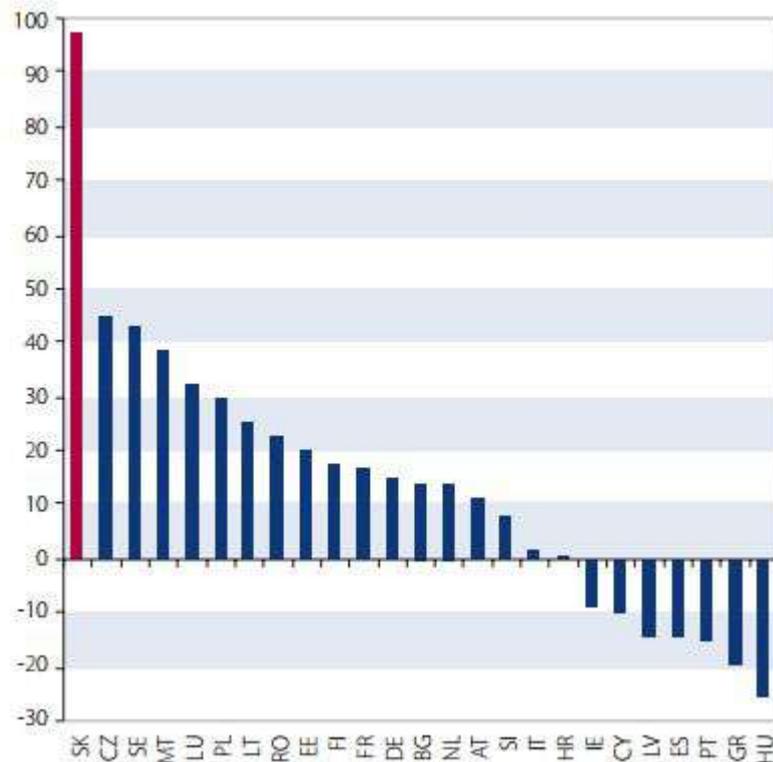


Fig. 3 Growth in lending to households in the EU - relative increase in lending to households between February 2012 and February 2018. Source: Eurostat in NBS, 2018;

http://www.nbs.sk/_img/Documents/_PUBLIK_NBS_FSR/Biatec/Rok2018/03-2018/Biatec_18-3jun_Kalman.pdf

The rapid increase in the lending volume was maintained by strong demand and supply factors. Growth in Slovak household loans was supported by an exceptionally good macroeconomic environment, in particular, by the gradual overheating of the labor market. The **low level of interest rates** appears to be an essential factor for strong credit growth. This is justified when comparing the growth in lending volumes in Slovakia and neighboring countries. The macroeconomic environment has also improved in the neighboring countries, however did not lead to such a high credit growth as in Slovakia. The situation in Slovakia differs when comparing with other countries, given that the

evaluation of interest rates has shifted significantly from almost the highest in the region to the lowest since 2010 (Kalman, 2018).

Moreover, Slovakia used to be at the bottom of the debt ranking as one of the least indebted countries from an EU perspective. Therefore, we attribute part of the credit growth period over the last 10 years, namely until 2016, to the effort to raise the standard of living of households, where such household lending is also beneficial to the national economy.

On the other hand, we distinguish a specific period, which is also referred to as the mortgage boom and lasts from March 2016 (see Figure 5). It was created by combining 2 major and a third associated factor:

1. Legislative change in a mortgage repayment fee, which limits the maximum charge for early repayment of the loan to the amount of max. 1% (by that time banks had no less than 4%).
2. The predatory practices of VUB Bank started a huge competitive fight between retail banks for providing mortgage deals, after which there was a significant customer demand. To the surprise of all interested parties, a 1.49% per annum. for all clients without distinction, while the lowest communicated rate on the market was already at a low level of 2.4% p.a. depending on the creditworthiness of the client. Gradually, the competitive battle pushed down rates to 1% p.a. or even less at the end, and this status is valid for August 2019. This situation has caused an influx of clients interested in credit, which is basically key to the whole issue that the regulator is addressing and is discussed in this article.
3. The favorable macroeconomic environment and positive sentiment in the economy supported credit appetite.

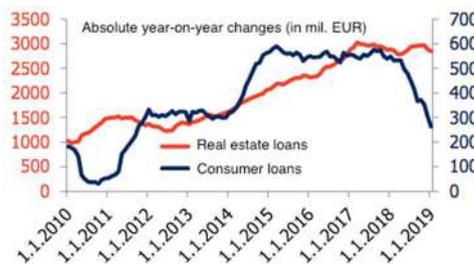


Fig. 4 Growth rate in Household loans

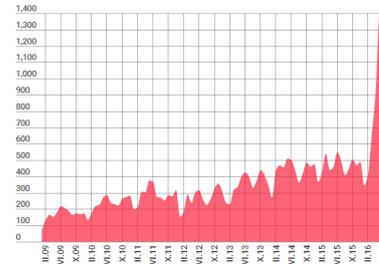


Fig. 5 Beginning of the mortgage boom

Source: NBS, 2019; https://www.nbs.sk/_img/Documents/_Dohlad/Publikacie/Banky_1p_2019.pdf

Another key fact we would like to draw attention to is the ECB study that confirms a high level of competition (in our case in retail) banking can increase the accumulation of risks. Excessive competition and competition between banks can result in reduced risk aversion and accumulation of risks in the banking sector with a consequent impact on the real economy (Carletti, Hartman, 2002). In his study, Feng shows that higher

competition (of the described type) correlates with a higher frequency of bank crises (2018).

The risks generated from households' indebtedness should also be drawn on the basis of their overall financial position. That consists not only of their debts, but also their savings. However, the ratio of savings to debt is one of the worst for Slovak households.

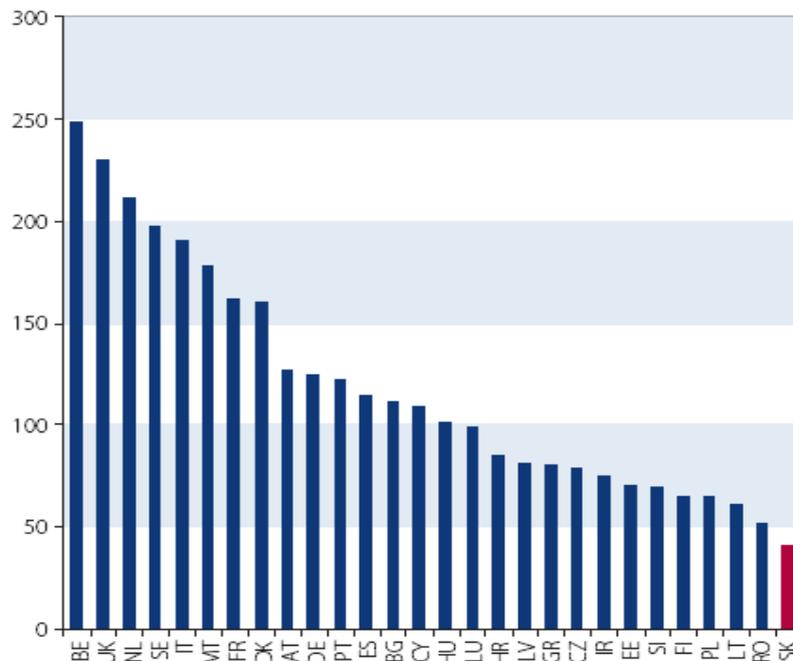


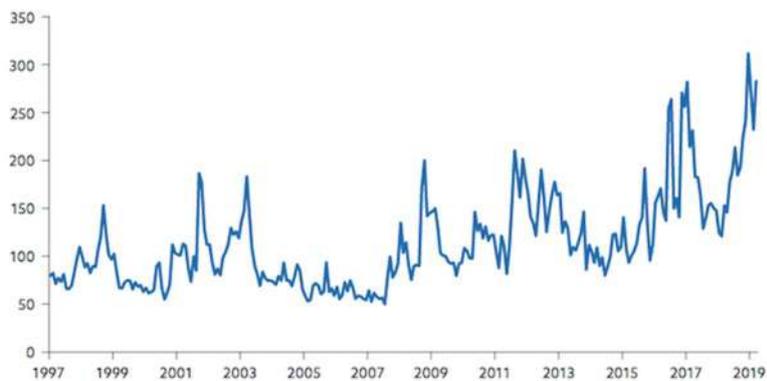
Fig. 6. Ratio of financial assets and liabilities in the EU (difference of financial assets and financial liabilities of households in relation to GDP). *Source: Eurostat In NBS, 2018; http://www.nbs.sk/_img/Documents/_PUBLIK_NBS_FSR/Biatec/Rok2018/03-2018/Biatec_18-3jun_Kalman.pdf*

After highlighting the risks, an assessment of the effectiveness of the countercyclical buffer tools is also required to avert or mitigate the consequences in practice. The literature on the credit cycle and its relationship to the business cycle provides little guidance. However, Jiménez et al. (2012) found that the countercyclical provisioning rules did indeed help to smooth the Spanish credit cycle, even though they failed to avert the build-up of vulnerabilities in the property sector. Aiyar et al. (2014) also mention that the effectiveness of countercyclical capital requirements depend on the banks' existing levels of capitalization.

3 A brief insight into the macroeconomic developments at home and abroad

One of the accompanying signs of the peak of the economic cycle, especially when we talk about the overheating of the economy, is skepticism. Thus, the gloomy mood prevailing in anticipation of recession. This behavioral tendency has been observed on the capital markets since the second half of 2018, when investors sold high-risk portfolios in mass. The pessimistic mood related to global developments, which has also reflected in the Economic Policy Uncertainty Index that has recently increased to record levels.

Fig. 7. Economic Policy Uncertainty Index in global economy. *Source: EPU, 2019;*



<http://www.policyuncertainty.com/>

In addition to the above-mentioned cyclical threats and increasing sensitivity in the banking sector and households, the risks arising from insufficient investment in science and research, aging population, dependence of the economy on the automotive industry and crisis in the steel industry in the Slovak Republic. The declining mood of optimism can be seen as an important indicator of economic sentiment.

Table 4. Economic sentiment indicator in SR

Indicator	2018												2019		
	4.	5.	6.	7.	8.	9.	10.	11.	12.	5.	6.	7.			
Economic Sentiment Indicator - ESI (three-month moving average)*	104,6	103,8	102,8	101,5	99,9	98,5	98,0	97,4	97,5	95,2	94,9	95,1			
Components of ESI: Industrial confidence indicator	7,7	2,7	1,0	1,7	0,7	2,7	-0,7	1,7	1,3	-3,7	-0,3	-12,3			
Construction confidence indicator	-0,5	-2,5	1,0	-2,0	-2,0	-11,0	-10,0	-7,0	-7,0	-21,5	-23,5	-18,0			
Retail-trade confidence indicator	20,0	20,0	21,0	17,3	19,0	18,0	19,0	18,3	22,3	22,0	19,7	19,7			
Services confidence indicator	8,7	7,7	5,3	1,0	-5,0	-9,0	-0,3	-11,3	-7,0	-7,3	-5,3	2,0			
Consumer confidence indicator	-7,7	-3,3	-3,6	-3,8	-3,5	-3,3	-3,5	-3,2	-3,7	-6,6	-3,7	-4,1			

Note: all indicators are seasonally adjusted

Source: STATdat, 2019; <http://stadat.statistics.sk/>

The increased presence of cyclical risks pressurizing the Slovak economy is also confirmed by the composite countercyclical indicator. This indicator gives a more comprehensive view of the development of cyclical risks of the financial market. Despite a slight decline in the second half of 2018, the level of this indicator is close to its historical maximum levels, with most of its components pointing at increased levels of cyclical risk in every area. Likewise, the simulation of the development of this indicator for 12 months in advance, based on macro-stress testing, indicates the persistence of increased levels of cyclical risks in the financial market (NBS 2019).

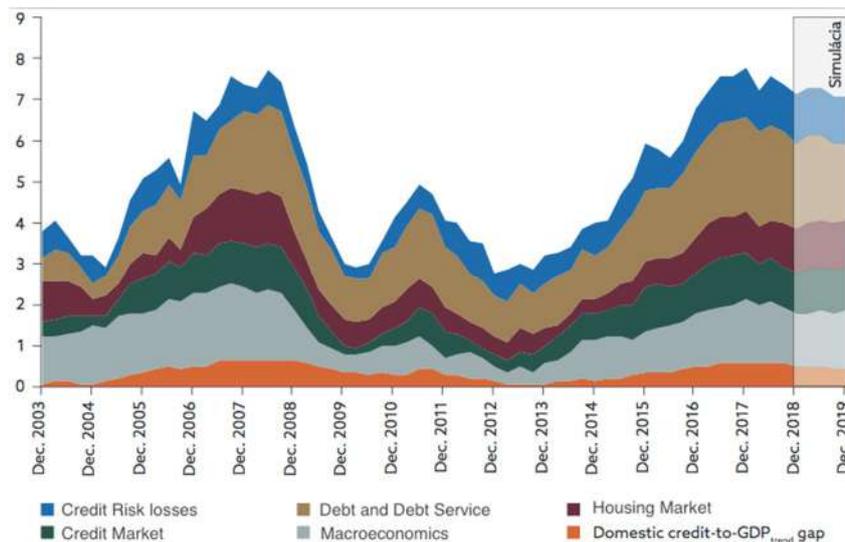


Fig. 8. Historical development of the composite countercyclical indicator and its simulation of further development in 2019. *Source: NBS, 2018; http://www.nbs.sk/_img/Documents/_PUBLIK_NBS_FSR/Biatec/Rok2018/03-2018/Biatec_18-3jun_Kalman.pdf*

4 Conclusions and policy implications

In this paper we revealed the undervalued data generated by the main indicator for CCyB level formation and the motivation of the regulator to replace this indicator with a more suitable model. We have identified the phases of business cycle in the domestic and global economy and, by using historical data and trend analysis on the world economy, we have discussed the latest developments and threats related to the domestic economy. We have identified a period of consumer interest in mortgage loans (loans to households), which bears the elements of herd behavior, triggered by the high competition in retail banking in our territory. We consider the regulator's activities and the phase at which the measures are taken as positively perceived. We will continue to monitor developments.

Acknowledgement

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NEGOTIATING AND REDISTRIBUTION IN GAME THEORY

Dana Figurová

University of Economics in Bratislava
Faculty of Economics Informatics, Department of Operations Research and Econometrics
Dolnozemska cesta 2
Bratislava, 852 35
Slovak Republic
dana.figurova@euba.sk

Abstract. The Cooperative Game Theory explores the positive effects of creating a coalition based on binding agreements. In general, we distinguish cooperative games with transferable and non-transferable winnings. For cooperative games with non-transferable winnings it is characteristic that prize winnings are tied to individual winners and their use cannot be transferred to other teammates. In a cooperative game with transferable winnings, winners can earn winnings from all members of the coalition. One of the prospective ways of analyzing the problem is the theory of redistribution systems, which is the original variant, application and extension of the Game Theory. This contribution is aimed at presenting different redistribution approaches result from mutual cooperation among members of the coalition.

Keywords: redistribution, cooperative game theory, bargaining theory.

JEL classification: C70, C71, C78

1 Introduction

The Game Theory (GT) is a science that basically examines a wide range of decision situations for multiple participants. One way to explore these decisions is to accept the possibility of cooperation between the participants (players). The game is cooperative, if players can create the coalitions respecting the predetermined obligations and thus they can profit from a common approach. In non-cooperative games the players act independently and we do not consider such commitments.

Cooperative Games can be characterized as "Theory, which primarily deals with a coalition of players who coordinate their activities to achieve the further benefits" (Branzei et al., 2008). Cooperative Game Theory (CGT) can be adopted for modelling the cooperation among the companies. Cooperative Games are concerned with distribution of the cooperation benefits when the players cooperate. Most applications of the

CGT are in scheduling, cost saving, negotiation and bargaining (Barron, 2013; Jindal – Newsberry, 2018).

The basic dilemma of Cooperative Game of n players is the player's choice of appropriate cooperation. In coalitions, players can gain more benefits than they would by playing the game individually. These benefits should then be fairly distributed among the players. In terms of redistribution of winnings (the pay-offs), we distinguish between guaranteed and joint winning (Demúth, 2013). Guaranteed winnings are those that a player has made at his own decision, regardless of the other player's behaviour. Joint winnings are the result of the mutual cooperation between the players. The distribution of winnings among individual players will be based on negotiation theory with assuming the portability of winnings. One possibility for a Cooperative Game is to use Shapley's value, which is based on a priori appreciation of each player's position and strength in terms of the possibility of coalition cooperation (Shapley, 1953). This method of redistribution of benefits was presented in (Figurová – Čičková, 2018).

A redistribution system is a system in which there exists some kind of redistribution of winnings (for instance salaries) compared to the performance of individual participants (players) in the system. Performance is understood as the influence of the player in the game on the achieved result, i.e. on the amount of the total reward that individual participants can divide among themselves. One of the prospective ways of analyzing the problem outlined appears to be the theory of redistribution systems, which is the original variant, application and extension of the Game Theory. A typical cause of redistribution within systems is that a coalition enforces its dominant influence to distribute the resources (winnings) that the organization receives to its advantage.

The application of Game theory to the issue of redistribution within social systems of various types can be found in many works. One of the first is the monograph Tullock (1997), which deals directly with the issues of socially focused redistribution, but it does not consider the influence of coalitions on the possibility of influencing the final redistribution. Similarly, Osborne (2004) deals in detail with the issue of bargaining theory towards the redistribution.

The literature review about the issue of the relationship between the distribution of the winnings (payoffs) by player performance and system performance can be find in (Čakrta, 2000; Štedron, 2007; Eucken, 2004). From the view of the Game Theory was this issue discussed in Mañas (2002) and Sekerka (2002). Other approaches (for example egalitarian solution, utilitarian solution, Nash solution and Kalai - Smorodinský solution), which are also based on negotiation theory were theoretically elaborated in (Figurová, 2018) and practically proceed in (Figurová, 2018).

2 Model of elementary system of redistribution

In the next chapter we will presented the elementary redistribution system discussed in (Budinský – Valenčík, 2009). In examining the redistribution systems, the authors created a model of an elementary redistribution system that proved to be a convenient simplification of the basic model. Model assumptions are as follows:

- The model has three players (P1, P2, P3) = (x_1, x_2, x_3) - so that the simplest but non-trivial coalitions can be formed (two against one).
- Players' payoffs are distributed into rate of 6: 4: 2 - to be small, natural, easily imaginable numbers that can be divided at least once.
- Each player has the same ability to influence the result (i.e. the influence power equal to one)

In terms of the Game Theory, these are games with more than two players (specifically three players in the simplest case), with a loose disjunctive coalition structure, with non-constant payoffs and a substantial Cooperative Game. It is an elementary redistribution system in which the basic parameters are intentionally simplified and it makes sense to create some expansion adding further assumptions. However, there is a way to create an interesting, elegant and effective mathematical apparatus describing the essential aspects of human behavior in organizations of various types.

For example in this redistribution system with a distribution of (6: 4: 2) payoff can be named as *performance-based pay*, of (3: 6: 3) payoff - *an egalitarian-oriented redistribution with a leader*, of (2: 5: 3,5) payoff - *punishment of resistance or rewarding loyalty by leader*, of (4: 5: 2,5) payoff - *redistribution with leader and partial merit* and of (3,5: 3,5: 3,5) payoff - *fully egalitarian system* etc. The answer to the question which determines the amount of payoffs is at this stage elaboration of the issue, intuitively. Any change in the elementary redistribution system is possible only if two players improve (increase their payoffs) compared to their previous state.

Based on the theoretical foundations of redistribution systems, the basic redistribution equations were formulated:

$$x_1 + x_2 + x_3 = 12 - \mu * R(x_1 - 6, x_2 - 4, x_3 - 2) \quad (1)$$

The expression on the left (1) is the sum of the actual payoffs of the individual players, the number 12 is the maximum reward that could be distributed if the redistribution system performance was at maximum, which means that there would be no redistribution based on performance but distribution of payoff according to performance, μ is the performance reduction coefficient and $R(\dots)$ is a function of the distance function of actual payoffs and payoffs based on performance. The redistribution equation (1) can then be read as follows: the players can divide as much as they possible could at maximum value reduced by performance-based distribution. We can define the distance function R differently but the most suitable is the definition using the common metric as the root of the sum of the squares of the optimal payoff according to the performance:

$$\sqrt{(x_1 - 6)^2 + (x_2 - 4)^2 + (x_3 - 2)^2} \quad (2)$$

In the general form for n players, the redistribution function can be written as follows:

$$\sum_{i=1}^n x_i = \sum_{i=1}^n a_i - \mu * R(x_1 - a_1, x_2 - a_2, \dots, x_n - a_n) \quad (3)$$

Respectively

$$\sum_{i=1}^n x_i = \sum_{i=1}^n a_i - \mu * R(X) \quad (4)$$

where X is a vector (x_1, x_2, \dots, x_n)

The following three statements can be applied to the each point on the redistribution surface: 1. It cannot be directly passed to any other point. 2. It can always go directly to another point. 3. It can be moved to any other point at most in two steps. Figure 1 shows an example of a computer-displayed redistribution area with a reduction coefficient $\mu = 0,5$ and R defined as the root of squares the redistribution deviation from the performance-based payoff (according to (2)).

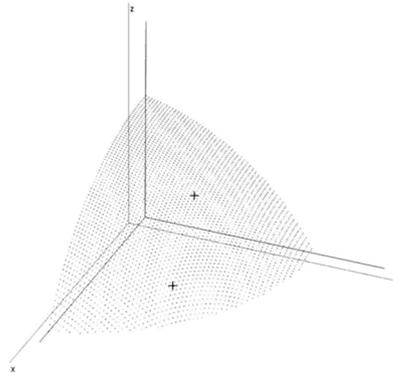


Fig. 1 Redistribution area represented by geometric expression. *Source: Budinský, P. – Valenčík, R. 2009*

At a point $(6; 4; 2)$ is the sum of all players' payouts at maximum. The further we move away from this point, the more the value of the sum of payouts decreases. The lower cross points to a point $(6; 4; 2)$, i.e. the point of redistribution of payments according to player's performance. The upper cross points to a point where each player receives the same reward (payoffs), which is about 3.51 for every player in this case. Each redistribution surface must pass through both points.

2.1 The bargaining theory and redistribution

In the next subchapter we will show examples of different types of bargaining in redistribution systems using the graphical representation of redistribution area. In the first case, two players are divided according to their performance, the third player retains as much as they left for him (at least a minimum payoff of 1). The graphical representation of such a situation is as follows:

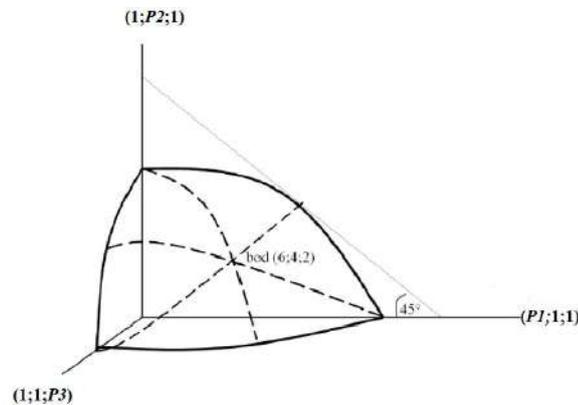


Fig. 2. The negotiating trajectory of redistribution the two players' payoff based on their performance. Source: Budinský, P. – Valenčík, R. 2009.

If three planes parallel to the rear walls of the redistribution surface pass through a given point on this surface, their intersection with the redistribution surface will define three curves intersecting at that point. The three curves divide the redistribution surface into six segments - three of which represent directly achievable changes, three corresponding to changes that cannot be realized. The trajectories of negotiation are labeled with dashed lines. They have interesting properties, e.g. they intersect at one point with values (6; 4; 2). They begin at the point of contact of the respective boundary curve with a 45° slope and end at the point of contact of the boundary lines. The bargaining trajectory in the agreement of two players on the distribution of their rewards equally (fully egalitarian) is shown graphically in Figure 3.

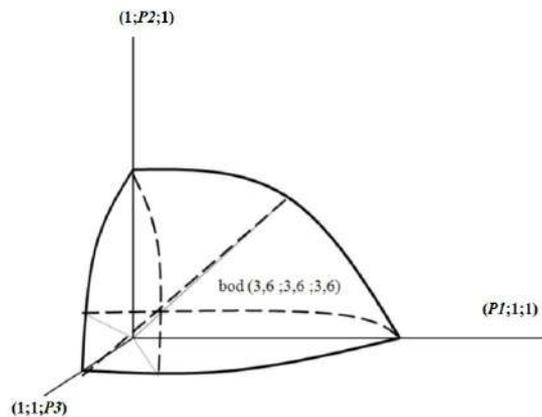


Fig. 9. The negotiating trajectory of redistribution of two players' payoff equally (egalitarian). Source: Budinský, P. – Valenčík, R. 2009

The trajectories of this bargaining are shown with dashed lines. We can see that they also intersect at one point, where they all divide by equal part. The following conclusions can be accepted. At first sight, the redistribution surface looks very symmetrical in terms of the coalition formation. The most powerful player $P1 = x_1$ can form a coalition with the average player $P2 = x_2$ and both will improve at the expense of the weakest player $P3 = x_3$. Similarly, player (P2) can make the coalition with player (P3) and improve at the expense of player (P1). Then there is a third possibility, when player (P1) and (P3) will make the coalition and improve at the expense of player (P2).

What is the best coalition for each individual coalition player? Assume that players in coalition divide their payoffs at maximum. After that, the best solution is:

- Player P1, if he or she has formed a coalition with player P3 and both improve at the expense of player P2;
- Player P2, if he or she has formed a coalition with player P3 and both improve at the expense of player P1;
- Player P3, if he or she has formed a coalition with player P2 and both improve at the expense of player (P1);

The best case is when players P2 and P3 make the coalition and both get better at the expense of the most powerful player P1. There is no other case where can two players together improve their payoffs.

With this example, the issue of players' behavior in redistribution systems is still open. The strongest player P1 is not completely defenseless. P1 may impel towards the weakest player P3, i.e. to offer him more than if the P3 make an agreement with the average player P2. We can see this situation in Figure 4.

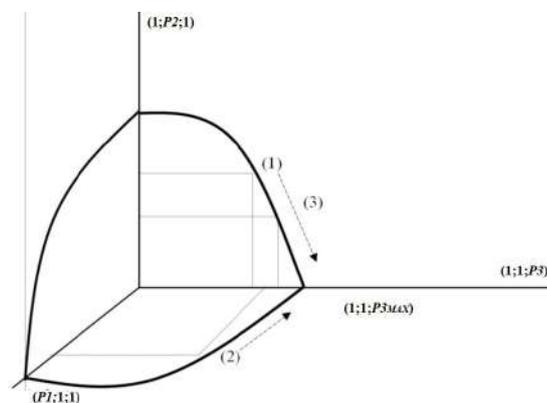


Fig. 4. The agreement between average player (P2) and weakest player (P3) followed by impelling the strongest player (P3). *Source: Budinský, P. – Valenčík, R. 2009*

If this impelling continues in the direction of the arrows, it would get to the point $(1; 1; P3max)$, where the weakest player (P3) would have the highest possible reward and both other players would have the smallest possible, equal to one. However, this is an

unreachable point (because the situation of two players get worse by any other point). Important conclusions are drawn:

- Redistribution systems that are not in a fiercely competitive environment (i.e. an environment where the decrease of their performance does not jeopardize their survival in the environment) will tend to assert a coalition of average and weak players who have better results at the expense of the most powerful.
- The first defense of the most powerful players lies in the impellent of the weakest. After that the average players are forced to act like the most powerful too.

Instead of the mutual underbidding the weakest player, the strongest and the average player can form a coalition together and both of them can have a better results than the last agreements that each of them has with the weakest player. The following figure 5 illustrates this situation.

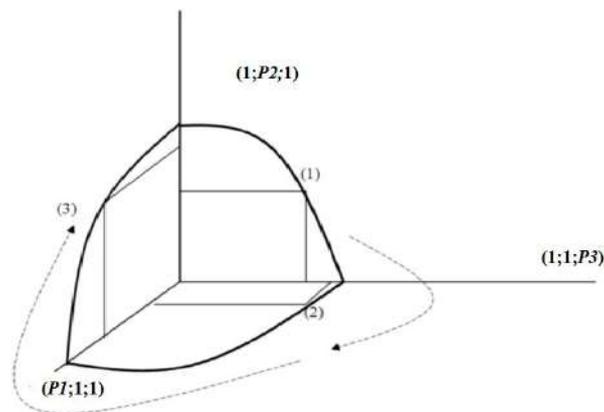


Fig. 5. The agreement between strongest player (P1) and average player (P2) compared to the agreements they have before with weakest player (P3). *Source: Budinský, P. – Valenčík, R. 2009*

The situation shown in Figure 5 can be described as follows: Situation (1) shows the first agreement between the average and the weakest player. Situation (2) shows the agreement offered by the strongest player to the weakest as an alternative to it. Situation (3) shows an agreement between the strongest and the average player to get benefits as an alternative to the first and second agreements which they both have with the weakest player.

From the individual player's point of view, the agreement with the other player rather than with those with whom the coalition has currently been formed with relevant pay check distribution, is a sacrifice opportunity. Instead of mutual underbidding to the weakest player, the best performer and the average player may join and get profit when compared to previous agreements they each have with the weakest player. Because all players may underbid in this way, there are finally the three following equilibrium situations where two players discriminate against the third one. These are discrimination equilibriums. Should there be no external influences (e.g. affection or trust between the

players), the conclusion of any equilibrium is equally likely. There is an important conclusion from the above:

- Should any player attempt to negotiate better conditions (higher pay check) in negotiations with the other player, s/he would influence the situation so that the coalition is formed without her/him and s/he would finally be the one discriminated.
- Should, on the contrary, s/he attempt to be involved in the coalition to avoid herself/himself being in the position of the discriminated, the offer of a higher pay check to the potential coalition partner (i.e. the underbidding) provokes underbidding of the third player as well and the negotiations may restart again.

The key to find the equilibrium in the case of negotiation is the following consideration. If there is an agreement between the weakest and the average player (this agreement has the parameters $(1; x_{2x2,x3}; x_{3x2,x3})$, it is equal to the agreement between the strongest and weakest player with the parameters $(x_{1x1,x3}; 1; x_{3x1,x3})$. Where the $x_{3x2,x3} = x_{3x1,x3} = \text{def: } x_{3u}$ must be hold (the value of z must have the same value whether it comes from negotiation between the weakest and average player or from the weakest and strongest player; denoted it as x_{3u}).

This implies the following system of equations:

$$1 + x_2 + x_3 = 12 - \mu \cdot R(5; x_2 - 4; x_3 - 2) \quad (5)$$

$$x_1 + 1 + x_3 = 12 - \mu \cdot R(x_1 - 6; 3; x_3 - 2) \quad (6)$$

$$x_1 + x_2 + 1 = 12 - \mu \cdot R(x_1 - 6; x_2 - 4; 1) \quad (7)$$

These are three independent equations with three variables and their solutions are our searched values. This solution shows the three equilibrium points with coordinates: $(1; x_{2u}; x_{3u})$ when the player (P1) is discriminated, $(x_{1u}; 1; x_{3u})$ when the player (P2) is discriminated and $(x_{1u}; x_{2u}; 1)$ when the player (P3) is discriminated. These equilibriums can be named as discriminated equilibriums with following values:

- P1= x_1 is outside the coalition and discriminated: $(1; 4,71; 3,63)$ with payoff 9,34
- P2= x_2 is outside the coalition and discriminated: $(5,65; 1; 3,63)$ with payoff 10,28
- P3= x_3 is outside the coalition and discriminated: $(5,65; 4,71; 1)$ with payoff 11,36

From these results we can already calculate the Nash equilibrium (with upper index N). The ratio of the average payoffs of players is put into the redistribution equation with this result:

$$x_1^N = 4,39; x_2^N = 3,73; x_3^N = 2,94$$

If any player wants to improve their payoff - whether by trying to make a coalition with impelling the one player and discriminate the other player or by a request a higher payoff - situation will get worse. It can easily be seen that if players (P2) and (P3) were able to exclude player (P1) from negotiation, their remuneration would be higher than that of our calculated Nash equilibrium. This implies a practically significant conclusion that in real systems we may encounter cases in which the most powerful player is

pre-deprived of the possibility to participate in negotiations on who will win in the system.

3 Conclusions

In this paper we presented approaches in redistribution of winnings (payoff) of individual players. Based on the calculated discriminatory equations, we can find the Nash equilibrium, which we define as the equilibrium in which players choose strategies that are best for each other. However, not every Nash strategy played by a single player is necessarily the best answer to any other strategy of other players. When all the players in the game play Nash's strategies, none of the players has the incentive to do anything else. In general, proof of the existence and demonstration of the possibility of calculating the Nash equilibrium in an elementary redistribution system is the key to identifying, describing, and possibly calculating (when quantifying system parameters) the Nash equilibrium in more complex redistribution systems. If the system has more players, there will be more points of discriminatory equilibrium and one Nash equilibrium.

A detailed and mathematically based analysis of the elementary redistribution system is extremely important for two reasons. On the one hand, when examining the different types of extension of the elementary redistribution system and on the other, when investigating how simple elementary systems become more complex. Every equilibrium within a simple redistribution system is unstable, and that is what leads to the integration of simple systems into hierarchical and network structures.

Acknowledgement

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ECONOMIC IMPACTS OF BOEING AIRCRAFT GROUNDINGS ON SELECTED SUBJECTS IN AVIATION INDUSTRY

Alexander Frasch

University of Economics in Bratislava
Faculty of Commerce, Department of Tourism and Services
Dolnozemská cesta 1
Bratislava, 852 35
Slovakia
alex.frasch@gmail.com

Abstract. The aviation industry was heavily affected by the groundings of Boeing aircrafts in 2019. Airlines had lost a significant capacity, which caused many complications to different subjects on international markets. We present the consequences of these groundings through the Smartwings case study, forecasting and mapping the key moments after Ethiopian Airlines Boeing 737 MAX crash. Besides Boeing, which is losing new aircraft orders, airlines that were forced to cancel thousands of flights, as well as the passengers themselves, the situation also adversely affected the travel agencies in conditions of our market. All the subjects are affected by the situation from an economic point of view, which will have a negative impact on the economic results of individual entities.

Keywords: Boeing 737 MAX, groundings, consequences, passenger aircraft industry.

JEL classification: L93, Z39

1 Introduction

The aviation industry has been significantly negatively affected by the fatal air disasters of Lyon Air and Ethiopian Airlines. Both of these accidents are linked by the same new and modern type of aircraft - Boeing 737 MAX, whose operation has become extremely questionable immediately after the fatal accidents.

In 2011, Boeing announced the entry of the long-awaited successor to the 737-Next Generation, the 737 MAX, which also became a direct competitor to the Airbus A320neo. This new type of aircraft from Boeing was supposed to guarantee more than 15% efficiency gain during its operation compared to previous models. Technological innovations were about new, more efficient engines, newly-shaped winglets, a new spoiler system, or software innovations in the flight deck (Bowen, 2019). The new aerodynamic shapes on selected aircraft components were able to ensure an additional

1.5% fuel savings (Tapan, 2015). The new aircraft model was also characterized by a more significant reduction in CO2 emissions or a reduction in noise during the various phases of flight (Benito - Alonzo, 2018).

The 737 MAX aircrafts had a built-in Maneuvering Characteristics Augmentation System (MCAS), which is probably considered to be one of the key moments of both accidents. (Zuska - Byrtus, 2019).

Many questions remain about Boeing's handling of the redesign and what went wrong. The Justice Department and other federal agencies are investigating whether Boeing provided incomplete or misleading information to get the airliner certified as safe to fly. It is Boeing's biggest crisis in years. The 737 has been the centerpiece of Boeing's business for decades, and the MAX was intended to carry that on. Now the entire 737 MAX fleet is grounded. Industry executives and former regulators say it could take years for the company to rebuild trust among airlines, pilots and foreign regulators. The fallout could affect the way the FAA monitors the development and approval of new aircraft essential for airlines to meet soaring global demand for air travel (Pasztor, et al., 2019)

The consequences of both air accidents affected several actors on international markets. In addition to many of the airlines that operated the type of the aircraft and the Boeing manufacturer itself, these are other aviation institutions, airports and last but not least, passengers themselves, or other companies such as travel agencies which contracted certain series of charter flights during the summer season.

1.1 Methodology

To obtain the results, a secondary research was carried out - collection, processing of already available data in domestic and foreign sources. By comparing the observed phenomena, we found out the identical or different features in the studied subject. Selected methods using logical thinking principles as abstraction, analysis, synthesis were also used in the paper. Through the Smartwings case study, we identified the impact of the reduced airline capacity on the Slovak charter air market and defined their impacts on travel agencies as well as the client. Based on prognosis, we figured the planned revenue of Smartwings Slovakia, which was operating the 737 MAX aircrafts.

Please note that the first paragraph of a section or subsection is not indented. The first paragraphs that follows a table, figure, equation etc. does not have an indent, either.

$$TR_{2019} = TR_{2018} * \overline{\Delta TR_{2015-2018}} \quad (1)$$

TR – total revenue

Δ – change between the variables

The aim of the paper was to identify individual phenomena and processes on selected market, which were caused by groundings of Boeing 737 MAX aircrafts. The secondary objective was to define the importance and worldwide demand for the 737 MAX on international markets.

2 Importance of the Boeing 737 MAX aircraft on international markets

The Boeing 737 is the best-selling aircraft in the world, with more than 15,000 planes sold. After Airbus announced an upgrade to the A320 that provided 14 percent better fuel economy per seat, Boeing responded with the 737 MAX. It was marketed as an upgrade to the famed 737 design, using larger engines to match the improved fuel efficiency from Airbus. Boeing claimed the 737 MAX was so similar to the original 737 that pilots already licensed for this aircraft would not need additional training and simulator time for the 737 MAX (Johnston – Harris, 2019).

The new Boeing 737 MAX is considered to be the fastest selling aircraft type in Boeing history. In total, the company has been dating nearly 4700 orders from more than 100 customers worldwide. This type of aircraft has been designed to offer greater flexibility, reliability and efficiency in the segment. The aircraft was designed and subsequently constructed in 4 different versions (MAX7, MAX8, MAX9, MAX10) with a maximum capacity of up to 230 passengers in Economy Class in the MAX10 aircrafts (Boeing, 2019).

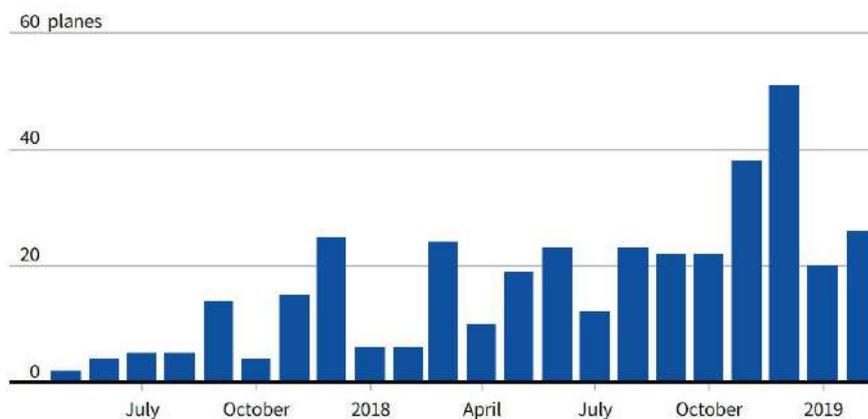


Fig. 1. Deliveries of manufactured 737 MAX aircrafts by months. *Source:* <https://graphics.reuters.com/BOEING-ORDERS-737MAX/0100915B1LD/index.html>

The first 737MAX aircraft models were delivered to airlines in 2017. We graphically illustrate the deliveries of aircrafts ready for commercial operation by months. While in 2017 totally 74 aircrafts of this type were delivered to airlines, in 2018 it was more than three times, in total 256 models delivered. An upward trend in the number of aircrafts delivered could have been expected in 2019, but the situation with immediate groundings of Boeing's 737 MAX aircrafts significantly complicated the situation in production and operation for the airlines.

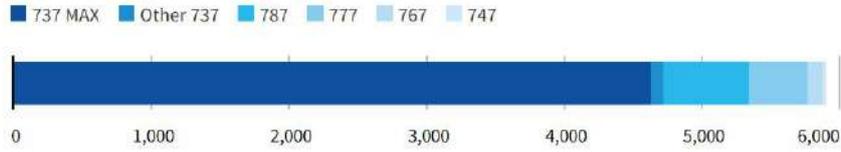


Fig. 2. Boeing not delivered orders by aircraft type. Source: <https://graphics.reuters.com/BOEING-ORDERS-737MAX/0100915B1LD/index.html>

Among the different types of aircrafts currently being manufactured by Boeing, it is possible to say that it is the 737 MAX that had until recently the biggest success on international markets, what is confirmed by thousands of ordered but still not delivered aircrafts. The 737 MAX is the successor to the 737 NG (Next Generation), whose production at Boeing is minimized because of a more modern, efficient and environmentally friendly MAX. The graph also shows the volume of non-delivered Boeing aircrafts used for long-haul flights as 787 Dreamliner, 777, 767, or Boeing 747.



Fig. 3. Airlines orders by territorial structures. Source: <https://www.boeing.com/commercial/737max/>

The Boeing 737 MAX was a long-awaited model of Boeing, which won over the airlines on the global market. As can be seen on the map, which shows the buyers of 737 MAX, we are talking mainly about Asian, American and European airlines. A smaller representation of the African airlines reflects the lower demand on African markets, including Ethiopian Airlines, whose ET302 flight crashed in March 2019 a few minutes after takeoff on the mentioned type of aircraft. This accident initiated extensive

gradual grounding processes of „MAX“ aircrafts whose consequences we monitor and experience even nowadays.

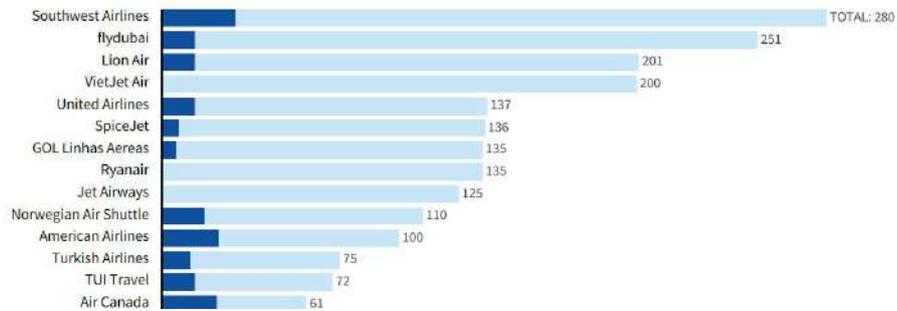


Fig. 4. Major buyers of the 737 MAX aircraft. Source: <https://graphics.reuters.com/BOEING-ORDERS-737MAX/0100915B1LD/index.html>

This chart represents the most important buyers of 737 MAX aircrafts, their total order and the actual number of the aircraft delivered. The airlines that ordered the majority of this aircraft type include Lion Air, Flydubai, or Southwest Airlines. Most meaningful European customers for this model are mainly Ryanair, Norwegian Air Shuttle and TuiFly. However, not all airlines have been supplied with new, modern aircrafts, which have avoided the consequences of their gradual grounding. As can be seen in the graph, the delivered aircrafts represent only a smaller percentage of the total ordered capacity, which was suppose to be delivered in the upcoming years.

Table 1. Boeing and Airbus orders and deliveries

Orders	2019	2018	2017	2016	2015
Airbus	718	747	1109	731	1080
Boeing	-84	893	912	668	768
Deliveries					
Airbus	863	800	718	688	635
Boeing	380	806	763	748	762

Source: own processing based on available data

As we can see the biggest competitor of Boeing - Airbus managed to get 718 orders compared to Boeing's -84 orders in 2019. These orders above are incomplete, with Airbus receiving a bigger order in December for a huge 115 aircraft, from Cebu Pacific and Spirit Airways. We can't ignore 2019's biggest aviation news story, the Boeing 737 MAX being grounded. Many airlines that had previously shown brand loyalty to Boeing moved over to Airbus, making big orders for their A320neo range and pushing the aircraft to have more orders than the 737. The year ended with the news that Boeing plans to shut down production of the 737 MAX (Cummins, 2019).

2.1 Groundings of the aircrafts and following consequences

After the second crash of the new Boeing 737 MAX 8 aircraft, the concern for the safe operation of the aircraft has intensified in the world of aviation. Taking into consideration the fact that it was the second accident of the same type of aircraft in a particularly short period of time since it had started its commercial operation, the aviation authorities have taken the necessary steps to investigate the events and at the same time to avoid further accidents of this type of aircraft. Immediately after the plane crash of Ethiopian Airlines aircraft on June 10, 2019, processes of gradual groundings of this type of aircraft occurred within individual territorial structures.

One day after the crash of the aircraft, the Civil Aviation Administration of China (CAAC) was the first to respond to the facts, ordering the immediate grounding of aircrafts of that type for domestic air carriers. CAAC argued that both air disasters have some similar features and the Chinese aviation system has a zero tolerance against safety risks, which are strictly monitored. The regulation, which entered into effectuality at 18:00 local time, immediately grounded approximately 25% of the total produced capacity of the Boeing 737 MAX on a global scale (Ostrower, 2019).

Other organizations active in the field of aviation safety started to join the CAAC. They also grounded the aircrafts within individual territorial structures. In addition to the individual organizations involved in the air transport, the airlines decided to ground the aircrafts as well, because they realized the possible technical or construction problem, which could have caused both accidents of the Boeing aircrafts.

An important step was the directive of the European Aviation Safety Agency (EASA), which issued the Airworthiness Directive, suspending all flight operations of 737 MAX aircrafts in Europe. In addition, EASA issued a Safety Directive where it suspended all commercial flights operated by airlines from third countries operated to, within and outside of the EU. This directive became valid on 12 March 2019 at 19:00 UTC (EASA, 2019).

On March 13, 2019, the American FAA (Federal Aviation Administration) issued a report informing about the temporary grounding of the "MAX" operated by US airlines or airlines operating this type of aircraft within the US. The Agency made this decision as a result of the data collection process and collected evidence (FAA, 2019).

So far, Boeing has manufactured and supplied 387 Boeing 737MAX aircrafts (Boeing, 2019). All these aircrafts are currently still grounded and represent a particularly significant loss of capacity for all subjects on the market.

Immediately after the 737 MAX grounding crisis, Boeing did not record any new orders for any type of commercial aircraft for 2 months. The company is experiencing a massive drop in the number of orders and approximately 5,000 orders have been canceled by airlines. Despite the grounding of these aircrafts, Boeing continued to produce them, but at a slower rate. Boeing faces a deep drop in total supply due to the "Max" groundings. Company's largest income comes from the supply of aircrafts, for that reason this situation has negative consequences on the company's economic situation and development (Wang, 2019).

The first airline, which canceled its orders from Boeing was Garuda Indonesia. The airline canceled an order for a total of 49 Boeing 737 MAX 8 series. The reason for this

proceeding was the loss of the trust of its passengers in the type of aircraft. The airline could have swapped its 6 billion \$ order for other Boeing models, including long-haul aircrafts, so the airline would not lose the deposit for ordered "MAX" aircrafts (Silviana, 2019).

However, in June 2019 at the Paris Aerospace Fair, Boeing regained the reliance of a major partner, the IAG - International Airlines Group, which includes carriers such as British Airways, Aer Lingus, Iberia, or Vueling. American concern Boeing and IAG signed a preliminary agreement of 200 Boeing 737 MAX aircraft delivery. If this tentative agreement was turned into a definite order, their total value would be around 24 billion \$. This type of aircraft should then be used by several IAG airlines, such as Vueling, LEVEL, and British Airlines (TASR, 2019).

2.2 Case study of Smartwings Slovakia - consequences of aircraft groundings on charter market in Slovakia

Smartwings is one of the most important air carriers that provide charter flights during the summer season in Slovakia. Originally a Czech airline, which started operating from Slovakia in 2010 (formerly Travel Service), has built up almost monopoly position on the Slovak charter market thanks to its stability and high-quality services.

In the recent past, the airline industry has been paralyzed by the grounding of Boeing 737 MAX aircrafts, which were operated also by Smartwings in a total number of 7 aircrafts and the airline counted with 15 aircraft of this type for the summer season. This fact has made the company extremely difficult to operate, as it lacks a significant part of the capacity to cover contracted flights during the summer season on several markets including Slovakia. The airline was forced to cancel selected contracts with travel agencies, canceled many of its own scheduled flights, and closed selected smaller bases. In Czech Republic, the airline canceled all flights from Pardubice airport and significantly limits its operation from Ostrava airport for the upcoming summer season. In total, up to 8% of flights should be canceled due to grounded aircrafts.

This situation has also affected the Slovak market. From the original 4 planned aircrafts based in Bratislava, only 3 remained and 2 of them are leased from Slovak airline Air Explore. The loss of one aircraft means canceling contracts with travel agencies, or changing departure days of charter flights caused by flights optimization. There have been extensive interventions in the originally scheduled flight plans for the summer season 2019. Many travel agencies have been forced by these facts to look for alternative foreign air carriers to cover the air transport to their holiday destinations.

A significant change, especially for the Slovak travel agencies, was the pressure from the Smartwings Slovakia before signing the summer contracts, to extend the summer season 2019, which meant earlier start and later termination of charter flights. Most of the Slovak travel agencies have accepted these conditions, but few of them, after years of good experience with Smartwings, have turned to another, mostly foreign airlines, and refused to accept these strict business terms. For Smartwings this action represents a massive loss of capacity. Loss of many important business partners as well as a slight reduction or optimizing the flights of other travel agencies has resulted in a significant decrease in the planned amount of flights, for which 4 aircrafts in Bratislava

base were originally suppose to be sufficient (in total 6 aircrafts were based in BTS in 2018). As a result of the “MAX” groundings, this capacity has been reduced to 3 aircraft in use and has caused extensive problems for the travel agencies which can be seen in following diagram.

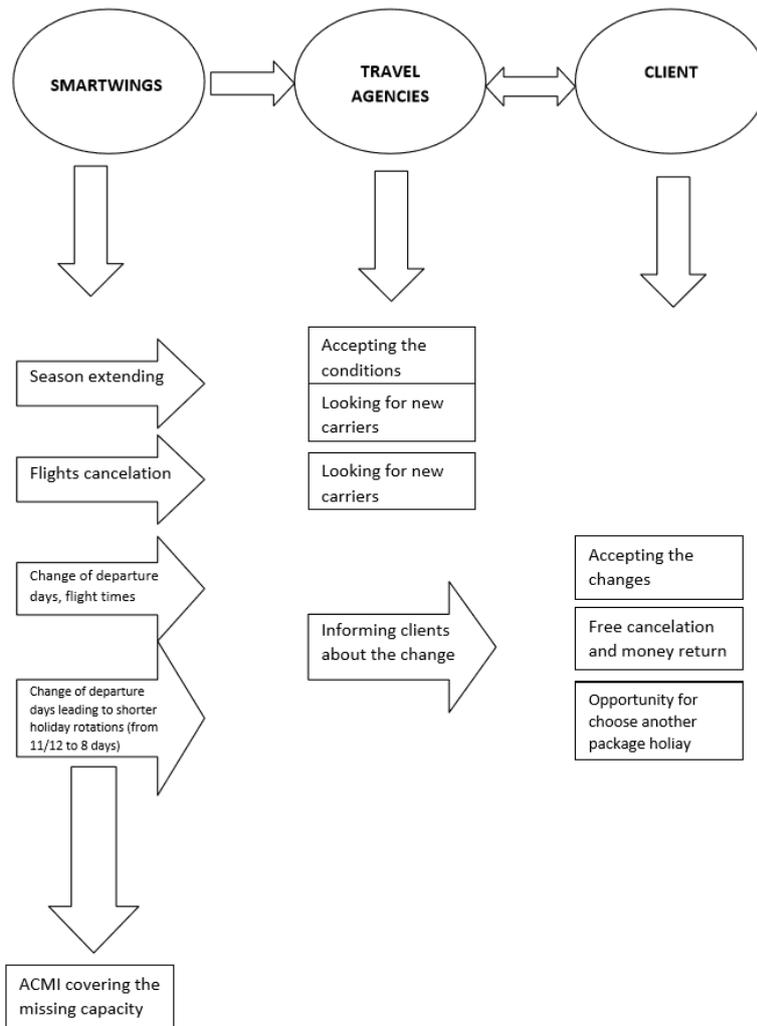


Fig. 5. Algorithm of processes of the airline requirements, travel agency and customer variant solutions. *Source: own processing*

The airline's situation may also result in further complications during its operation. Monitored negative effects represent the most significant problems caused to all travel agencies and clients by Smartwings in its history. As a result of the mentioned factors, the market share of foreign airlines in the total charter air transport is increasing, while

Smartwings is losing its market power and indirectly opens up business opportunities to other airlines.

As a result of the "MAX" groundings, Smartwings replaced a part of this capacity with ACMI contracts, hiring aircrafts with crew from other airlines to minimize the cancelations of scheduled flights and contracts with travel agencies.

Most effective solutions for Smartwings and also another airlines dealing with the same situation were optimization of the flight schedule, merging with other flights/airlines or signing ACMI contracts. In many cases airlines were forced to cancel significant number of flights.

Table 2. Revenue prediction of Smartwings Slovakia

	2019	2018	2017
Revenue	37 670 083	74 086 149	58 927 081
Number of based aircrafts	3	6	5
Revenue per 1 aircraft	12 556 694	12 347 694	11 785 416

Source: own processing based on data from <https://finstat.sk/47880627>

Based on the overall reduction in contracted charter flights, we expect a significant weakening of the company in terms of revenue. We reflect this decline through the calculations in the table above. In connection with reducing the total number of based aircrafts we expect approximately 50% decrease in the company's revenue in 2019 compared to the previous year. This loss will bring with it a decline in the tax paid to, in employment and the consequent loss of contributions to social and health insurance.

3 Conclusions

Air transport can be considered as one of the most growing and expanding sectors in present. However, the aviation world is currently experiencing extremely turbulent moments due to the groundings of nearly 400 Boeing 737 MAX aircrafts on a global scale. The question of the aircraft safety has created uncertainty in the world, which is also felt by individual stakeholders. Airlines that were operating this model of the aircraft had to start with canceling flights, optimizing schedules, or to compensate the missing capacity through the ACMI contracts. The lack of capacity and, in particular, loss from unused grounded aircrafts will also be reflected in the financial results of the airlines, which we have demonstrated by the sales forecast of Smartwings Slovakia, where they can be expected to decline significantly. The events of recent months have also affected travel agencies, which have often been led by air carrier to change their departure days, length of package holidays, or to cancel the flights and look for alternative air carriers. The groundings of a new and modern type of this aircraft have raised airlines doubts against Boeing, what was reflected in an immediate decline in demand for new orders of any type of aircraft from an American manufacturer. On the other hand, other aircraft manufacturers, especially the most important competitor of Boeing – Airbus, may prosper from the situation. Despite a high level of mistrust towards Boeing, the company

signed a preliminary agreement at the end of June 2019 for supply of 200 Boeing 737 MAX aircrafts with the International Airlines Group, which brings together several European air carriers. It is still questionable when the grounded aircrafts will come back to operation. It can be stated that this is one of the biggest crises in the aviation industry since its beginning, with negative economic impacts that will have long-lasting consequences. Despite all the negative facts, it is important to realize that safety in air transport is a priority for Boeing, airlines, as well as air transport institutions. The following removal of technical or software failures in new aircraft models will contribute to the basic air transport attributes, which are safety and comfort of the passengers.

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CONSUMER PERCEPTION OF ECO-DESIGN

Petra Garasová

University of Economics in Bratislava
Faculty of Commerce, Department of Commodity Science and Product Quality
Dolnozemská st. 1
Bratislava, 852 35
Slovakia
petra.garasova@euba.sk

Abstract. *The environment is getting worse and there is a growing commitment to sustainable consumption from retailers, manufacturers and customers. The goal of ecological design is to propose how to reduce or completely eliminate the individual negative environmental impacts of the product after identifying key environmental areas. The aim of the paper is to identify consumer perception of eco-design in Slovakia and consumer preferences of eco-design of home and kitchen accessories. We conducted a consumer survey using structured questionnaire. 100 respondents participated in the survey. We found out that only 46% of respondents are aware of the term eco-design. 63% respondents are not interested in the disposal of the home and kitchen accessories after use but 67% of respondents use home and kitchen accessories after use for other purposes than they were originally intended for. Respondents perceive eco-design of kitchen and home accessories as expensive but as quality. Women and men perceive eco-design of home and kitchen accessories almost the same way.*

Keywords: *eco-design, consumer perception, home and kitchen accessories*

JEL classification: *M20, Q50*

1 Introduction

A key aim of eco-design is to reduce to a minimum the overall environmental impact of a product or service. Eco-design refers to innovative design solutions in both products and services that take into consideration the entire lifecycle. Minimisation of pollutants during the production period is just as important as it is during the product's lifetime. However, eco-design is an elastic and evolving concept that is better considered as an approach to design than as a label for eco-friendly products (EcoDesign Circle, 2018).

Product design is rapidly evolving, utilizing new knowledge, materials, and product creation processes. Customer expectations also evolve. Functionality, ease of use, and affordability, are the characteristics that are regarded by the customer as obvious for

everyday products. Recent trends in design focus on products that inspire and improve their users' lives.

The big challenge facing today's advanced economies is to integrate environmental sustainability with economic prosperity, diminishing the environmental damage caused by economic growth and thus creating "more with less". The consequences of climate change and the growing demand for energy and resources make it more difficult to achieve this objective. The aim of European policies is to improve the overall environmental performance of products throughout their life cycle, to support the demand for better products and production technologies and to help consumers make informed choices. Product design is therefore faced with new challenges in the area of sustainability, inclusive design, participatory product design and product creation for community-based good.

The EU is now turning its attention to 10 kinds of disposable plastic products and fishing gear, which together account for 70% of marine waste in Europe. The new rules cover these areas, prohibition of certain plastic products for example: plastic cotton sticks, cutlery, plates, straws, mixers and balloon sticks, reducing consumption of plastic food containers and cups (Enviroportal, 2018).

Concerning sustainable development, ultimately, our aim is quality of life - for everyone - today and in the future. To ensure that design and product development progresses in the right direction, we need to include a holistic perspective that includes environment, people, economy and culture (Von Matern, 2018).

1.1 Literature Review

The Directive 2019/125/EC defines eco-design as integrating environmental requirements into product design to improve product environmental acceptability throughout its life. Eco-design as a product development process identifies the key environmental areas that have an environmental impact throughout the product lifecycle. It examines and evaluates all activities, materials and substances that are associated with extraction of raw materials, production, distribution, use and final disposal of the product (Proková Mališová et al., 2018).

There are two types of requirements specific and generic that specified products must comply with under eco-design directive (Europa, 2018, Europa, 2019): a) specific requirements – contain precise values, including value limits, such as the minimum amount of recycled material used in the production; b) general requirements – no limits are specified but it may be required that: the product be "energy efficient" or "recyclable", the information be provided on how to use and maintain the product so as to minimize its impact on the environment, product life cycle analysis be performed to identify improvement and alternative design solutions.

The goal of ecological design is to propose, after identifying key environmental areas, how to reduce or completely eliminate the individual negative environmental impacts of the product (Proková Mališová et al., 2018).

Eco-design is devoted to eliminating the adverse environmental impacts of industrial production, by using secondary raw materials or by closing the durability into the product lifecycle, by incorporating "post-consumer" stages: decommissioning, waste disposal, disposal or reuse of material, recycling raw materials from renewable sources (Knošková, 2014).

Eco-design offers innovative and appealing solutions, viewed from a perspective that encompasses aesthetics, functionality, user-friendliness, and of course sustainability and environmental compatibility (Brinkschulte – Liwitzki, 2018). The other definition says that eco-design not only minimizes negative impacts but also maximizes positive sustainability impacts - economic, environmental, social and ethical - throughout and beyond the life-cycle of existing products or solutions, while fulfilling acceptable societal demands/needs (Charter – Tischner, 2001).

Various authors deal with consumer behaviour and eco-design in their studies. Knošková and Donovalová in their study about the importance of the energy label during consumer purchasing decisions when buying a household appliance discuss consumer behaviour and preference for environmental criteria (2018). Luttrupp and Lagerstedt in their study discuss merging environmental aspects into product development (2006).

2 Methodology

The aim of the paper is to identify consumer perception of eco-design and consumer preferences of eco-design of home and kitchen accessories.

The required primary data is obtained from our consumer survey using standardised questionnaire sent to the respondents in Slovakia via the Internet. The obtained data was evaluated by simple analyses, and a semantic differential was used to better understand consumer perception of eco-design. For survey we chose product category: home and kitchen accessories. The reason of this choice is future elimination of plastics in specific accessories due to environmental harm. For example a product like a plastic cotton sticks, cutlery, plates, plastic straws, mixers and balloon sticks and reducing consumption of plastic food containers and cups an others. So we want to know the consumer awareness of eco-design and consumer preferences of eco-design of home and kitchen accessories.

The use of a semantic differential to investigate consumer behaviour is outlined by many authors (Richterová et al., 2013 and 2015, Duarte, 2008). Shanat and Sali took advantage of the semantic differential method to investigate consumer satisfaction in furniture design (Shanat – Sali, 2018). Han Lu Che et al. used the semantic differential method in the course of designing laptop bags (Han Lu Che et al., 2012).

The following formula is used to work out the semantic differential. This formula allows us to determine the average values associated with the individual adjectives used on the scale.

$$x = \frac{x_1 + x_2 + x_3 \dots + x_n}{n} \quad (1)$$

x = average

x_1 = value of the first item

x_2 = value of the second item

x_n = value of the last item

n = number of respondents

The standard deviation shows the extent to which the measured values are around the mean value. The formula used to calculate it is:

$$\sigma = \frac{\sqrt{(x_1-x)^2+(x_2-x)^2+\dots+(x_n-x)^2}}{n} \quad (2)$$

σ = standard deviation

x = average value of the term

x_1 = value of the first item

x_2 = value of the second item

x_n = value of the last item

n = number of items

Total of 100 respondents participated in the survey (Table 1). Of the total number of respondents, 75 (75%) were women and 25 (25%) were men. The largest number of respondents was in the age group 21 – 30 years, 33 (33%) of respondents, followed by age groups 31 – 40 with the number of respondents 26 (26%) and then age groups 41 – 50 with the number of respondents 17 (17%). In the survey, respondents with a higher education prevailed, 49 (49%) respondents with university degree. The most frequent employment situation of respondents was employee in 53 (53%) cases. The largest number of respondents has the medium income, 60 (60%) of respondents.

Table 3. Respondents' demographic data. *Source: Own survey*

Gender	Age	Educational attainment	Employment	Income
Women 75 (75%)	15 – 20 7 (7%)	Still studying at Secondary school 3 (3%)	Student 9 (9%)	Low 17 (17%)
Men 25 (25%)	21 – 30 33 (33%)	Still studying at University 5 (5%)	On maternity or parental leave 17 (17%)	Medium 60 (60%)
	31 – 40 26 (26%)	Primary 2 (2%)	Employee 53 (53%)	High 12 (12%)
	41 – 50 17 (17%)	Secondary 41 (41%)	Businessman/entrepreneur 12 (12%)	No income 11 (11%)
	51 – 60 13 (13%)	University 49 (49%)	Retired 5 (5%)	
	61 and more 4 (4%)		Unemployed 4 (4%)	
Total respondents: 100				

3 Results

Through the survey, we wanted to find out the respondents' awareness of eco-design (Figure 1). We found that 46 (46%) of respondents were aware of the concept of eco-design, and 54 (54%) of respondents did not know this concept. Eco-design is quite a new term which can cause lower awareness.

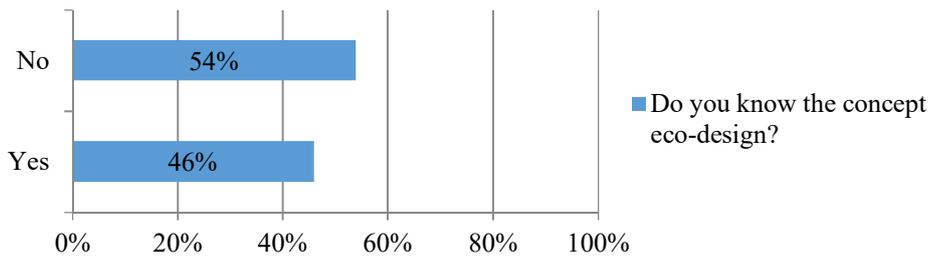


Fig. 1. Awareness of eco-design by respondents. Source: Own survey

The material from which home and kitchen accessories are made is important for 40 (40%) of respondents, for 47 (47%) of respondents it depends on the product. The largest number of respondents, 63 (63%), are not interested about the disposal of the home and kitchen accessories after use. Of the total number of respondents, 67 (67%) respondents, use home and kitchen accessories before disposal for other purposes than they were originally intended for (Figure 2).

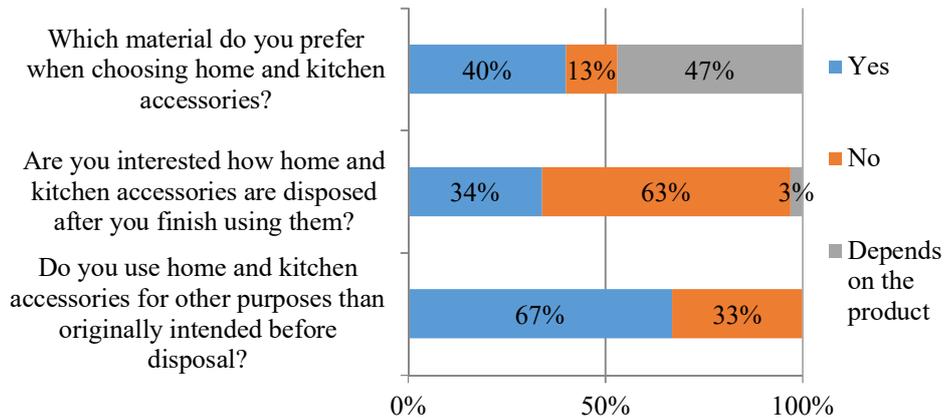


Fig. 2. Selection of home and kitchen accessories. Source: Own survey

The most preferred material of home and kitchen accessories is glass, for 36 (36%) of respondents. Wood is preferred by 23 (23%) of respondents, porcelain/pottery preferred

by 20 (20%) of respondents and metal by 18 (18%) of respondents. Plastic as a material for home and kitchen accessories preferred only by 2 (2%) of respondents (Figure 3).

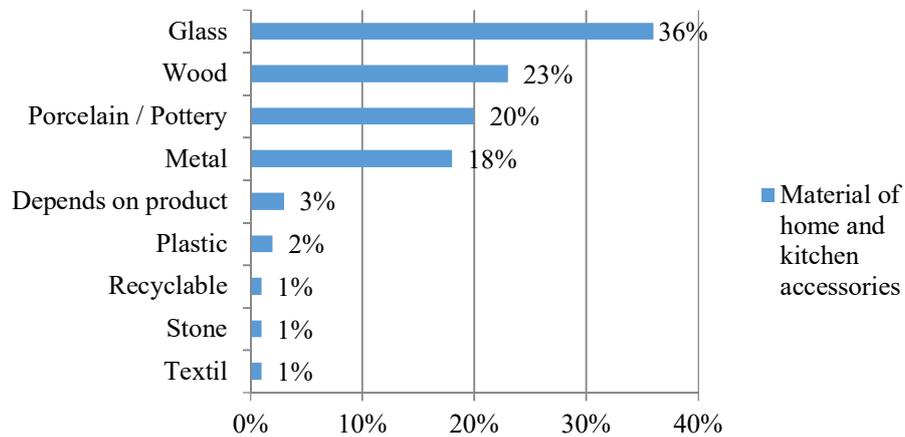


Fig. 3. Preferred material of home and kitchen accessories. *Source: Own survey*

The most important criterion for the 78 (78%) respondents is quality the second criterion is price, for 75 (75%) respondents. The third criterion is material, for 61 (61%) respondents, and then the design as product selection criterion is important for 48 (48%) of respondents (Figure 4).

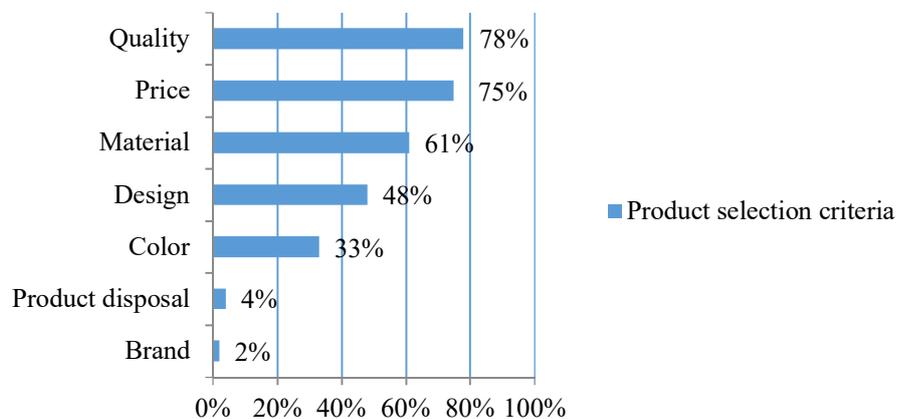


Fig. 4. Product selection criteria of home and kitchen accessories. *Source: Own survey*

Respondents perceive eco-design of kitchen and home accessories as expensive but also as quality and recyclable. Despite of the perception of eco-design of home and kitchen accessories as modern, respondents perceive it also as timeless (Figure 5). It means that consumer can use this product for long time and it does not lose its appeal.

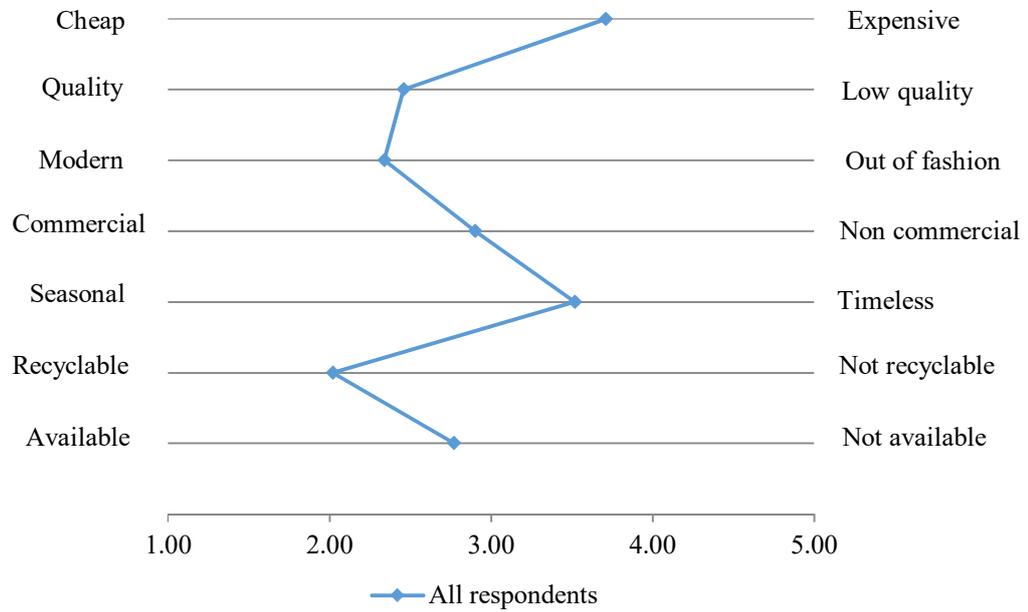


Fig. 5. Consumer perception of eco-design of home and kitchen accessories *Source: Own survey*

Women and men perceive eco-design of home and kitchen accessories almost the same way. Women think that home and kitchen accessories with eco-design are more expensive, modern and timeless. Men perceive these products as more quality (Figure 6).

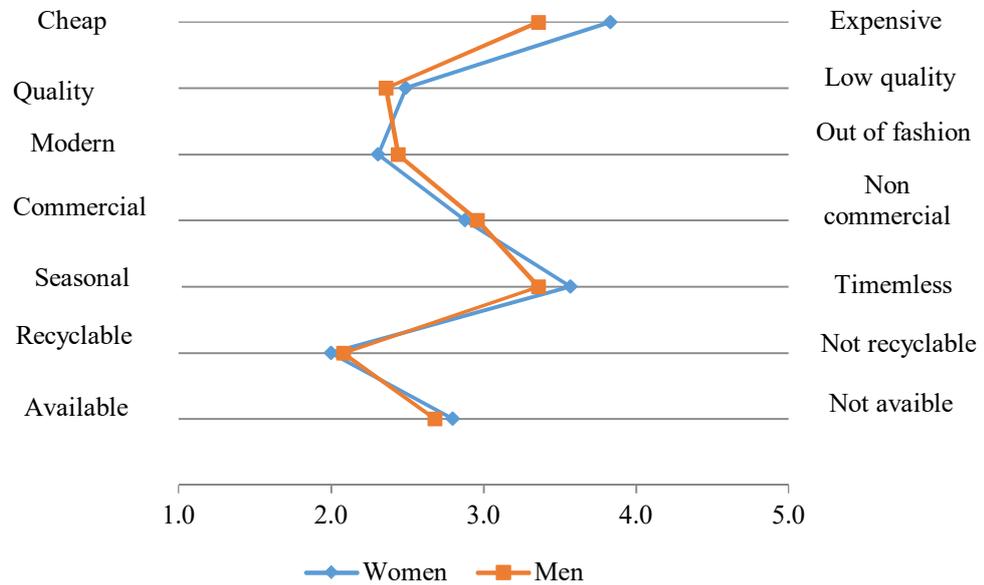


Fig. 6. The perception of eco-design by women and men. *Source: Own survey*

Table 2 shows the average values and standard deviations in the characteristics of eco-design of home and kitchen accessories in three categories of respondents: all respondents, women and men. The most striking differences from the average value among all respondents were the perceptions of the characteristics: modern – out of fashion (1.15). Women had most diverse opinion in terms of what is modern – out of fashion (1.21). The most striking differences from the average value among men were the perceptions of characteristics: seasonal – timeless (1.04).

Table 2 Average values and standard deviation. *Source: Own survey*

Eco-design of home and kitchen accessories		
	Average value	Standard deviation
All respondents		
Cheap – expensive	3.71	0.83
Quality – low quality	2.46	1.1
Modern – out of fashion	2.34	1.15
Commercial – non commercial	2.9	0.98
Seasonal – timeless	3.52	1.06
Recyclable – not recyclable	2.02	1.06
Available – Not available	2.77	1.01
Women		
Cheap – expensive	3.83	0.88
Quality – low quality	2.49	1.14
Modern – out of fashion	2.31	1.21
Commercial – non commercial	2.88	1.05
Seasonal – timeless	3.57	1.07
Recyclable – not recyclable	2	1.15
Available – Not available	2.8	1.08
Men		
Cheap – expensive	3.36	0.57
Quality – low quality	2.36	0.99
Modern – out of fashion	2.44	0.96
Commercial – non commercial	2.96	0.73
Seasonal – timeless	3.36	1.04
Recyclable –not recyclable	2.08	0.86
Available – Not available	2.68	0.8

4 Conclusions

The aim of the paper was to identify consumer perception of eco-design and consumer preferences of eco-design of home and kitchen accessories. For the survey we chose the product category of home and kitchen accessories. The reason of this choice is future elimination of plastics in specific accessories due to environmental harm. Based on the primary survey using the standardize query method, we found out that 54 (54%) of respondents are not aware of the concept of eco-design. The resulting low awareness of eco-design can be caused by insufficient information to consumers but also insufficient marketing support.

The material from which home and kitchen accessories are made is important for 40 (40%) of respondents. The largest number of respondents, 63 (63%), are not interested in the disposal of the home and kitchen accessories after the consumption. It can be caused by the fact, that 67 (67%) of respondents reuse home and kitchen accessories

after the consumption for other purposes than they were originally intended for. The reason of lower interest in the disposal of home and kitchen accessories can be caused by the type of preferred material which is glass, that can be recycled over and over again.

Respondents perceive eco-design of kitchen and home accessories as expensive but as quality. Despite of the perception of eco-design of home and kitchen accessories as modern, respondents perceive them also as timeless. Women and men perceive eco-design of home and kitchen accessories almost the same way. Women think that eco-design home and kitchen accessories are more expensive, modern and timeless. Men perceive these products as more quality. The most diverse perception among all respondents and women is in the terms modern – out of fashion.

It is worth pointing out that the issue of eco-design is important to pay attention to, because this topic is very current. In the paper we used the standardized query method and the semantic differential. Our survey is the basis for further exploration in area of consumer perception and preference of eco-design product solutions. It is also necessary to extend the survey to other product categories such as drugstore products for their high consumption and environmental impact.

Acknowledgement.

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THE IMPACT OF NEW TECHNOLOGIES ON ACCOUNTING AND AUDIT

Milan Gedeon

University of Economics in Bratislava
Faculty of Economic Informatics
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
milangedeon@gmail.com

Abstract. The technological revolution in accounting has started with digitization. In the field of digitization, many professionals see the future of business and non-business subjects (European Business Management Conference, 27 October 2016 in Bratislava), because it undoubtedly contributes to streamlining processes, data transparency, data sorting and overall better use. The enhancement of digital technology is in cloud-based accounting applications that capture information and process it seamlessly. The change of the capture of accounting information also has a significant impact on audit process. The purpose of the paper is to clearly define the categories of digitization and automation, identify the specific impact of these processes on accounting and audit, and analyze the advantages and disadvantages of introducing digitization and automation into accounting.

Keywords: automation, accounting profession, audit profession.

JEL classification: M41, M42, O33

1 Introduction

Oxford University researchers Carl Frey and Michael Osborne conducted the research "The Future of Employment", which examined the extent to which automated threats to individual jobs are threatened. There were examined 702 professions, among which accounting was ranked as the worst profession. Accountants and auditors will be replaced by artificial intelligence, with a probability of 94% over a 20-year horizon, according to research results published in 2013, basically meaning that 94% of the processes performed by accountants and auditors will be automated. In the case of accountants, the forecast is even worse and up to 98% probability of replacement by robot. Research has focused on the US labour market. We can expect similar results in the European environment with a view to the globalization process. With the use of digiti-

zation and automation of accounting, there are several opportunities and risks, advantages and disadvantages, depending on the point of view of the entity itself, from the point of view of its employees or from the point of view of the country.

Automated processing of accounting records is already a standard way of recording individual business processes in an accounting unit. Automated processing refers to the use of economic software for bookkeeping, while economic software allows the accountant to keep books of account - the journal and the general ledger in electronic form. In the journal, all accounting transactions are recorded in the time line as they are followed. Timestamp entries in the journal have an important control function, ensuring that the completeness of the accounting records is proven and that they are accounted in the relevant accounting period. In the general ledger, all accounting transactions are recorded in a substantive and systematic manner. Accounting records are entered in the books by the accounting unit on the basis of accounting documents. Accounting records mean the technical accounting of the transaction. Under Act no. 431/2002 Coll. on accounting in the wording of later regulations (hereinafter "the Act on Accounting"), it is necessary to carry out the accounting entries in a clear and transparent way to ensure their performance. Understandable and transparent accounting records are those considered legible (accounting entries are made in the national language). Accounting records that are readable for an indefinite time are considered to be permanent. The following Figure 1 illustrates a simplified process from the making of the accounting transaction to its entry in the accounting books. Regardless of the way in which the accounting transaction is recorded (written or technical record), the requirements resulting from the Figure 1 as well as the Act on Accounting should be respected.

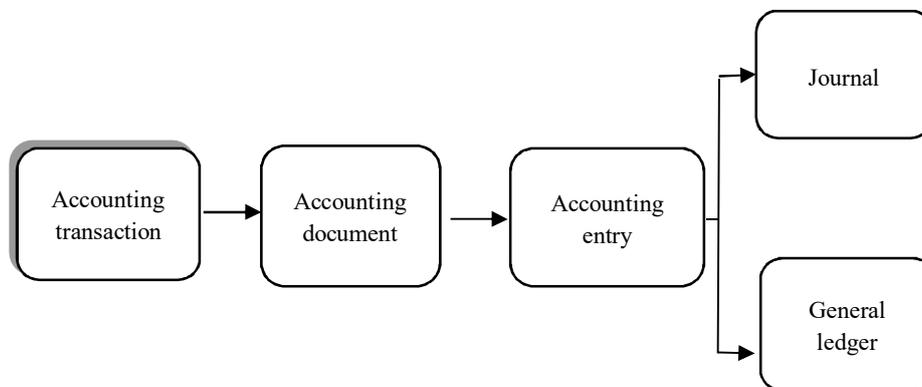


Fig. 1. Accounting records in the accounting books. *Source: Šlosárová et al. (2016)*

The accounting document must first be processed by an accounting entity and may then be booked according to the content of the accounting document. An accounting entity may use different accounting systems for bookkeeping. Their detail and complexity depends on the scope and nature of the entity's operations. The choice of the accounting system also depends to a large extent on the requirements for output information from accounting and also on the possibilities of importing data into the accounting system.

An accounting entity should take account of the flexibility of the accounting system when selecting the accounting system. The flexibility of the accounting system means the extent to which the accounting software can be adapted to the circumstances of the particular entity. An entity may expand or may change the nature of the business activity over time, and therefore the flexibility of the accounting system is an important attribute. Nowadays, accounting systems are very often part of the complex information systems that an entity uses not only for bookkeeping purposes but also for keeping supporting records. Examples of supporting evidence can be inventory, long-term assets, sales, records of reminders and various other records - modules. With such information systems, there is a direct link between the registration modules and the accounting system. In many cases, it is possible to talk about the online accounting where individual accounting transactions are booked at the time of their creation. The advantage is automated execution of the accounting without the intervention of an accountant, which reduces the error rate unambiguously. In this context, we can divide the accounting records into (Šlosárová et al., 2016):

- **manual accounting records** that are not created based on the system settings; it is an accounting record made directly by the accounting officer, manually into the accounting system, on the basis of an accounting document;
- **automatic accounting records** that are created based on the system setting and the fact that is the subject of accounting. This can be, for example, automated booked of depreciation of fixed assets or automated booked of goods in a store.

The paper has focused on manual accounting records. At this time, it is not possible to set fully automatic accounting records in all entities. For some, this may not be technically possible (some types of contract production) and in smaller accounting units, implementation of automated processes may not even be cost-effective. When an entity does not have a comprehensive information system, it is possible to partially automate manual accounting records. Based on this, it would be desirable to add one more category to the distribution of accounting records, in part automatic accounting records. To begin with, I would like to point out the relationship between the accounting document and the accounting record depending on whether it is a manual or automated accounting record:

- a. The relationship between the accounting document and accounting record of the manual accounting record - manual accounting records are performed by an accounting unit on the basis of the processed accounting documents. Booking is not automated, but only when the accounting entity receives the accounting document, processes it, and then manually accounts. Accounting has to be done in a timely manner so that the accounting record is made in the accounting period with which it is factually and temporally related. An accounting record is made by an accountant who should be inspected by his senior staff (e.g. senior accountants). This relationship between the accounting document and accounting record is shown in Figure 2.

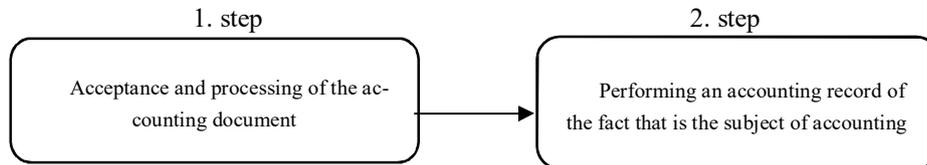


Fig. 2. Manual accounting record. *Source: own processing according to Šlosárová et al. (2016)*

- b. The relationship between the accounting document and accounting record in the automated accounting records - the automated accounting record must be set in the accounting system in advance. Subsequently, the accounting system automatically calculates selected items at specified intervals, e.g. on the last day of the month it books the depreciation of long-term assets. The accounting system performs the accounting records automatically, so the accountant just checks the impact of the automatic record in the accounting. However, the accounting must be carried out in a timely manner so that the accounting record is executed in the accounting period with which it is temporally and factually related.

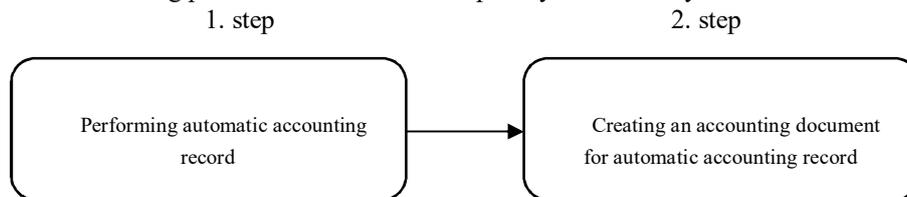


Fig. 3. Automatic accounting record. *Source: own processing according to Šlosárová et al. (2016)*

1.1 Digitization, digitalization and automation

Digitization and digitalization are two different terms that are closely associated and often used interchangeably in a broad range of literatures. The Oxford English Dictionary determines the first uses of the terms digitization and digitalization in conjunction with computers around the year 1950.¹ (**Digitization** is the action or process of digitizing – the conversion of analogue data into digital form (into digital bits of 1s and 0s with discrete and discontinuous values.). Analogue data are data that are measured or stored using non-numeric information. Digital data are accurately described using numeric values. Unlike analogue data with continuously varying values, digital information is based on just two distinct states (Feldman, 1997). In the digital world, things are there or not there, "on" or "off". There is nothing between these two values. Digital

¹ There are many resources which dissertate in the medical science fields dating from the late 1800s on digitalization that refers to the administration of the digitalis family of plants for the treatment of heart ailments. For the purposes of this chapter, we do not consider this specialized use of the term. (Brennen & Kreiss, 2014)

bits have only two possible values what means that digital information is discrete and clean, whilst analogue information is continuous and noisy (Pepperell, 2003).

Digitalization means the use of digital technologies in order to create revenue, improve business in many ways (not just processes) and create a digital culture whereby digital information is at the core. Digitalization refers to the adoption or increase in use of digital or computer technology by an organization, industry or country. The digitalization of the new economy, society and culture is one of the defining characteristics of the contemporary era (Castells, 2010). “Digitize is a subset of the concept represented by the word digitalize.” (Garth, 2014) Digitalization is about a new, adaptive and interactive framework that defines a unified digital strategy that becomes the basis of the digital enterprise and pumps new energy, ideas, and innovation across the enterprise that will redefine the business processes, revenue models, and ultimately the business model.

Automation means to make (a process) automatic or to be made automatic. In generally, we can the word automatic define as working by itself with little or no direct human control. Automation of business processes is now a necessity that improves the competitiveness of companies; it reduces costs and improves customer experience. Automate, in particular, repetitive activities in an accounting unit such as filing claims, resolving complaints, logistic processes, backing up data, collecting data from different systems, and then reporting or other.

2 Methodology

A contribution to the conference is focused on assessing the impact of automation and digitization on a consultancy company that provides its clients with accounting and tax advice and auditing financial statements. The subject of the survey was a complex process of processing the accounting documents of a particular client - the accounting unit, which is a hotel with a capacity of 410 beds in 200 rooms. The entire process of accounting documents includes the collection of economic information, its sorting and complex recording in the time sequence, adjustments at the end of each reporting period, summation of the information and its preparation for presentation purposes only after disclosure. The observation period was four months (July 2018 - October 2018), and it is important to note that research is based on real data. By July 2018, all documents were processed manually in their entirety. My partial but essential goal to achieve the primary goal was to set at least partially automatic accounting records in the accounting unit. Based on the observation of the processes and the subsequent comparison of the time requirements to the complex processing of the accounting documents before and after the implementation of the new processes, I evaluated the impact of automation. As mentioned above, automation includes also digitization, which is a necessary part of that.

The bulk of new processes included automatic import of accounting documents into the accounting system using import files processed in the Microsoft Excel spreadsheet. As a result of the aforementioned characteristics of the accounting records, in this case I have focused on achieving partially automatic accounting records. When importing

accounting documents, it is still necessary to manually intervene, but I have modified the import files so that the accountant made only minimal adjustments when accepting new documents from the client. In all import files, the same algorithm is applied, under which the accountant must place the source data in the form in which it has been received from a client into the unambiguously marked import file sheet. In addition, it is just needed to set the current date and current document number in the base of a specific import file. The base sheet handles the source data in such a way that all the accounting software requirements are met. In each import file, there is a test to alert the accountant of any errors. The problem may occur when a client changes the structure of the source data. In this case, it is necessary to modify the base sheet so that the accounting system imports the file (the individual options of the accounting software must be respected). When the accountant has prepared an import file, he imports it into the account through a specific accounting software module.

3 Conclusions

After integrating the new processes applied to the accounting records of the entity, interesting conclusions were found. At the beginning of the research, I measured the total time needed for the individual performance related to the processing of accounting documents. It is important to point out that I have abstracted from exceptional performances that have been linked to client requirements beyond regular performances. Total time spent on the examined unit was approximately 247 hours in July. With the preparation and implementation of the new processes, we started in August 2018 and, in the beginning of October, all the new planned processes were applied.

The Figure 4 gives an overview of accountant's performance in hours, including the time needed to implement or test and control new processes spent by accountants. Time for preparing import files and consulting new processes in the table has not been incorporated. The total time required for the processing of accounting documents has decreased from 247 hours to 91 hours, which means that it has decreased to 37% of the original time. For a consulting company that provides comprehensive advice to this client, this means saving one accountant who can provide comprehensive advice to at least one other client.

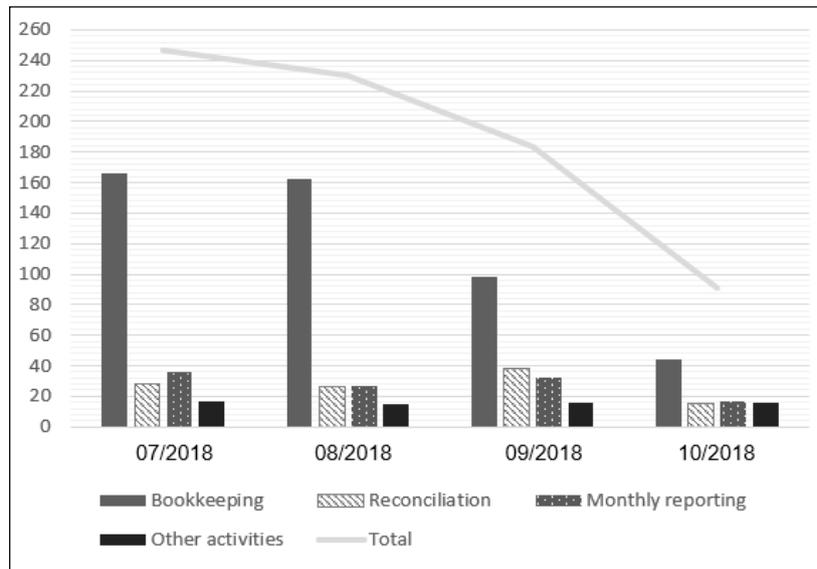


Fig. 4 Overview of accountant's performance / in hours /. *Source: own processing*

Based on the research I have come to the conclusion that the introduction of automation in an advisory firm results in the following key benefits and risks:

- lower error rate, higher accuracy,
 - increased productivity, time saving and creating space for operational solution of client requirements,
 - orientation on innovation,
 - employees development, reduction of stereotypical work,
- employees may lose track and logical link about operations that are performed automatically,
 - great reliance on technology that can fail,
 - increasing the risk of compromising confidential data.

We have just mentioned the primary opportunities and risks from which rise to other, derived benefits and disadvantages. Reducing error rates, higher labor productivity, and innovation orientation clearly increase the competitiveness of an advisory firm. Employee development - reducing the proportion of stereotypical work can be attractive for new employees. However, we cannot forget that automation is the current trend that affects each entity. It is assumed that the proportion of manual labour will be smaller and consultancy companies will need to improve continuously, otherwise it may jeopardize their existence.

Automation in this context changes significantly and will change the profession of accountant itself. The fact that a substantial part of the work of an accountant is replaced by a robot-computer will greatly affect the number of jobs. On the other hand, a qualified accountant will no longer have to deal with manual work and will be able to focus

more on the added value for a particular client. It is also a signal that it will be necessary to change education the accountants to prepare for these changes.

The change of the capture of accounting transactions also has a significant impact on audit process. When the accounting information is in digital form, the auditor may apply several ways to check this information. New technologies bring approaches such as data analytics, blockchain, AI and machine learning and natural language processing. In the end, one interesting idea: *“It is often written that technology is an enabler. It can assist in creating change but of itself it is never the sole driver for.”* (Brand, Chief executive, ACCA, 2019)

Acknowledgement

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LOAN PRODUCTION DEVELOPMENT IN SLOVAK BANKS – COMPETITIVE APPROACH

Peter Gernat

University of Economics in Bratislava
Faculty of National Economics, Department of Banking and International Finance
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
peter.gernat@euba.sk

Abstract. Mortgages are the main part of the whole retail loan portfolio in Slovak commercial banks. Researchers did a significant amount of work trying to define the main drivers of loan growth and levels of loan production. Instead of taking a classic macroeconomic approach, we are trying to evaluate the development of commercial banks loan portfolios. Adopting a correlation analysis approach, we define commercial banks that develop according to current market trends. Our methodology furthermore allows us to define interesting signals in selected time periods, which can mark important competitor moves.

Keywords: mortgage market, competitive analysis.

JEL classification: M31, G21

1 Introduction

Many researchers focused their research on determining the main drivers of banking sector size, usually measured with Loans-to GDP ratio, loan growth ratios, etc. According to the results we now understand what are the main determinants of our dependent variables and we know what drives the loan market development as a whole. A significant amount of research has been done in a field of macroeconomic and microeconomic determinants of overall banking sector size.

Development of loan portfolio on a market level does not always copy the development of loan portfolio in different commercial banks. There are many different important characteristics on an individual level, that influence individual bank's risk appetite and willingness to participate in a strong competitive battles, which are especially interesting for us in this paper.

2 Literature overview

English (1999) applied panel regression approach and discovered that inflation, GDP per capita are the main determinants of banking sector size. Labor productivity on the other hand does not significantly influence levels of bank loans in the economy. Per capita GDP influence was found to be stronger in developed countries with higher overall levels of GDP per capita (English, 1999).

Calza et. Al. (2001) published a paper addressing similar issue. According to their results there is also a positive link between real GDP and banking sector size and negative relationship between average interest rate and loan growth levels (Calza, 2001).

Hofmann (2001) further expanded the set of important drivers of loan market development. In his work, he addressed the issue of real estate prices and their relationship with loan levels (Hofmann, 2001).

Another group of researchers addressed the issue of loan market development on a microeconomic level. Magri (2002), estimated determinants of Italian households participation on a loan market. According to the results, age and income level are positively linked with the individual participation in a loan market. Eventually income level uncertainty was found out to have a strong negative relationship with loan volumes. Additionally, household's origin was also found out to be important when determining loan levels. Rural households are less likely to participate on a loan market compared to urban households (Magri, 2002).

Similar microeconomic approach was adopted by Tudela and Young (2005) in analysis of loan market determinants in UK. Their results confirm the role of individual income in determining loan levels. Additionally they discovered that net worth and loan prices (average interest rate) also influence the volume of retail loans in UK (Tudela and Young, 2005).

Polish researchers Rubaszek and Serwa (2014) assumed a lifecycle model and income uncertainty. Their results confirmed the role of interest rates, especially interest rate spread (difference between average loan rate and deposit rate), individual income uncertainty and persistence of current income levels on a banking sector size (Rubaszek and Serwa, 2014).

Nieto (2007) used a different approach and tried to analyze credit expansion from macroeconomic point of view. The results of his work confirmed previous studies (Calza et. al. 2001, etc.). According to those results developments on a credit market are mainly driven by net wealth of households, their real consumption, average interest rates and unemployment. Furthermore he discovered that remaining maturity of outstanding loans can determine loan growth levels.

Stepanyan and Guo (2011) used a large set of data and tried to identify determinants of loan growth. According to their results credit expansion is driven mostly by the traditional macroeconomic variables. Their results are in line with the previous studies and they confirmed important relationships between GDP and loan growth. They also identified a relationship between inflation and monetary policy. Soundness of a financial sector was also confirmed as an important determinant of credit expansion.

3 Data and methodology

The main goal of the paper is to analyze development of individual commercial bank loan portfolio, and find out whether mortgage levels develop according to current market trends or whether they react on a different competitors and their market moves.

To deal with the issue we adopt a correlation analysis approach, which does not prove evidence on causality between new production levels of Bank A, with production levels of Bank B, but may identify time periods in which portfolios of two individual banks, with similar long term portfolio development trends, has been developing the opposite direction. Such information could be a signal, that there might have been an important competitor move.

To provide additional interpretation and support of such signals we use access to MARKET VISION SLOVAKIA banking market competitive intelligence database, which consist of banking monthly campaign data from 2014 until 2019. Data on individual bank mortgage volumes and market shares were obtain from the database of National Bank of Slovakia.

Calculations in our simple analysis were conducted in GRETL.

Table 1. Descriptive statistics

Summary Statistics, using the observations 2010:01 - 2018:12
(missing values were skipped)

Variable	Mean	Median	S.D.	Min	Max
dCSOB_vol	3.00e+005	2.79e+005	1.05e+005	5.10e+004	5.45e+005
dOTP_vol	3.75e+004	2.69e+004	4.99e+004	-3.74e+004	1.91e+005
dPABK_vol	4.78e+003	-1.23e+004	4.24e+004	-2.84e+004	1.46e+005
dPRIMA_vol	2.17e+005	2.06e+005	2.14e+005	-4.26e+004	7.39e+005
dSLSP_vol	5.80e+005	5.95e+005	1.97e+005	1.42e+005	1.02e+006
dVUB_vol	4.06e+005	3.33e+005	2.59e+005	1.08e+005	9.68e+005
dTB_vol	2.88e+005	2.38e+005	1.23e+005	8.84e+004	5.29e+005
dUCB_vol	1.33e+005	1.39e+005	4.79e+004	3.18e+003	2.25e+005

4 Results and discussion

Since 2010 mortgage levels in three biggest banks in Slovakia more than doubled. SLSP, the largest bank in Slovakia increased its mortgage portfolio by approximately 5 bil. EUR. Similarly second biggest player (VUB) increased its mortgage portfolio by 3,5 bil. EUR. In the post crisis period, the trends in mortgage market were very clear. We have witnessed a significant boom period, but competition on a market is a reason, why not all banks were successful.

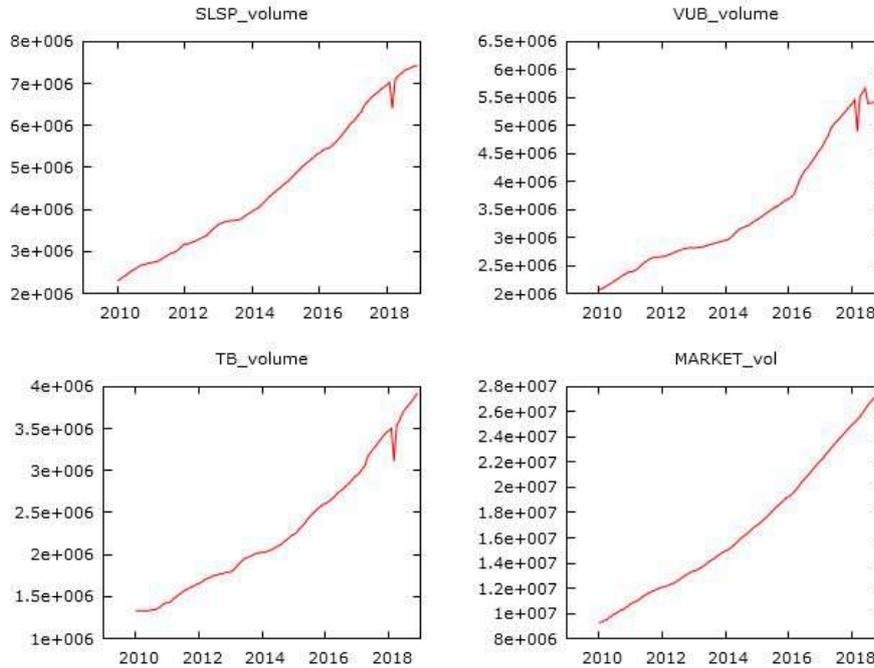


Fig. 1. Credit market development in Slovakia 2010 – 2018. *Source: own calculations in GRETL, 2019.*

We prepared a correlation matrix using a full data sample covering 60 months period. According to the results, mortgage portfolio of almost every bank in Slovakia has been developing similarly with market trend.

There is one specially interesting fact, that the biggest player on a mortgage market – Slovenská sporiteľňa (SLSP) did not copy the development of the market on a same level as its competitors. It could be assumed, that the biggest bank contributes significantly on a market development, but from our perspective it does not look like this is the case for Slovakia. As shown in Figure 1 correlation coefficient between SLSP and MARKET reached 0,50 in 5 years time, which is slightly lower than coefficients of its competitors VÚB banka and Tatra banka.

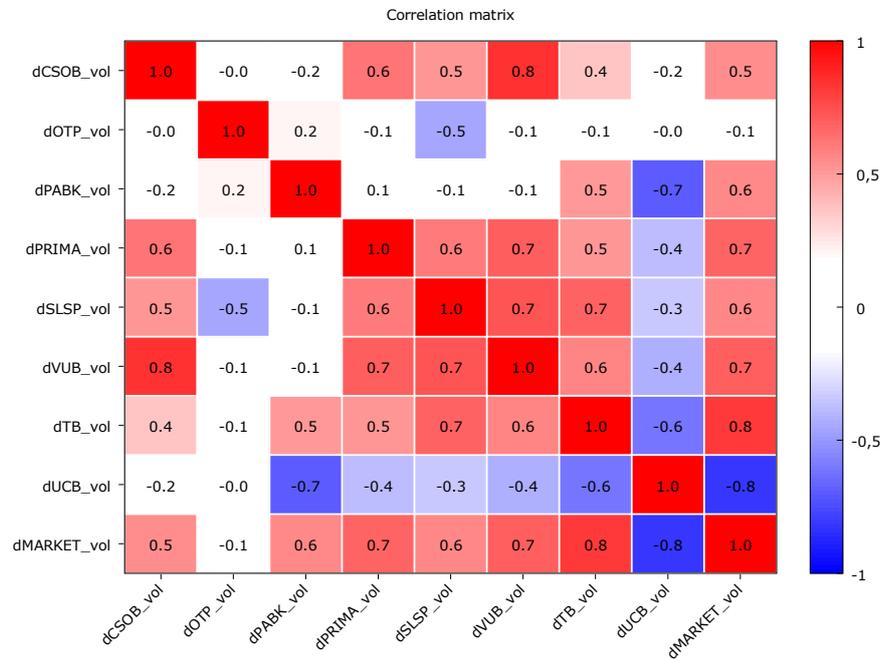


Fig. 2. Correlation coefficients, using the observations 2014:01 - 2018:12; 5% critical value (two-tailed) = 0,2542 for $n = 60$. *Source: own calculations, 2019.*

Another interesting fact is the case of UniCredit Bank (UCB) portfolio development, which does not copy the development of the MARKET, but develops mostly in an opposite direction. This fact can signal that the bank did not enter very competitive Slovak mortgage market with media campaign.

Because of the dynamics of highly competitive Slovak mortgage market, we identified one special period – years 2016 - 2018. According to MARKET VISION SLOVAKIA database, during this periods there was an entrance of Poštová banka (PABK) in a mortgage market with a significant rise in its media activity, there were also important price moves of market's leading banks – VÚB banka (VUB), Prima banka (PRIMA) and important media campaigns from ČSOB (CSOB), VÚB banka (VUB) and Tatra banka (TB).

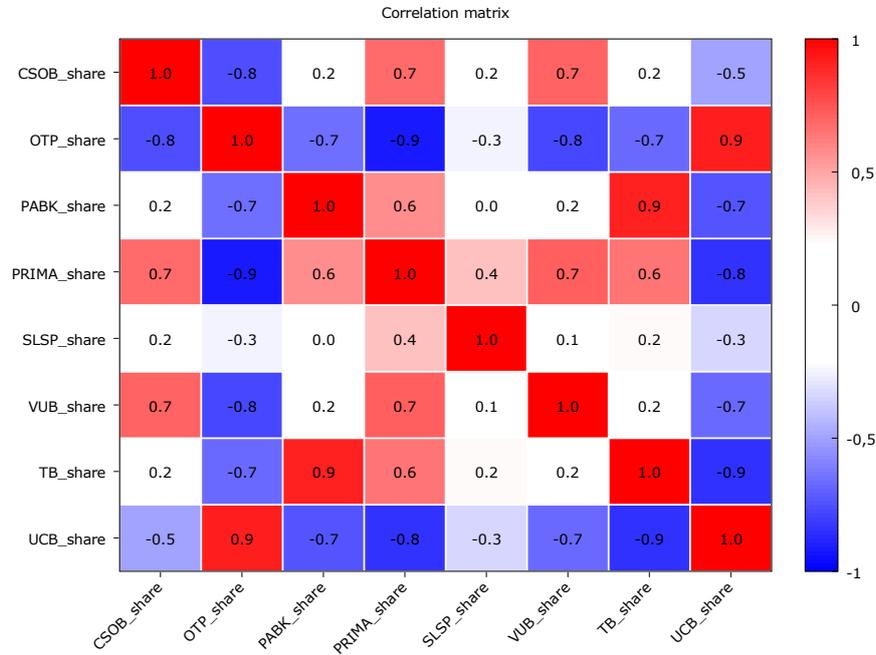


Fig. 3. Correlation coefficients, using the observations 2016:01 - 2018:12; 5% critical value (two-tailed) = 0,3291 for n = 36. *Source: own calculations, 2019*

Figure 1 shows correlation coefficients of individual market shares development. We can identify one interesting signal in the correlation matrix. Correlation coefficients of Slovenská sporiteľňa (SLSP) are rather small, which means the market share of the biggest player in a mortgage market develops differently than market shares of other competitors.

Correlation coefficients may indicate, that competitors are probably targeting the biggest player portfolio of clients. VUB banka also reached a low level of correlation coefficient with SLSP, which means, their portfolio does not develop over time according to the same trends. This situation is supported also by the evidence from campaign database, that says VUB banka launched intensive media activity in spring 2016, which continued until winter 2016. Second biggest player lowered its interest rates, which was followed by a media campaign.

5 Conclusions

In conclusion, we showed that correlation analysis can provide supportive information about development of individual market players and compare them with benchmark. This information although has to be supported by additional evidence from the field or

competitive intelligence databases. Altogether it creates a reliable picture about market developments and developments of different competitors.

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Data and supportive intelligence provided by MARKET VISION SLOVAKIA Ltd.

SOFT POWER 30 INDEX – COMPARATION OF THE VISEGRAD GROUP COUNTRIES

Natália Goda

¹ University of Economics in Bratislava
Faculty of International relations
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
natalia.goda@euba.sk

Abstract. The paper deals with Soft Power 30 index and its results from 2018. This index was first introduced in 2015 and it compares 30 countries. The index consists of six categories, namely Government, Digital, Culture, Enterprise, Engagement and Education. The aim of this paper is comparison of results of Visegrad group countries in Soft Power 30 index and analyse its strengths and weaknesses in the context of soft power. The results of comparative analysis are summarised in the final part of the paper. Based on the results, author suggest concrete improvements for the future position of Visegrad group in Soft power 30 index.

Keywords: Soft power 30 index, Poland, Hungary, Czech Republic.

JEL classification: M 30, N43

1 Introduction

Joseph Nye first developed the concept of soft power in his book *Bound to Lead* from 1990 (The Soft Power 30, 2019a). According to him, the soft power as „the ability to affect others to obtain the outcomes one wants through attraction rather than coercion or payment. A country’s soft power rests on its resources of culture, values and policies“(Nye.J.,2008).

To measure soft power, there are nowadays many researches and indices that compare countries with each other. Such as Anholt's Good Country Index, which compares countries based on how much they are contributed to building a better world and society (Good Country, 2019). Furthermore, the Anholt Nation Brand index, which assesses the strength and quality of the state brand compared to others (Anholt, 2005). Not only Simon Anholt but many other authors created indexes to compare states in context of Soft power. One of them is The Soft Power 30 index, written by Jonathan McClory and his team. In this paper we focus on Visegrad Group countries and their ranking in the

Soft Power 30 index. The aim of this paper is to highlight the main differences of the Visegrad Group and formulate proposals to improve the positioning of the Visegrad Group countries in the Soft Power 30 index as well as suggestions to improve their common branding “Visegrad group”.

2 Soft power 30 index (2018)

But after that recovering soft power is much harder than re-equipping and recovering hard power, for which political will is sufficient. Restoring soft power is a long-haul run because it is necessary to regain credibility and regain “hearts and minds”. (Treverton and Jones, 2005)

With the help of Nye's definition, the Soft power 30 index was created in 2015 for the first time. Author of Soft Power 30 index in 2018 is an American specialist in soft power Jonathan McClory. The index was also based on the 3 main pillars defined by Joseph Nye. The index deals closely with 6 main categories, namely Digital, Culture, Enterprise, Engagement, Education and Government. Index compares 30 countries of the world in the above mentioned six categories (McClory, 2018). The index was created using a combination of both objective and subjective data (see Figure 1).

The number of international polling countries increased to 25 countries in 2018 compared to 2015, when only 20 countries were engaged in international polling. In 2018, the sample size reached 11,000 respondents. Respondents answered various questions in the above mentioned categories, which were translated into their native language, using a scale from 0-10, where 10 points presented the most positive opinion (McClory, 2018). Each country could reach in the ranking a score of 100. The best ranked country in 2018 was United Kingdom with a score of 80.55 and the worst ranked country was Argentina with a score of 48.89 (see Table 1).



Fig. 10. The Soft Power 30 framework. *Source: McClory, J. (2018). The Soft Power 30. Portland Communications.*

Table 1. Soft Power 30 – 2018, Top 30 countries. *Source: Authors' own elaboration based on <https://softpower30.com>*

Rank	Country	Score	Rank	Country	Score
1.	United Kingdom	80.55	16.	Belgium	67.25
2.	France	80.14	17.	Austria	67.23
3.	Germany	78.87	18.	New Zealand	66.68
4.	United States	77.80	19.	Ireland	62.78
5.	Japan	76.22	20.	South Korea	62.75
6.	Canada	75.70	21.	Singapore	62.44
7.	Switzerland	74.96	22.	Portugal	57.98
8.	Sweden	74.77	23.	Greece	54.63
9.	Netherlands	73.79	24.	Poland	54.14
10.	Australia	72.91	25.	Hungary	53.49
11.	Denmark	70.70	26.	Czech Republic	52.64
12.	Italy	70.40	27.	China	51.85
13.	Norway	69.60	28.	Russian Federation	51.10
14.	Spain	69.11	29.	Brazil	50.69
15.	Finland	67.71	30.	Argentina	48.89

The Soft power 30 index compares 30 countries of the world. Slovakia as the only country from the Visegrad Group countries is not represented in this index. Therefore, we will only compare the remaining countries of the Visegrad Group - Hungary, Poland and Czech Republic. As mentioned above, the Soft Power 30 Index compares 30 countries of the world in 6 objective categories namely Digital, Culture, Enterprise, Engagement, Education, Government (see Figure 2). Poland ranked best in 24th place, followed by Hungary in 25th place, and among the Visegrad group was the last Czech Republic in 25th place (The Soft Power 30, 2019b).

	DIGITAL	A country's digital infrastructure and its capabilities in digital diplomacy
	CULTURE	The global reach and appeal of a nation's cultural outputs, both pop-culture and high-culture
	ENTERPRISE	The attractiveness of a country's economic model, business friendliness, and capacity for innovation
	EDUCATION	The level of human capital in a country, contribution to scholarship, and attractiveness to international students
	ENGAGEMENT	The strength of a country's diplomatic network and its contribution to global engagement and development
	GOVERNMENT	Commitment to freedom, human rights, and democracy, and the quality of political institutions

Fig. 2 Soft Power 30 categories. *Source: McClory, J. (2018). The Soft Power 30. Portland Communications.*

The best ranked country from the Visegrad countries was in various categories Poland, namely Education, Culture and Engagement. In the Education and Culture category, it ranked 22nd worldwide. Hungary was the worst ranking country in both categories. In the Education category was 29th, one place behind the Czech Republic and one place before Argentina. In the culture category Hungary occupied the worst place not only from the Visegrad group countries but worldwide - 30th position. In the last of the mentioned categories - Engagement, in which Poland dominated, the Czech Republic ranked worst in 29th place. On the other hand, the Czech Republic received the best ranking in two categories - Enterprise (20th place) and Government (19th place). The authors of the index attribute better position of the Czech Republic, especially to its geographical position, which is attractive to foreign direct investment as well as an educated and easily accessible workforce. Hungary ranked 11th worldwide in the Digital category as the only country among the Visegrad group, which was ranked in the better half of the evaluated countries. According to the authors of the index, the reason is mainly because of the rapid improvement in the effective use of its digital diplomacy tools (The Soft Power 30, 2019b).

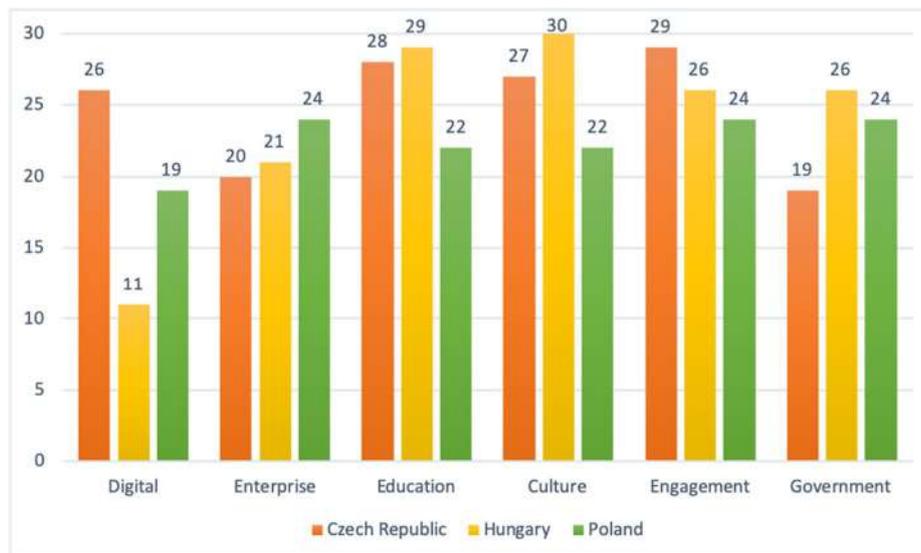


Fig. 3 Visegrad group countries ranking in the Soft Power 30. *Source: Authors' own elaboration based on <https://softpower30.com>.*

3 Conclusions and policy implications

Many indexes exist in academia to measure the country's soft power and branding. Soft power 30 index compares selected 30 countries of the world. In our paper we compared the the Visegrad Group countries. Visegrad groups consist of 4 countries - Hungary, Czech Republic, Poland and Slovakia. We consider Slovakia's non-participation in this

index as the biggest drawback of this comparison, however we have decided to compare the remaining three countries of the Visegrad Group.

We can identify some specific findings (conclusions) from our analysis. The first finding is related to the absence of Slovakia in this index. Main reason why we consider Visegrad group branding weak, it's because in many global country comparisons, Slovakia is missing as a Visegrad group participant and only the remaining countries are compared. As a result, the Visegrad region is not perceived compactly at the global level. To strengthen the perception of the importance of all Visegrad countries around the world, we propose to improve Visegrad group brand and awareness.

Another finding is that the above mentioned countries ranked in the Soft Power Index in almost every category in the worst third of all analysed countries. The only exception is the mentioned Hungary, which took 11th place in the digital category. We also see the positive image of the Visegrad Group countries by strengthening the position of Hungary and the Czech Republic in the Soft Power 30 from 2018. The Czech Republic, as well as Hungary, has improved its global position and thus achieved the best ranking since 2015. According to the index's authors, the Czech Republic, Poland and Hungary could be placed at the top of the list if they would not refuse the EU migrant policy so significantly.

I am convinced of the importance of the index, both for academic community and policy makers, because it reflects strengths and weaknesses of countries in the context of soft power.

Index is dynamic and therefore we see the need to monitor its changes and analyse the improvements or deteriorations of the position of the Visegrad countries, which affects the overall image of the region.

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STRESS TESTING IN THE CONTEXT OF ECONOMIC CYCLE

Peter Golha

University of Economics in Bratislava
Faculty of National, Department of Finance
Dolnozemská cesta 1
Bratislava, 852 35
Slovakia
peter_golha@tatrabanka.sk

Abstract. We argue that there are systemic causes for stress testing exercises by the regulators. We describe these causes and point out the example of two stress tests in Europe and the USA, their construction, results and economic context.

Keywords: stress tests, financial stability, financial market

JEL classification: G21, G28, D53

1 Introduction

Stress testing exercise is a standard tool to test for financial resilience of the banking sector (Jorion, 2007). The overall stability and vulnerability of the banking system in the exceptional but authentic stress scenarios is regularly tested for instance by the European Banking Association (EBA) in cooperation with the European Central Bank in the EU or the Federal Reserve System (FED) in the USA. The primary goal of stress testing is to identify the structural vulnerability and the overall risk exposure in the financial system, which could lead to instability of financial markets. Utilization of stress testing is hence limited to the micro-level of individual institutions but plays an important role in the macroprudential analysis, especially in the context of systemic risk identification and mitigation, both in the banking sector and the global economy.

The main goal of stress testing is to consider performance of the financial system in extraordinary conditions. However, the financial system is a complex organism consisting of a whole set of financial institutions, financial markets and payment systems, and therefore it is not easy to put it through a comprehensive analysis. Stress testing exercise of the financial system takes a close look on its individual elements, usually financial institutions, with the aim to obtain an overall perspective of the system as such (Allen and Saunders, 2003). In some cases, the richness of analysis rests in capturing economic structure and includes inputs from sectoral probabilities of default and modelled as a function of macroeconomic variables (Misina et al. 2006).

Stress testing is also used as a supplement to internal models of financial institutions while, for instance, Value-at-Risk (VaR) models have limited use at times of extreme events on the market because extreme events occur very rarely, therefore it is not possible to capture them in these statistical models (Virolainen, 2004).

2 Stress testing at a system level

The issue of mutual interaction between financial entities and regulatory bodies is often viewed as a competition of individual financial institutions whose primary goal is the attempt to maximize profit in the free market, and regulators whose aim is to maintain stability of the financial system. In this context we can also see the views on the banking regulation and supervision, ranging from the orthodox liberal approach, which prefers *laissez-fair* to the market forces, to fully interventionist approach supporting institutional regulation of banks to the highest possible degree. Supporters of regulation argue that banks play a specific role in the market economy, and therefore it is necessary to maintain a high level of protection of depositors stimulated by market imperfection (Revenda, 2001). As a rule, substantial increase of regulation in the banking sector occurs after great financial and economic crises. This was especially the case after the Great Depression in 1929 and after the Global Financial Crisis in 2008, but regulatory furthers steps has also been brought to live or at least brought to lively discussion after the inflationary period of early 1980's, Nordic crisis of late 1980's or post DotCom bubble burst in 2001. Changing conditions have always lead legislators to re-assess possible controls and to improve cushion for systemic risks. The accurate level of institutional regulation is necessary for stability of the financial system, especially in the context of systemic risk mitigation.

3 Comparison of two stress test approaches

In connection with new trends in regulation and management of risks of the financial sector, the global regulatory bodies conducted a series of stress tests in order to consider the resilience of the financial sector, as well as of the individual financial institutions, and their resistance when overcoming potential financial imbalances at the times of economic recession. Most of the global financial authorities conduct regular testing. In the two major global institutions, stress tests are regularly conducted by the EBA and FED.

According to the EBA (2014, 2016), the aim of the European-wide stress test is to consider resistance of banks in the European Union to the adverse economic conditions, to help the supervisory authorities consider soundness of individual banks, to contribute to understanding of systemic risk in the EU, as well as to support market discipline and cautious behavior of banks.

Stress test in 2014 had included 123 banking groups in the entire EU, including Norway with the overall volume of assets of EUR 28 tn., which cover over 70% of global assets of the banking sector. The test sample in 2016 was restricted to 55 banks. The suggested adverse scenario is designed to reflect systemic risk, which represent a threat

to the banking sector stability. Such scenario for instance expects further deterioration of credit quality, shocks to the bond market, weak economic fundamentals and vulnerable banking sectors. Slowdown of the political reforms would, according to the scenario, endanger confidence in sustainability of public finances, which, along with the lack in the required restructuring of balance sheet of banks, complicates funding of debts via financial markets.

Federal Reserve System (2015, 2016) requires that the banking institutions in the USA must possess sufficient capital in order to maintain the support of real economic activity, despite adverse economic conditions. In 2015, the FED conducted stress tests on a sample of 31 banks, while in 2016 it tested 33 banks. The models are based on hypothetical, stress macroeconomic and financial market scenarios. Very adverse scenarios cover deep recession in the United States, Europe and Japan, and considerable drop of prices of assets, increase of risk premiums and substantial slowdown in the economic growth in Asia. In 2016, the very adverse scenario is characterized by a serious global recession, which goes hand in hand with a period of increased corporate financial stress and negative revenues of short-term US public securities.

In its reporting, the FED provides more detailed information about stress test settings compared to the EBA. That is the reason why we use predominantly the analysis of stress test settings for the FED. Figure 1 displays the settings of macro-environment in terms of regular stress tests of the American federal system in 2015 and 2016. It captures both historic development and prediction of the indicators of economic performance, interest rates and real estate prices in the stress horizon of three years. Evolution of time series shows the assumption of a rapid start of crisis with a sharp decline of economic performance, growth of unemployment, which exerts deflationary pressures on the economy. Stagnant inflation tends to be accompanied by a sharp decline in residential and commercial real estate prices along with a striking fall of stock indices and growth of risk premium of both state and corporate bonds. The anticipated development in the field of short-term interest rates is at its minimum level in the long run, while the FED expects negative values in stress testing 2016. Relatively fast restoration of the economic growth and correction of macro indicators for their pre-crisis levels is expected in the second half of the stress test period, which creates a typical “V” shaped form of a recession.

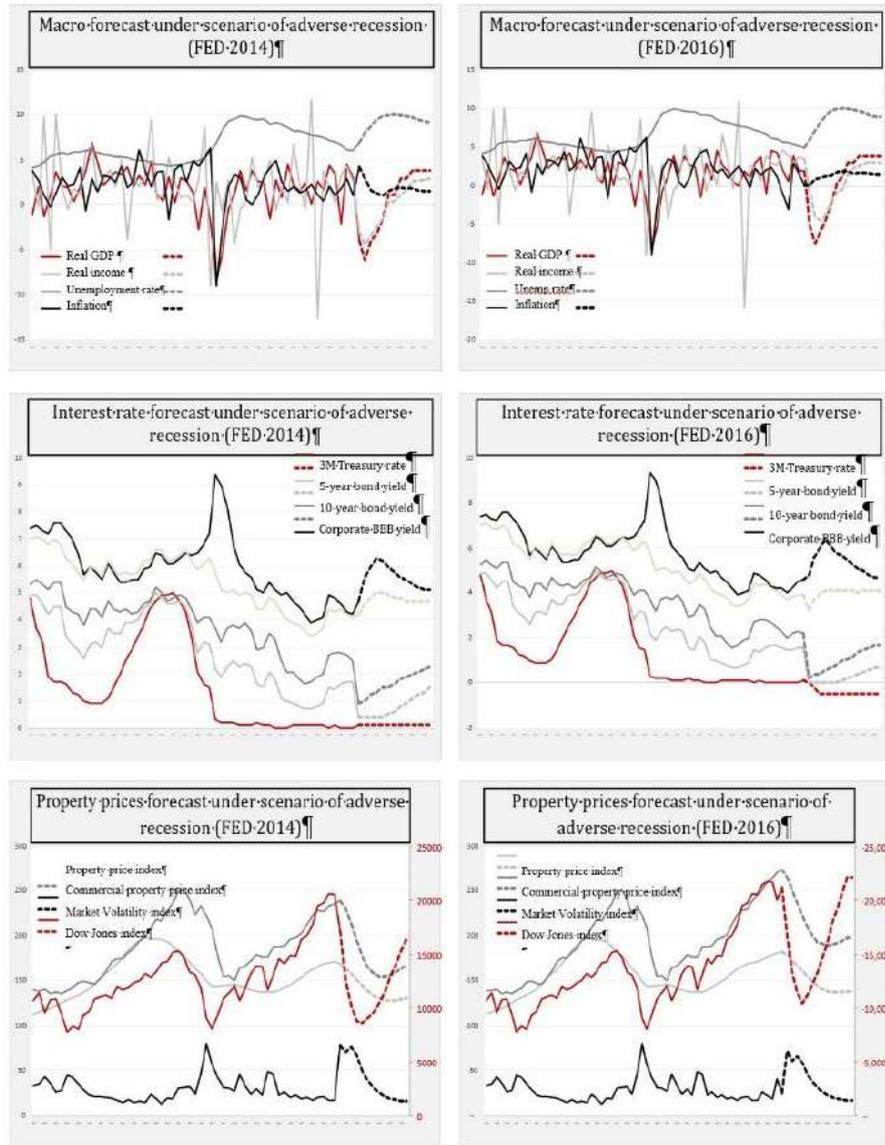


Fig. 1. Development of stress scenarios in the USA based on the FED forecasts for 2015 and 2016. *Source: FED forecasts for 2015 and 2016.*

Table 1 displays a comparison of the main economic indicators used in terms of the serious stress test scenario by the European Banking Association and the FED. Looking at development of basic macro-economic indicators in terms of serious stress scenario, we can notice diverse dynamics in the extent of conservative approach in individual systems. The European scenario is characterized by the assumption of a higher degree

of risk premium. In case of the USA we can see higher sensitivity of real estate prices and sharper decrease of GDP followed by faster correction.

Table 1. Comparison of macro-economic stress scenarios setting in the EU and the USA

Indicator	EU (EBA)						US (FED)					
	Stress Test 2014			Stress Test 2016			Stress Test 2015			Stress Test 2016		
	2014	2015	2016	2016	2017	2018	2015	2016	2017	2016	2017	2018
Long-term government bonds	0,04	0,04	0,04	0,02	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,02
Real GDP growth	-0,01	-0,01	0,00	-0,01	-0,01	0,01	-0,02	0,03	0,04	-0,04	0,03	0,04
Inflation	0,01	0,01	0,00	-0,01	0,00	0,00	0,01	0,02	0,02	0,01	0,02	0,02
Unemployment rate	0,12	0,13	0,14	0,11	0,12	0,12	0,10	0,10	0,09	0,09	0,10	0,09
Growth of residential real estate prices	-0,08	-0,06	-0,02	-0,07	-0,02	0,00	-0,15	-0,11	0,02	-0,12	-0,12	-0,02
Growth of commercial real estate prices	-0,02	-0,03	-0,01	-0,05	-0,06	-0,02	-0,26	-0,13	0,10	-0,18	-0,14	0,02

Source: 2016 Author's own processing based on FED data

Table 2 summarizes the results of stress testing in the EU and the USA. The analysis is based on the number of banking entities whose CET 1 ratio to risk weighted assets dropped below 8%, 6%, 5% and finally 0%. Capital adequacy of 8% represents basic capital requirements resulting from the so-called Cook Ratio defined by the initial Basel I. rules. In case capital adequacy drops below 8%, the bank must proceed to immediate changes, either in its capital base (increase of bank's capital) or in the risk structure (reduction of risk weighted assets).

Table 2 chart shows results of stress tests, which can be interpreted at two levels. On one hand, there is an adverse development of capital adequacy CET1 between the two periods, and on the other, we can see a comparison of results of banks in the EU and the USA. The analysis of the average and medium figures the capital adequacy indicator between the periods shows a certain improvement in case of the EU when the median value of capital adequacy in the adverse scenario increased from 8.2% to 9.5%. In the USA, this growth was only at the level of 0.2% (from 8.1% to 8.3%), while the average capital adequacy value of the sector in stress dropped by 0.3%.

In the year 2014, 41% of banking institutions in the EU recorded a decrease of the capital adequacy indicator below 8%, and 20% of these institutions even below 6%, while 5 banks recorded negative values. The year 2016 showed a significant improvement when only 18% of the tested sample recorded a decrease of the capital requirement below 8%. These data remained almost unchanged between individual periods in case of a stress test conducted in the USA. Approximately 40% of the institutions recorded a lower capital adequacy than 8% and no bank dropped below 5%.

Table 2. Stress test results in the EU and the USA

		2014			2016					2015			2016		
CET1 Band		Total	Adverse	Adverse %	Total	Adverse	Adverse %	CET1 Band		Total	Adverse	Adverse %	Total	Adverse	Adverse %
EU	< 8%	123	51	41%	51	9	18%	USA	< 8%	31	12	39%	33	14	42%
	< 6%	123	25	20%	51	1	2%		< 6%	31	1	3%	33	2	6%
	< 5%	123	18	15%	51	1	2%		< 5%	31	0	0%	33	0	0%
	< 0%	123	5	4%	51	1	2%		< 0%	31	0	0%	33	0	0%
	Average	9.2%			10.7%				Average	9.2%			8.9%		
Median	8.2%			9.5%			Median	8.1%			8.3%				

Source: Author's own processing based on EBA (2014, 2016) and FED (2015, 2016).

4 Stress testing in the changing economic environment

The scenario settings and, of course the stress test results, are determined by the position in the economic cycle. The EBA tests in 2014 were operating with the risk scenario of cumulative fall in GDP of 1.5%, testing in 2016 worked with the assumed downfall of 1.7% and testing in 2018 with 2.7% cumulative in three years. All shocks were therefore far below the first estimate of the corona virus GDP impact. Such underestimation of potential freefall is symptomatic. It was also the case before the global financial crisis, as it may be documented by Simons and Rolwes (2008), who assume zero GDP growth as a stress scenario just 6 months ahead of the deepest crisis in modern post World War II history.

Still, the setting of shock in terms of the unemployment rate remains relatively unchanged with the expected growth by 2.9 – 3% for the simulated three years (with different resulting level in each case; 10.5% for tests conducted in 2014 and 9.7% for tests conducted in 2018). The setting of negative scenarios grows stronger in the course of testing as the period from 2012 was characterized by recovery of the economies and continuous shift from the negative output gap until its closure, or even overheating of the economies in certain cases in the EU. In any case, hypothetical scenarios do not cover the entire scale of potential events, which might occur, but attempt to model the casualties, which might be caused by the economic slowdown or fall in the balance sheets of the banking sector, and what consequences it can lead to on sustainability of individual institutions, as well as on the system (hence financial stability) as a whole.

5 Conclusion

Stress test results are often associated with the position in the economic cycle. This, to an extent, can be seen also in comparison of stress testing in the USA and in Europe. While in the USA, restriction prevailed in the given period, programs for asset purchasing were launched in Europe, which rather represents an ultra-loose monetary policy. This comparison, along with the results from the given period, also shows that stress tests need to be conducted often and on a regular basis because the situation can change significantly and that yet for geographically large units.

At the micro-level, the crisis showed a conflict in the definition of capital between various legislations, as well as lack of information allowing the market participants fully consider and compare the quality of capital between the institutions. It is the quality capital, which is necessary for providing consistency and transparency of the capital base of banking institutions.

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COMPARABILITY ANALYSIS – THE CORNERSTONE OF TRANSFER PRICING

Tatiana Hajniková

University of Economics in Bratislava
Faculty of Business Management
Department of Business Finance
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
tatiana.hajnik@live.de

Abstract. It is not possible to identify comparable prices and conditions resulting from comparability analysis with the general term of “market price” under all circumstances. The higher level of complexity involved in the transfer pricing methodology may lead to transfer prices not necessarily identical to market prices. Reliability of the data obtained by comparability analysis is often proved using statistical methods.

Keywords: transfer price, statistical methods.

JEL classification: M21, G32, C58

1 Introduction

Generally, transaction prices in market economies represent effects of many determinants, above all supply and demand, where on the supply side, a seller tends to sell an object of transaction for the highest possible price, whereas on the demand side, a buyer tends to buy an object of transaction for the lowest possible price. All mutual interactions of all market forces result into an equilibrium price, corresponding to the intrinsic value of a transaction object (Seneši et al, 2018).

If there is economic, personal or other relation between enterprises, it impacts their mutual behaviour more or less significantly and the associated enterprises (related parties) are usually no more governed by market forces. The most important effect of such behaviour of associated enterprises (related parties) is that their joint transactions produce other prices compared to those produced by mutually unrelated enterprises (parties) under similar circumstances.

Transfer pricing is based on the arm’s length principle. Its essence is to examine whether the price of goods, services, property etc. applied in transactions of dependent

parties (related parties) is similar or as identical as possible to the price applied in transactions of independent persons (unrelated parties) in similar transactions under similar circumstances.

Comparability analysis (comparison) is the cornerstone of practical application of transfer pricing. One of the basic principles of transfer pricing is the fact that in most cases, prices and conditions of controlled transactions will not be compared to one and only result of comparability analysis, but the result of the analysis will most often be a range of transfer price (range of profitability indicators). Such range reflects the fact that transfer pricing and the arm's length principle only represents approximation to conditions agreed between independent enterprises (unrelated parties). If the range results from heterogeneous reliability of compared data, it will be necessary to eliminate the least reliable, uncontrolled transactions. Considering the application of range of transfer price, it is necessary to define the method for identifying the range so that it is in accordance with the arm's length principle. The paper elaborates on identification of transfer prices in controlled transactions and points out to the question of statistical tools and conditions for their use so that they lead to improved reliability of comparability analysis results in transfer pricing.

1.1 Overview of domestic and foreign authors addressing the issue in question

In Slovakia, the issue of transfer pricing is addressed by many experts on both, scientific and practical levels. Máziková et al. (2016) consider transfer pricing a dynamic economic discipline, integrating especially elements of accounting, taxation, law, management, econometrics and ethics. Kočíš (2018) identifies importance of comparison in both basic obligations and principles of transfer pricing as follows: a) in documentation regarding transfer pricing (Mintál, 2015), and b) in calculating the tax base in accordance with the arm's length principle (Slivková, 2015). Both obligations have one important element in common – the comparability analysis, which is the crucial pillar of the current legal mode (Kufelová, 2017) of transfer pricing.

The transfer pricing methodology is also important due to its potential influence on possible double taxation and tax evasion (Stieranka et al, 2016; Šimonová, 2017). Double taxation can emerge when two different bases for application of transfer pricing methods are applied by tax authorities from two states. Tax evasion can emerge (Kušnířová, 2016) as a consequence of purposeful behaviour of tax subjects in the course of comparability analysis. The elementary reference tool for more specific comparison principles is the OECD Guidelines (2017).

In 2015, Breuer (2015) presented his paper on the use of statistical methods in order to analyse changing market prices and to correctly define the transfer price with help of transfer pricing methods. He encourages using also different statistical methods to prove reliability of prices in comparability analysis, not only interquartile range. He prepared a four-step process (comparison of averages, analysis of interquartile bands, graphic analysis, T-test) to prove the correctness of goods and services pricing in controlled and uncontrolled transactions, even when sums are different. The comparison of Average Method and Pooling Method to the traditional interquartile range can be found in Ullmann (2015).

Methodology

Undoubtedly, the elementary attributes characteristic for each business or financial transaction are an object of transaction, price of object of transaction and conditions for the settlement of clearing relationships resulting from the transaction. The object of business and financial transaction include e.g. selling and buying a property, providing and receiving services, granting and accepting loans, providing and accepting guarantees etc. In relation to pricing, it is necessary to define the categories of price and value. Price is defined as an objective rate of value facilitating the exchange of goods. In other words, price is a value of goods expressed in monetary units (Soukupová et al, 2004). Value expresses the degree of utility (Králíček, 2003). Value is given by the ratio of utility to price of a product, thus expressing the importance of the object for a specific subject. The process of setting the price, pricing, is different to the process of measurement. However, the processes are mutually related. The mutual relation between measurement and pricing is especially visible in providing services between enterprises, where the enterprise setting the price (based on existing costs or value identified by the buyer) transfers the pricing subjectivity to measurement, and not only to its own measurement process, but also to the buyer's measurement process. The buyer attributes the bought service a measurement unit – it measures it, enters it into accounts and reports it. Measurement is a method (process) of expressing the object of measurement in monetary units (prices). The essence of measurement is definition of a measuring unit (price) used for measurement (Šlosárová, 2011). Pricing is a process of setting the value based on the suitable pricing methods (Harumová, 2008)

A special sphere from the viewpoint of theoretical bases of measurement is the process of measurement, with its respective phases (Bednářová et al, 2015):

1. identification of measurement objects,
2. attribution of proper measurement parameter,
3. expression of the parameter in monetary units.

Considering the term value (essential quality of goods, means to satisfy needs, elementary value in the broadest possible meaning, degree of utility, (Králíček, 2003)), the process of pricing can be different. Pricing strives to set the value in relation to utility for a specific subject to a specific time in the future. The value of the object under the pricing process is set with help of models used by experts in the respective field, while the most important element of the process is setting the value after taking into account all factors affecting the object.

Let us continue the thoughts in the legal framework. How is price considered legally? According to section 2 letter c) of the Act 595/2003, income means monetary payment and payment in kind (even if obtained through exchange), which has been attributed to the price normally used in the place and at the time of supply or consumption taking into account the type, quality, or wear rate of the relevant payment in kind, unless this Act provides otherwise. According to section 17 art. 5 of the Act 595/2003, the tax base shall also include the difference between the prices agreed in business transactions of related parties. The tax base can be distorted by low non-market returns as well as high non-market costs, which are imposed on a Slovak tax subject due to a related party (Pastierik, 2015). Similarly, in relation to measurement, we consider

economic price, i.e. price including costs incurred and reasonable profit. This idea is logical as economic price shall reimburse the costs incurred and create profit for the further development. In Slovakia, the rules for prices creation, application, regulation and control are object of the Act 18/1996. The prohibition of agreeing on excessive prices within the independent price formation process shall always be respected. According to the Act 18/1996, section 12, art. 2 and 3, excessive price of a seller is a price significantly exceeding economically reasonable costs or reasonable profits (i.e. profits based on the development of usual share of domestic goods profit on economically reasonable costs, taking into account the quality of goods, usual production risks or circulation and development of demand on domestic market); excessive price of a buyer is a price significantly lower than economically reasonable costs (i.e. costs of procuring the relevant amounts of material, wage costs and other personal costs, necessary technological direct and indirect costs, circulation costs, considering the usual levels of the costs under comparable economic conditions, taking into account specific features of given goods). The effects of the excessive transaction prices affect not only special purpose tax evasion and obtaining tax advantages (Pastierik, 2015), but also informative value of consolidated accounts (Seneši et al, 2018) as well as systematic creation of financial situations (positions) through purposeful setting of transaction prices between related parties.

In practice, respecting the arm's length principle in controlled transactions is often referred to as the obligation to ensure the so-called „market price“. Comparable prices and conditions, obtained through comparability analysis, cannot always be identified with the general term of „market price“. Comparability analysis principles exceed the framework of standard market price calculation and, in order to ensure the consistency of the arm's length principle, they require several special approaches (e.g. rules for selecting internal and external comparable transactions, elimination of all potential relations between related parties from the comparison etc.). Therefore, prices and conditions obtained through comparison in order to carry out transfer pricing are characteristic with a higher degree of exactness and complexity of the used methodology, which can ultimately lead to a result not identical to a market price.

The transfer pricing norms are based on the arm's length principle, which is primarily determined by the applied methodology of defining prices of transfers between related parties. The essence of applying the arm's length principle is comparison (comparability analysis), which is carried out in quite a complex way in the mode of transfer pricing, requiring consideration of comparable uncontrolled transactions including the so-called comparability factors and rules for selection and application of the transfer pricing methods.

Comparability analysis is a structured and methodologically demanding process, resulting into information on range of transfer price (or range of profitability indicators) accepted from the perspective of the arm's length principle.

Various statistical methods can be used in order to improve the reliability of comparability analysis (e.g. interquartile range). The use of several methods might be suitable for more exact definition of a transfer price (e.g. when two ranges calculated with two different methods overlap), or might lead to reassessing the used methods (when the resulting ranges of transfer price do not overlap). The OECD Guidelines states that if

there are significant differences between the values within the range, it might indicate that the data used are not reliable enough or that it would be necessary to make an adjustment in order to improve the reliability of the calculations for the specific comparability analysis. In such cases, it would be necessary to take a closer look at the range values in question. Regarding this, the OECD Guidelines explicitly stipulates that if a specific condition in a controlled transaction (i.e. price or a selected profitability indicator) falls within the range defined by comparability analysis, it is not necessary to make any adjustment of a tax base. Each value located within the range shall be considered consistent with the arm's length principle. In case the values of the defined range are equally reliable, then, each value falling within the range is consistent with the arm's length principle. If the values are not equally reliable, it might be necessary to use central tendency tools in order to define proper range values (such as e.g. median or weighted average) in order to minimise the risk of an error caused by discrepancies in the compared data. It is necessary to differentiate if the defined transfer price range is based on sufficiently reliable input data. The OECD Guidelines take into account statistical methods only in case of insufficient reliability.

The OECD Guidelines offers examples of comparability adjustments from the perspectives of accounting consistency, financial data segmentation, differences in capital, functions, assets and risks (OECD Guidelines, 2017, Chapter III, A6.1., 3.48). Carrying out the adjustments is dependent on a judgment, taking into consideration costs of tax payers when identifying the comparable data. The OECD Guidelines do not require complete identification of all relevant sources of information. Adjustment of comparability analysis shall be considered in cases improving its reliability and only for differences with significant impact on comparison. At the same time, it is necessary to document all comparability analysis adjustments in order to ensure the proper level of transparency, recording reasons for adjustments, calculation methods, changes in the results for the compared data and the effects of the adjustment in favour of comparability. If extreme results are in question, including losses or extremely high profits, it is necessary to point out that also loss-making transactions can be compared, as the comparability status is defined based on the facts and circumstances of specific cases, not the financial results. However, loss-making transactions and businesses shall be excluded from the list of compared data if the losses do not reflect common business conditions or comparable levels of risks. A similar procedure shall be applied in case of unusually high profits.

Comparability analysis can lead to the following results: a) a single value (a price or a margin) based on which a consistency of a controlled transaction with the arm's length principle is evaluated; however, such situation is rare; b) a range of relatively equally reliable values. In such situation it might happen that despite efforts to eliminate the values with lower comparability, there are still some doubts in comparability analysis which cannot be identified and/or quantified, and thus, they cannot be adjusted. In such cases, the analysis reliability might be supported by statistical tools taking into account medium trend and thus reducing the range, such as e.g. interquartile range, median, weighted average or other percentiles. However, the statistical tools are not meant to support routine range adjustments in direction to medium trends and subsequent non-acceptance of minimum and maximum range values, but to minimise the risk

of errors resulting from sustained unknown or unidentifiable comparability errors (Solilová et al, 2019).

Market range is identified from the set of obtained comparable data (obtained based on internal or external comparison). The arm's length principle is respected if price of profit margin of a controlled transaction falls into the range. The lowest and the highest price or profit margin in the market range is defined as a minimum and a maximum range value. Furthermore, it is possible to express a market range with help of statistical tools under certain circumstances; i.e. to express interquartile range defined as a range between the 25th (lower first quartile) and 75th (upper third quartile) percentile. This method of expressing the market range eliminates extreme values and stipulates that comparable values are those falling among the most frequently occurring values, oscillating around the median value (50%).

2 The use of statistical tools in order to eliminate errors in comparability analysis

The example of the use of statistical tools in order to eliminate errors in comparability analysis will be illustrated on the case study of profit margin range definition.

Case study of profit margin range definition.

Example: Enterprise A is a non-resident parent company, owning 100% of enterprise B, producing bakery products. The parent company defines the group strategy, carries out marketing and sales functions, product development and design development and production planning and it also provides enterprise B with plans and production technology and procedures. The parent company owns a network of business representatives and distributors negotiates agreements and price conditions for clients. The sold products are directly distributed from enterprise B to clients. Enterprise B produces categories and volumes of bakery products according to orders sent from the parent enterprise. It procures necessary material from the parent enterprise and other unrelated subjects. In production, it uses plans, technological procedures and forms of the parent enterprise. The products are only sold to the parent enterprise. Within the group policy of transfer prices, the controlled transaction between the producing entity (enterprise B) and the parent enterprise A is evaluated by the TNMM method to overall costs and the profit margin of 4%.

There is no comparable internal transaction.

The OECD Guidelines explicitly mentions that the selection of the method for defining transfer prices shall always aim to finding the best possible method regarding the circumstances of each specific case. Such process shall take into account strengths and weaknesses of the methods recognized by the OECD, suitability of a method in relation to the nature of a controlled transaction, selected with help of functional analysis, accessibility of reliable information necessary for application of the selected method and the degree of comparability of controlled and also uncontrolled transactions. The transactional net margin method (TNMM) seems to be the most suitable method for defining the transfer price; it assesses adhering to the arm's length principle by testing net profit margin reasonability in relation to overall costs; in our specific case study, the profit

margin is 4%. If the cost-effectiveness of overall costs of potentially comparable enterprises oscillates around 4%, the transfer price of enterprise B is in accordance with market conditions and we may conclude that the enterprise respects the requirements of the arm's length principle.

Net cost-effectiveness is defined as:

$$\text{Profit/loss from operating activities or EBIT} / \text{operating costs} \times 100 \quad (1)$$

$$\text{Operating costs} = \text{costs of goods sold} + \text{other operating costs} \quad (2)$$

or

$$\text{Operating costs} = \text{operating income} - \text{EBIT} \quad (3)$$

When defining the margin range it is necessary to consider the use of statistical tools in order to eliminate comparability errors. In our case, we would apply interquartile range which is defined as the range between the 25th (lower quartile) and 75th (upper quartile) percentiles. For the selected, potentially comparable subjects, it is necessary to define net margin in the form of profitability of costs, such as follows in Table 1

Table 1. Profitability of costs

Potentially comparable enterprises	Profitability of costs in % (Formula 1 and 3)		
	Year I	Year II	Year III
Enterprise I	3,3	4,7	10,16
Enterprise II	-3,62	3,6	13,34
Enterprise III	3,38	-15,64	11,7
Enterprise IV	11,28	10,08	9,92
Enterprise V	16,18	15,6	3,96
Enterprise VI	10,44	-0,16	15,5
Enterprise VII	19,94	27,8	25,74

Source: Own Processing

Then, the profitability range is expressed. There are several options for the expression:

- A.) Interquartile range is calculated (IQR) for each year of observation and then the values are compared.

Table 2. Inter-quartile Range (IQR)

Inter-quartile Range (IQR) – Method					
Year	Quartile 0 (Minimum)	Lower Quartile (Quartile 1)	Median	Upper Quartile (Quartile 3)	Quartile 4 (Maximum)
I	-3,62	3,34	10,44	13,74	19,94
II	-15,64	1,72	4,7	12,84	27,8
III	3,96	10,04	11,7	14,42	25,74

Source: Own Processing

However, it often happens that the results in the individual years differ. Because of that, it is recommended to calculate mean values for the monitored years (see Method B or, in case of small number of samples, Method C).

- B.) Mean values for businesses in the monitored period is calculated; then, results of specific enterprise for the monitored period are calculated, and IQR is defined based on the calculations. In our case, the resulting range values are as follows:

Table 3. Average over the period. Average -Method

Profitability of costs in %					
Average over the period	Quartile 0 (Minimum)	Lower Quartile (Quartile 1)	Median	Upper Quartile (Quartile 3)	Quartile 4 (Maximum)
	-0,18	5,24	8,6	11,16	24,5
Inter-quartile Range (IQR) 2,62 - 5,58 %					

Source: Own Processing

- C.) So-called pooling, where all profitability values for potentially comparable subjects for the monitored years are pooled and then, IQR is defined – this method is proper especially at the small number of samples.

Table 4. Pooling. Pooling-Method

Profitability of costs in %					
Period	Quartile 0 (Minimum)	Lower Quartile (Quartile 1)	Median	Upper Quartile (Quartile 3)	Quartile 4 (Maximum)
I - III	-15,64	3,6	10,16	15,5	27,8
Inter-quartile Range (IQR) 1,8 - 7,75 %					

Source: Own Processing

Within the controlled transaction, enterprise B has defined the transfer price as TNMM 4% to costs. As it can be seen in the ranges, calculation methods significantly affect the final position. In case of the method A, comparison of the final margins would

lead to the question how to evaluate the year III, when the applied 4% profit margin falls below the interquartile range, but it is still in the range of maximum and minimum values. In case of the method B, the position towards the transfer price policy would be positive; i.e. the arm's length principle would be respected, same as in the case of the method C.

Another option, not presented in the paper, is calculation of mean values for the monitored years, for all potentially comparable subjects, and identification of IQR based on the mean values.

3 Conclusions and policy implications

The conclusions for comparability analysis methodology and definition of transfer prices in accordance with the arm's length principle can be summarised as follows:

1. Prices and conditions obtained as comparability analysis results might not always be identical with the „market price“;
2. Comparison is an essence of transfer pricing; without comparison, the application of the arm's length principle is problematic;
3. With no comparison, the transfer pricing documentation can only provide presumptions for application of transfer pricing rules, and with help of proper argumentation, it is only possible to approximate to the arm's length principle;
4. Transfer pricing methods are not only mathematic calculations of transfer prices, but they also include comparison of the used prices and conditions to prices and conditions applied between unrelated parties;
5. Improper or inaccurate procedure of comparability analysis can lead to results which are unreliable and insufficiently relevant in relation to evaluation of the arm's length principle application;
6. Comparability analysis results are mostly in the form of a range of values, not a single value. While sticking to the comparability analysis methodology, the whole range of transfer price (range of profitability indicators) represents acceptable values from the perspective of the arm's length principle;
7. The use of statistical methods shall occur only in order to improve the reliability of values in range of transfer prices; in case of sufficient reliability of data, the use of statistical methods might not be inevitable. Even the slightest differences in the range values serving to assess the necessity to adjust the tax base, could cause significant differences in the ultimate tax obligation in case of large amounts of transactions. Therefore, the definition of the range values is a key taxation-related issue in the whole question of transfer pricing.

Acknowledgement

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Act 595/2003 Coll. on Income Tax as later amended

Act 18/1996 Coll. on Prices as amended.

DOES PENSION SYSTEMS HAVE FUTURE?

Raman Herasimau

University of Economics in Bratislava
 Faculty of National Economy
 Dolnozemska cesta 1 Bratislava, 852 35 Slovak Republic
 raman.herasimau@euba.sk

Abstract. Globalization, regional integrations, different unions of countries have great influence on economies of their members and other countries beyond them, pension system is not an exception. But why pension system is more important than e.g. monetary police or tax police, why we should look at social system and pension system in particular through the glass of risks and potential problems? All these questions we will discuss. The aim of this article is to give answer for the question: Does the pension system has future due to it faces with lot number of problems.

Keywords: Funded system, PAYG, pension models, pension system, scope of government, social security.

JEL Classification: H11, H55, H75, N33, N34

1 Introduction

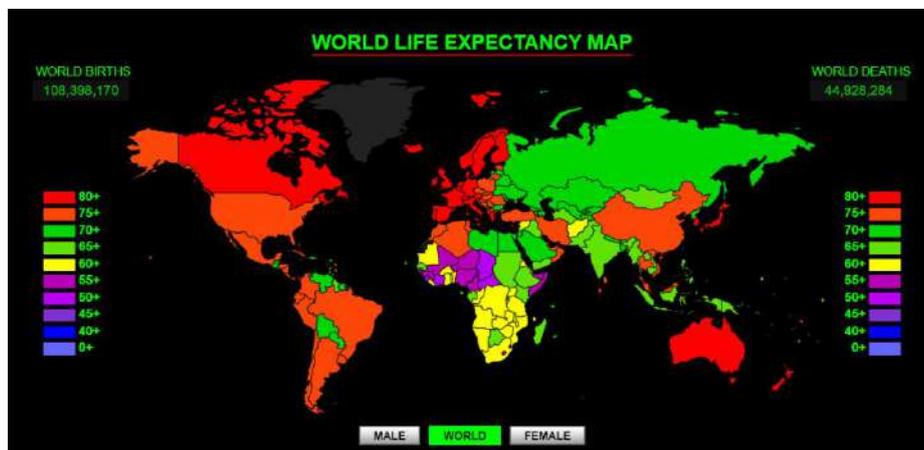
In all times pension system was an instrument of prevention poverty in old ages. It takes roots from Ancient Roma when warriors after 20 years duty received land and lump-sum as a pension. During the time this “benefit” became part of social security of population in Europe and USA. Until the end of 20th century when world population grew pension system commonly was solidarity (pay-as-you-go) and it needn’t had any changes.

Today we see absolutely another situation: population aging, enhance of lifespan, falling of fertility, financial crisis, etc., all these challenges places a serious burden to pension system. This article is divided to two main parts. First, breathily we will look at population situation in the world and in Europe, to the second part belongs sustainability of pension system, we will look on it through different models. The author found out that are: a) in global meaning pension system is the great source of investments, the political weapon and the source of social stability of a country, b) from private point of view, individual savings is still the part of common system and individual savings are not isolated from whole system, c) sustainability of pension system is under the threat. In the end we summarize and give the answer for our question.

2 Current demographical situation

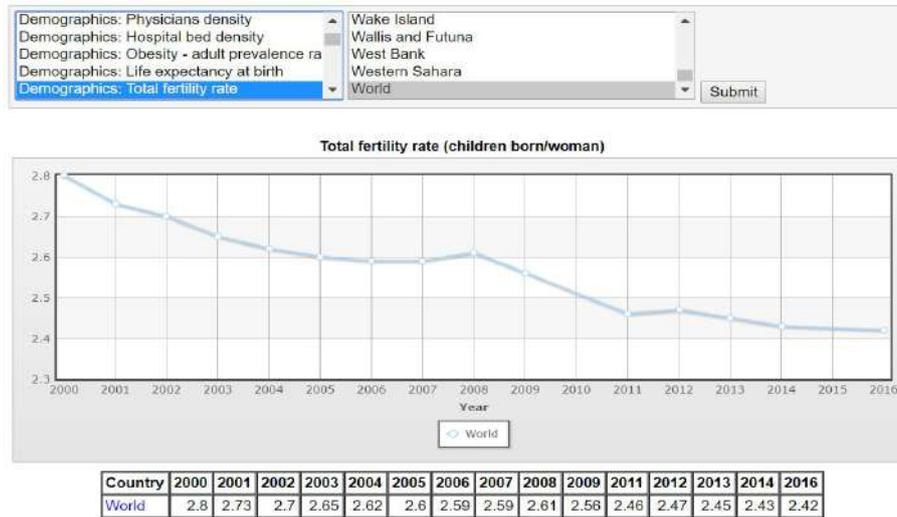
Today most of countries faced with the problem of ageing population, and according to UN's report this process will continue in future 50 years UN World population ageing (2015), so decline of population, decline of fertility and growth of lifespan creates a great challenge to future labor productivity, unemployment rate, modern and future social security system including pension system as it part.

According to UN the average life expectancy in the periods of 5 years are the following: 1990-1995 – 65 years; 2010-2015 – 71; 2045-2050 – 77; 2095-2100 – 83 (World population prospect 2017). Current life expectancy LeDuc Media is shown on the infographic 1. From these data follows that there is a great burden to pension system of developed and developing countries, it's mean that social security and provision must be the main issue to solve for economists.



Infographic 1. World life expectancy map. *Source: UN. (2015). World populating ageing. Report.*

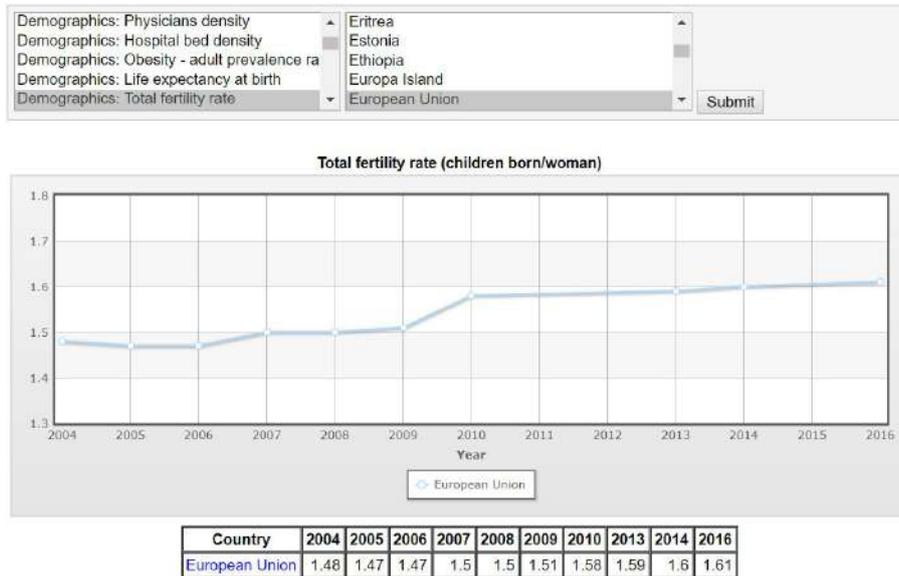
In a counterweight, the world fertility rate is decreasing. As we can see on the Infographic 2 from the year 2000 to 2016 fertility rate decreased from 2.8 to 2.42 or to 13.57%.



Infographic 2 World total fertility rate. *Source. [4]*

At the same time if we look at the fertility rate of EU it is less than the natural level of population reproduction (Infographic 3). From 2004 to 2016 the fertility rate increased only to 8.78%. So this problem has global character and in the framework of separate region e.g. EU there are two possible solutions of the problem: first is increasing in children birth and the second one is increasing of immigrants outside from EU [5], because the crisis of the pension system is a demographic crisis (5, Hans-Werner Sinn).

Breathily looked at the situation we should understand that turn around world fertility not just difficult process but will take much time. In this case, individuals should protect from poverty in retirement by themselves.



Infographic 3. EU total fertility rate. *Source.* 4. <https://www.indexmundi.com/g/g.aspx?v=31&c=xx&l=en>

3 Sustainability of pension systems and main controversial questions

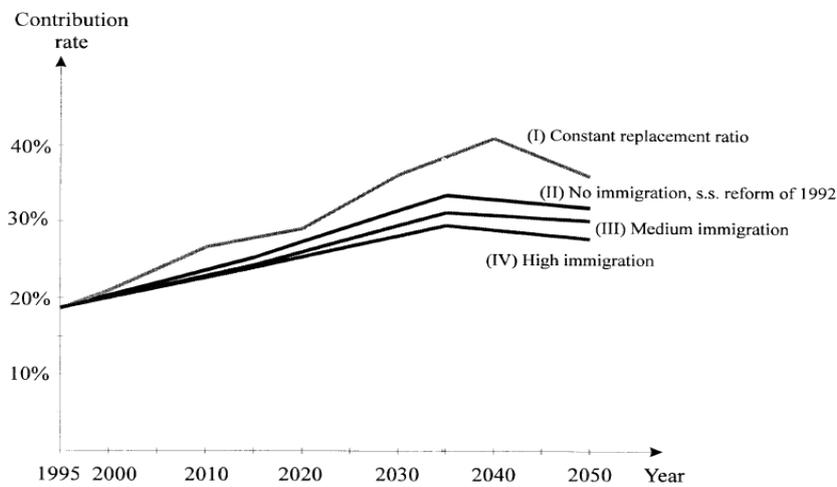
In the past there were disputes about which type of pension system better to use PAYG or Funded, today most economists agree that the best variant is mixed pension system but still there are convictions that PAYG worse than Funded one. However, there are two main problems: a) aging of population and b) low fertility rate.

The “aging world” creates problems for the distribution and accumulative pension systems. However, it is important to understand that aging itself - the longest life expectancy of people - is not the main problem. In fact, if longevity were the only demographic change underway, there would be no fundamental problems in developing a pension policy. Instead, there would be one obvious, though sometimes politically difficult decision. As longevity increases, in conditions of a stable birth rate, a proportional increase in the retirement age (that is, an increase in which the ratio of the adult working-age and retirement age remains stable) allows you to balance the distributive pension system. In this case, there is no need to raise the rates of contributions or to reduce pensions relative to average incomes. A much more fundamental problem is the decline in fertility. Throughout the twentieth century, distributive pension systems operated, in a sense, according to “Ponzi schemes” or pyramid schemes: in order to mathematically equalize the amount of pension contributions and paid pensions, each next link in the chain, the next generation, must be more numerous than the previous. But the age pyramids have come to an end. This is good for global environmental sustainability, but it

creates serious problems for pension systems. The severity of the demographic problem for pension systems is directly proportional to the birth rate or, more precisely, the combined birth rate and permanent immigration (immigrants, from the standpoint of the developer of the pension system, are functionally equivalent to new citizens who, on average, are more than twenty years old at birth) (Ader Turner 2006).

There are two main possibilities to solve this problem: we can increase fertility rate or we can increase number of immigrants from without. Hans-Werner Sinn (1997) analyzed how will change contribution rate in different situations on the example of Germany.

The development of the pension contribution rate in Germany under alternative immigration scenarios



Source: Besseling/Zeeuw (1993, tab. 3.2), Bonin/Raffelhüsch/Walliser (1997, tab.1), and own calculations.
Note: (I) Constant replacement ratio, no immigration. (II) No immigration and measures to reduce the replacement rate enacted in 1992. (III) Like (II), but medium immigration of 100.000 ethnic Germans per year which will decline to zero until 2011. Steady inflow of 200.000 other migrants per year. (IV) Like (II), but high immigration scenario: 300.000 immigrants every year from 1996 to 2012. From 2013, 620.000 immigrants per year.

Fig. 1. Source: 5. Sinn Hans-Werner (1997).

Today in Germany contribution ratio is 18,7% to state pension system and from 4 to 7% to second and third pillars, so we can say about approximately 22,7 – 27,5% it is match with 3rd scenario (German Council of Economic Experts. Pension provision 2017).

Also if we look at immigration statistics we can surely say that Germany moving to 4th scenario, because according to Destatis in 2016 came 500 thousand people and in 2017 – 416 thousand people. But there is the open question about how quick these people started to make contributions to pension system and what amount Germany will spend for them?

Different countries try to solve problems connected with pension system sustainability in a different ways and with creating different pension models. The complexity

of optimal pension policy should caution us against believing that a similar set of recommendations would be appropriate in countries ranging from Argentina to Azerbaijan, from China to Costa Rica, from Sierra Leone to Sweden. In response to the question (Orszag P.R., Stiglitz J.E. 1999). The three pillar doctrine was created in 1994 (Leimgruber M. 2012), but in Sweden it had been existing from 1913 (Hagen J. 2016), so today we can blend different combinations of these three pillars. But some economists point out four pillars: zero pillar, first, second and third (Robert Holzmann 2013). In fact zero pillar it's a social pension which has every person who don't have rights for other type of pension (old-age, disability etc.). This type of pension needed for prevention poverty, but also we can say that it has the same problem as the "basic income", because it first of all create additional burden to pension system and the second –doesn't help solve low level of live. That's why in many countries zero pillar is mean-tested, it helps to decrease burden through the limit number of recipients. For the author's opinion we can't call it "pillar" for the next reasons: 1) Almost all countries pay this social guaranty payment not from pension fund but from budget, 2) the number of recipients are very small, otherwise it would be economical collapse of the country or region, 3) this social payment can't be redistributed between generations, because we can't predict number of poor people and also, what is more important, recipients didn't be involved in social and economic relationships, we can say that these people have "fell out" from society.

The second pillar is PAYG part of pension. It is always mandatory. In the past it was the only one system, but today it's only part. The main principle of it is that working generation provide with pensions retires. Financial resources of PAYG part accumulated in non-budget fund and redistributed among retires. Due to the increasing of life-expectancy, decreasing of working generation and fertility rate, this part of pension system was transformed and today there is not pure redistribution component but quasi funded. The most important novation was made in Sweden – it's NDC (non-financial defined contribution). The rate of return in the NDC is determined by the per capita wage growth. The NDC was designed to bring stability into the pension system. There are several mechanisms for that. The first one links with life expectancy through dividing the person's balance of notional account by an annuity divisor. If life expectancy continues to increase, future cohorts will receive less monthly pension, because earned rights will distributed across more years. The second mechanism is automatic stabilizer that abandons indexation when financial stability of the system under threat. Third pillar according to Holzmann is combination of occupational and voluntary pensions. To motivate voluntary participation, countries have traditionally used favorable tax regimes with limited success and questionable distributive effects. Increasingly countries across all income levels are using ex ante subsidies in the form of matching contributions and/or other nudging devices and advocacy, particularly for informal workers.

If we talk about suitability we should look at PAYG and Funded system. Hans-Werner Sinn (2000) shows that the PAYGO pension system is not, in its essence, an inefficient insurance device that absorbs economic resources but a zero-sum game between the generations. In present value terms, there is nothing to be gained from a transition to a funded system even though the latter offers a permanently higher rate of return. The sum of the implicit and explicit tax burdens that result from the need to respect the

existing pension claims is the same under all systems and transition strategies. This statement had to be qualified in the presence of capital income taxation, risk premium and a consideration of an endogenous labor leisure choice, but nevertheless these modifications were seen not to lend any particular support to the transition from a PAYGO system to a funded system. The arguably 'true' reason relates to an extended view of burden smoothing when both the tax implicit in the PAYGO system and the cost of child rearing is taken into account. In the presence of the demographic crisis, burden smoothing implies partial funding: where human capital is lacking, and to the extent that it is, real capital could be used to fill the gap.

Holzmann formulate the same question like: will Bismarckian systems with their mandated and often high contribution rates survive in countries with high levels of labor market informality, and what happens after their marginalization or, perhaps, demise? Holzmann says that if social pension provision would move to tax on formal work and may create an intensive for individuals to take informal jobs or move into self-employment while they build up their own retirement provisions (e.g. businesses, houses, financial assets, etc.), knowing that the "safety net" or "floor" will be there for them if everything else fails. If confirmed, this may risk sounding the death knell of Bismarckian systems in many low- and middle-income countries. But what would a future retirement income scheme look like: only basic mandatory provisions plus unstructured voluntary retirement provisions? Or innovative new schemes in which basic provisions are also based on individual accounts funded across the life cycle by government and augmented by individual savings supplements of unknown design? In the absence of clear answers, this question calls for much greater attention by researchers and policy-makers.

In counterweight, we can say that Bismarckian system assume preservation of individual's income, but not just getting social minimum, according to such logic working Beverigian model, that state provide only social minimum and for other part of pension is responsible individual. Orszag, Stiglitz in there working paper discussed this question in the frame of three sections: macroeconomy, microeconomy and political economy (Orszag P.R., Stiglitz J.E. 1999). And made the following conclusion: Underfunded public pension systems represent a potential threat to the fiscal soundness and, more broadly, economic stability of many developing countries. The World Bank's study, *Averting the Old Age Crisis*, provided an invaluable service in drawing attention to this problem and in discussing specific policy changes to address the issue. Unfortunately, as often happens, the suggestions have come to be viewed narrowly focusing on a second pillar limited to a private, non-redistributive, defined contribution pension plan. Was shown that most of the arguments in favor of this particular reform are based on a set of myths that are often not substantiated in either theory or practice. A move toward privately managed defined contribution pensions may or may not have an adverse effect on savings, welfare, labor supply, or the fiscal balance. Authors identified a number of factors that affect the outcome in any specific country. In developing economies, there is not any presumption in favor of the "conventional wisdom" a privately managed, defined contribution system. Less developed countries usually have less developed capital markets, with less informed investors and less regulatory capacity, making the scope for potential abuse all the greater. Moreover, the presence of greater volatility

and the absence of many types of financial markets makes many kinds of insurance provided by traditional defined benefit programs all the more valuable. The debate over pension reform would benefit substantially from a more expansive view of the optimal second pillar, which should incorporate well-designed public defined benefit plans. A privately managed second pillar is not always optimal. A more expansive perspective would allow policy-makers to weigh appropriately all the tradeoffs they face, including private vs. public systems; prefunding vs. not prefunding; diversifying vs. not diversifying; and defined contribution vs. defined benefit pension plans.¹

If twenty years ago question about form of pension system was the main, today gaining strength and importance problem of fertility rate and immigration. As we said above, there are two ways for improving situation: immigrants or increasing fertility rate.

Holger Bonin, Bernd Raffelhüschen and Jan Walliser in their research found out that the overall fiscal contribution of immigrants is positive if they resemble current migrant residents in their economic characteristics. Therefore, immigration can decrease the fiscal burden of future resident generations. Residents, natives' fiscal gain from admitting labor migration is potentially large. If the aggregate net payments made by the immigrant population are distributed evenly among future born natives, their net tax burden falls by approximately 30 percent, assuming a constant annual immigrant inflow in the magnitude of 0.25 percent of the initial resident population, and by almost 45 percent in the high migration case. The positive fiscal impact of immigration stems from two sources. Firstly, due to the immigrants' favorable age composition, their average payment to the public sector is positive, even when taking into account additional government consumption induced by migrants. Secondly, immigration raises the cohort size of future born native generations who share in the additional tax burden required to meet the intertemporal public budget constraint. Both the fiscal and the demographic impulse account for about one half of the overall positive impact. But only with immigrants couldn't be solved intertemporal generational balance and the second problem that efficiency from immigrants decrease extremely if assimilation of prospective immigrants is slow (Holger Bonin, Bernd Raffelhüschen and Jan Walliser. 2000). In this case, we should increase fertility rate, but how we can do it, the last 25 years it extremely has fallen down? A. Cigno says that fertility will consequently be higher if, in addition to altruistic pleasure, children bring tangible rewards – in other words, if bringing a person into the world is a good investment, as well as an act of love. Explanations of reproduction and transfer behavior based entirely on the latter do not appear to fit the facts (Alessandro Cigno. 2007). In developing countries where young children can be made to work, part of the reward for having a child may come rather early, in the form of the child's net contribution to family income. In developed countries, young children do not usually make any contribution to family income. But most grown-up children provide their elderly parents with personal services, and a few also with material support. Since, in developed countries, the old are relatively well provided with

¹ We should mention that working paper “Rethinking of pension reform: ten myths about social security system” mostly focus not at the pure PAYG system (redistribution) but the role of the state, as a fund for accumulating, investing and distribute financial resources.

money through either personal saving or the pension system, and given that the market does not provide perfect substitutes for the services of their own children, the money-equivalent of the utility that they derive from such services (i.e., the amount of money that they would be willing to pay for them) is likely to be even higher than in developing countries.

One thing a government can do, if it wants to get rid of the undesirable effects of a public pension system, is get rid of the system (or cut it back drastically, leaving in place only a low safety net). That would restore the incentive to have children, and invest in them. But it would also reduce the incentive to save. Could this be countered by tax inducements to buy into private pension plans? Since the tax advantages induce a substitution of pension plans for other forms of voluntary saving, there will be an overall increase only if the substitution effect is dominated by the income effect. But the latter will in any case be compensated away if the government raises the income tax rate to recover lost revenue. An alternative to cutting the public pension system, or cutting it too drastically, is to subsidize fertility. Cash benefits and tax allowances for families with children are present almost universally. Fertility-related benefits are present in some pension systems. Examples of this are the *majoration de durée d'assurance pour enfants* in the French Régime Général, and the Swedish *extrapension för barn*. In 1986, the German government started crediting parents who withdraw from the labor market to look after a child with a notional pension contribution, *Kindererziehungszeiten*, originally set at 75 percent of average earnings, for up to one year. Later, this notional contribution was raised to 100 percent of average earnings, and extended to three years. Since 1996, however, the condition that the parent should actually give up work in order to qualify for the benefit has been removed, and *Kindererziehungszeiten* has become a fertility related pension benefit just like the French and Swedish ones. The only difference between child benefits as commonly understood, and fertility-related pension benefits, is that the former are paid much earlier, and are less uncertain, than the latter. Given imperfect credit and insurance markets, one euro in the form of conventional child benefits is thus likely to elicit a stronger fertility response than the promise of a fertility-related pension benefit with a present value of one euro. Irrespective of when they are paid, however, fertility-related benefits induce parents to substitute quantity for quality – in other words, to have more children, and spend less money or time on each of them. This may be countered using education subsidies. Since both kinds of subsidy cost taxpayer's money, however, using them together is an expensive way to foster fertility and human capital formation. In fact, we can say that main idea is to seriously decrease or even send a signal of significant decrease income from pension system for increasing the fertility rate. Also under this system would be sense to have more children in shorter time, for time economy and possibility back to work.

From the economic and mathematic point of view this suggestion have the right to life, but from social and especially from political it would be very difficult to implement such scheme.

4 Conclusion and policy implications

The 21st century is the period of great problems for pension system. As we see population aging, low fertility, financial crisis destroy social security system. Every model has its own advantages and disadvantages, economists and policymakers try to solve current problems through changing retirement age or tax deductibles, but in fact forget about real problems like low fertility rate. Even with high level of immigration every single region doesn't improve common world situation. Immigration from poor regions to developed won't increase human potential but for one hundred percent increase budget expenses.

Economists suggest different models of pension system with different number of pillars, but as we studied it is impossible do without enough members in it, even if we try make individual savings outside the system we will face with decreasing of return of capital due to falling of human capital. In this case one is increasing of fertility rate. Quite radical suggestion gave Cigno (2007). Main idea is that people should look at the children not just from altruistic point of view but from investment. Thus, we'll substitute one source of investment to another one, increase fertility rate and improve demographical situation.

Answering the main question of the topic we can say – yes pension system has future but in case of holding several main conditions: a) fertility rate shouldn't be less than the natural reproduction level, b) growing retirement age according to increase in lifespan, c) financial resources of pension system should be highly diversified, d) social pensions should be mostly mean-tested. Execution of these conditions help not only hold pension system on zero-level but improve it.

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IDENTIFICATION OF KNOWLEDGE MANAGEMENT IMPLEMENTATION BARRIERS AT SLOVAK HIGHER EDUCATION INSTITUTIONS

Ivan Hlavatý

University of Economics in Bratislava
Faculty of Commerce, Department of Business Informatics
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
ivan.hlavaty@euba.sk

Abstract. Higher Education Institutions (HEIs) are complex institutions, with diverse history, culture, resources and missions. They are expected to be the leaders in knowledge generation and dissemination in the new economy era. The intensified competition from HEIs from other EU countries calls for transformations of HEIs that include pursuing new management and marketing approaches, and implementation of knowledge management practices could provide HEIs with the needed improvements to their functions. The area of knowledge management is a well-researched at business level, but it was mostly ignored when dealing with the specifics of its implementation at HEIs. Because of that, the area is comparatively under researched. Academic aspects of HEIs' knowledge management have been prevalent in the scientific discourse, with the organizational view lacking behind. Focus of this paper are the barriers of knowledge management implementation at Slovak HEIs, identification of the most important ones, as well as ascertaining if different categories of HEIs – public, private and state, are affected by the same barriers. Primary data was collected in semi-structured interviews with representatives of participating HEIs. Based on analysis of these interviews, we identified universal, as well as specific barriers for different categories of HEIs.

Keywords: knowledge management, Higher Education Institutions, barriers of implementation

JEL Classification: M1, M54, D83

1 Introduction

Quality in the higher education system is essential for cultural and economic growth, considering that the mission of universities recognizes the achievement of both institutional and social objectives, and research provides the basis for the systematic creation of knowledge and the development of human capital (Di Pietro et al., 2012). Higher education in Slovakia attained a significant growth in the last 30 years, in terms of number of universities, faculties and students which have increased many times from the amount in 1989 (as percentage of population).

Higher education institutions (HEIs) have traditionally had two main roles: creating knowledge and disseminating knowledge. Research has been the main method for creating knowledge and teaching has been the main method for disseminating knowledge. In today's rapidly-changing economic environment, the traditional role of universities as providers of knowledge is greatly challenged. Education institutions must recognize and respond to their changing role in a knowledge-based society. They need to be consciously and explicitly managing the processes associated with the creation of their knowledge assets, and to recognize the value of their intellectual capital to their continuing role in society (Rowley, 2000). On the other hand, students no longer are satisfied with one phase education. Their needs are now increasingly seen to be continuous throughout a working life and embrace personal growth at all stages of an individual's life. Modern students will require regular updating of their knowledge, skills and competences. In this context, universities will be required to expand flexibility and innovative learning and teaching.

The management of an organization's knowledge has become one of the most important strategic vehicles to an organization's sustainable competitive advantage. This is evident from current business reports that reveal increased investments in intangible assets such as knowledge, as opposed to tangible assets like plants and equipment, "indicating a major shift toward a knowledge-based economy" (Hao et al., 2011).

Knowledge management (KM) at business level has been widely discussed over the past decade, including its benefits, enablers, barriers, risks etc. In relation to HEIs, the area of knowledge management is comparatively under researched. The available research mainly deals with the impact of knowledge sharing on the creation of project teams and increased quality of research outputs. Organizational view of successful KM implementation at HEIs is researched to an even lesser degree.

At the same time, the quality of academic outputs and/or products is greatly affected by KM (Ghabban, Selamat, & Ibrahim, 2018; Draghici, Baban, Gogan, & Ivascu, 2015). Exchange and use of knowledge by teachers, researchers, and supporting staff positively influence the quality of the two basic products of HEIs, namely education and research. In terms of education, students will gain recent knowledge in their field of study due to updated curriculums, educational methods, and top-level lecturers.

2 Theoretical background

Similar to other organizations, implementing KM in HEIs can have various positive impacts. Some of these impacts include facilitating a collaborative environment, improving organizational culture, increasing satisfaction of employees, making more informed decisions and increasing efficiency of management processes. These aspects of university KM are regarded as organizational or non-academic, and they establish the foundations for sustainable competitive advantage (de Guimarães et al., 2018; Lee et al., 2016).

There is a growing acknowledgement that KM can allow HEIs to evolve more smoothly in a highly interactive and dynamic learning environment (Robson et al., 2003). The functions of higher education can generally be summarized in three types:

- creation of knowledge (learning),
- diffusion of knowledge (teaching) and
- use of knowledge (learning, academic management services).

These functions are all directly related to KM. Throughout the KM processes, universities could be seen as the main "centers of innovative knowledge". Table 1 presents a summary of selected previously carried-out studies regarding KM in educational institutions.

Table 1. Selected studies regarding knowledge management in educational institutions. Source: modified and expanded by author, based on Asma, K. and Abdellatif, M., 2016, 4-5

Researchers	Findings
Coukos-Semmel, 2002	The strategies of KM in higher education environments: leadership, technology, culture and evaluation.
Ramachandran et al., 2009	To investigate and compare the practices of KM processes, which have been grounded in the KM literature between public and private HEIs.
Sharma, 2012	The results indicate that five attributes — i.e. knowledge acquisition, knowledge dissemination, leadership, culture and technology — are important dimensions of KM orientation in engineering institutions.
Brewer and Brewer, 2010	The authors examined the relationship between KM, human resource management, and typical knowledge learning goals of an accredited business education program. A theoretical model is presented, illustrating how these relationships might overlap. The model proposes a linkage between KM tenets, human resource management activities in organizations, and Bloom's Revised Taxonomy for planning and evaluating educational goals.
Bhusry and Ranjan, 2012	Emphasize the need for KM in the teaching-learning process in technical educational institutions in India, and to assert the impact of information technology (IT)-based KM intervention in the teaching-learning process.
Tan and Noor, 2013	This research fills the impact of KM enablers (trust, knowledge self-efficacy, reciprocal benefits, top management support, organizational rewards, organizational culture, KM system infrastructure and KM system quality, openness in communication, and face-to-face interactive communication) on knowledge sharing that supports research collaboration by faculty members.
Demchig, 2015	This study is to conduct an assessment of KM capability and to determine the current position of the knowledge management maturity of one of the higher education institutions.
Hu et al, 2019	Research focuses on developing a UNISON framework for managing knowledge for university–industry collaboration with a plan-do-check-act (PDCA) improvement circle.

Considering the results of these studies, it was noted that most of the proposed models did not investigate the relationship between the three elements of knowledge management systems (inputs, process and outputs). Of the few survey studies that examine relationships between knowledge management and other factors, only a few articles theoretically or empirically investigate the relationship between knowledge management and universities performance. None of the studies takes a closer look at the barriers of knowledge management implementation at institutions of higher learning.

2.1 Barriers of knowledge management implementation

Barriers are factors that have a negative effect on knowledge management and the likelihood of its being beneficial. The literature on KM identifies a wide range of barriers, such as organizational culture and structure, technology, rewards and incentives, leadership, industry–academia linkages, human resources and research repositories.

Mason and Pauleen (2003) have classified the KM barriers into three categories: culture, leadership and education (awareness, vision and understanding of KM). The most important aspect of their classification is that 92% of the issues related to KM barriers are internal organizational issues. Organizational culture, leadership, lack of understanding, and effort versus reward are all under the direct control of top management. The other 8% includes technology (7%) and knowledge complexity (1%). They also suggest that the role of technology in the KM implementation cannot be overlooked.

Singh et al. (2006) have reported the various barriers hindering the success of KM in the organizations. The two main barriers identified were KM concepts not well understood and lack of top management's commitment. Two other important barriers identified were high staff defection, and lack of organizational culture. The other reported barriers in the success of KM in the organization include the lack of ownership of problem, less use of IT, staff retirement, a lack of structure and methodology, high expenses required in maintaining the expert network, emphasis on individuals than rather teams, a lack of contact among employees, a lack of documentation, poor financial resources, and a lack of time. Also, some of the barriers which have been found to be of lesser importance are non-standardization of key processes, a poor incentive system, difficulty in measuring return on investment (ROI), the labor-intensive nature of the task, difficulty in retaining support with increased usage, and lack of non-financial resources.

There have been many researches to find out enablers and barriers to enhance knowledge management as well as to prevent from making repetitive mistakes (Ajmal et al., 2010; Chua and Lam, 2005). However, it may be difficult to draw a line between successful factors (i.e. enablers, or enabling factors), and failure factors (i.e. barriers, interfering factors) of knowledge management (Ajmal et al., 2010). The reasons for difficulties in distinction between enablers and barriers may be that while one of factors will play a role as an enabler, it will also influence damaging factors to implement knowledge management. Ajmal et al. (2010) suggest describing these factors as "The influencing factors" or "The affecting factors" reflecting their contradictory characteristics.

Sharma, Singh, Neha (2012) focused on the issues of knowledge sharing. They found, that management policies have the largest impact on motivating knowledge sharing. They developed an interpretive structural model of organization knowledge sharing. At the top of the model is top management's commitment and not understanding knowledge sharing as the main barriers to knowledge sharing. The other issues such as personal motivation and personality concerns are according to them, less of an issue than top management commitment.

Rewards and incentives are seen as key motivators for behaviors. In higher education, the embedded and international reward structure places a high value on evidence of individual achievement in research and scholarship. This poses a challenge for universities who need to ensure that incentives recognize academic's contributions to any knowledge sharing system and fulfil their expectations of positive outcomes of knowledge sharing, both in terms of extrinsic rewards and in terms of the development of relationships. Academics expect their engagement in knowledge sharing to improve and extend their relationships with colleagues, and to offer opportunities for internal promotion and career development in other universities (Fullwood et al., 2013).

Based on the literature review, Kant and Singh (2008) identified 20 barriers that interfere with KM initiatives in organizations. They developed relationships among the identified barriers using ISM and classify these barriers according to their driving and dependence power. These barriers are derived theoretically from various literature sources and discussion. Some barriers are extracted from the work of those who have explored KM in general or have addressed a particular barrier in detail. Although different researchers have used different terminologies to indicate these barriers, they can be represented by generic themes. In addition, they have also been mentioned in the literature with a mixed extent of emphasis and coverage.

1. Lack of top management commitment
2. KM is not well understood
3. Lack of financial resources
4. KM not integrated in business processes
5. Lack of organizational structure
6. Lack of methodology
7. Lack of technological infrastructure
8. Lack of organizational culture
9. Fear of losing personal value if giving up know-how/unwilling to share knowledge
10. Lack of time or priority of users
11. Lack of motivation and reward
12. Lack of employee's commitment
13. Lack of respect and trust among employees
14. Lack of training related to KM initiatives
15. Staff defection
16. Staff retirements
17. Difficulty in codifying tacit knowledge
18. Information overload
19. Lack of ownership of the KM problem
20. Lack of sufficient KM expertise

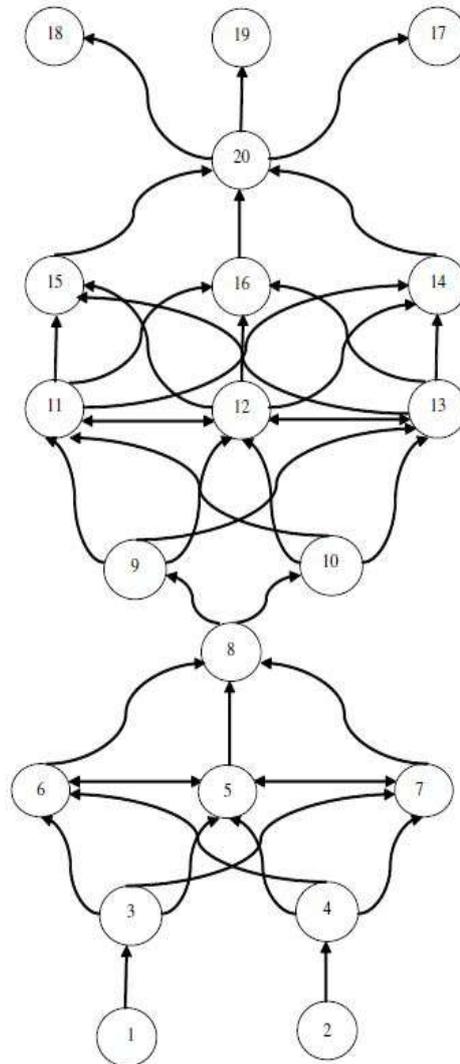


Fig. 1. Relationships among the knowledge management barriers
Source: Kant, R. and Singh, M. D., 2008, p. 301

Knowledge management barriers as shown in Figure 1, are according to Kant and Singh (2008) the major problems of the KM implementation and lack of sufficient KM expertise, might be the root cause for this. Further, staffing changes and lack of training related to KM initiatives multiply the problem of insufficient KM expertise. Lack of motivation and reward, lack of employee commitment, and lack of respect and trust among employees are another factor that increases the problem. Organizational culture plays a primary role in the likelihood that employees will be willing to work together and share their knowledge. If the culture is not supportive, or the reward system favors only individual effort, it may be difficult to get people to work together. Hence, organizational culture is a critical element in determining the success or failure of any KM initiatives.

3 Methodology

The aim of this paper is to identify the main barriers of knowledge management implementation at Slovak HEIs, as well as ascertaining if different categories of HEIs – public, private and state, are affected by the same barriers.

Following the aim, three research questions have been formulated:

- RQ1: What is the Slovak HEIs awareness of knowledge management and its barriers?
- RQ2: What barriers to knowledge management implementation are the most prominent?
- RQ3: Are barriers to knowledge management implementation different for different categories of HEIs - public, private and state?

Data collection was done using semi-structured interviews. The choice to use this type of interview was done because of its ability to tailor the conversation naturally, either by excluding questions that were redundant, or asking follow-up questions when it's necessary.

There were 9 interviews concluded during the months Jun through August of 2019, covering 5 publics, 3 private and 1 state HEI (out of 20 publics, 12 private, 3 state). Foreign HEIs were not included. Participating HEIs were selected from the results of previous research by Miklošik, Hlavatý and Evans (not published yet). A modified Kant's and Singh's (2008) model of KM barriers, was taken as basis for the interview. Interviewees were encouraged to add additional barriers perceived as not covered in it or specific to their category of HEI.

The interviews followed up on previous research conducted via a questionnaire targeting the general awareness of knowledge management and related issues as well as analysis of documents on their websites. Total population sampling was used to select the entities for this part of the research. This type of purposive sampling was used because of the relatively small number of Slovak HEIs. A total of 37 Slovak HEIs were included in the research sample - 20 public, 12 private, 3 state and 2 foreign.

4 Results and discussion

HEIs in Slovakia operate in highly competitive markets. The competition extends outside the boundaries of Slovakia, as Slovak HEIs also compete within HEIs in other EU countries. There are two types of HEIs in Slovakia, namely universities and colleges, with larger organizations consisting of faculties and departments. Regarding ownership, these HEIs are categorized as public, private, state, and foreign. The HEIs develop and offer two main products to their customers, namely a) education, where students represent the customers and b) research results, where a different spectrum of organizations, companies, government etc. form the customer and partner base.

Out of the 37 HEIs participating in the study, 22 declare the need for knowledge management in some for in one of their program documents – bylaws, directives or guidelines. This declaration is found most in documents of public HEIs (85%). Private

and state HEIs are relatively far behind with 33.3% of institutions declaring the need for KM implementation, and foreign HEIs are not mentioning the need at all.

Although many HEIs declare the need for KM, none of the participants in the study had a complex KM solution implemented (some of the HEIs have declared the need for KM solutions for many years, the oldest document found to declare it was from year 2007). Partial solutions of KM best practices have been found implemented at many HEIs, even on those, that don't declare the need for complex KM solutions. Many of those are centered around the area of information technology infrastructure and structure (roles and responsibilities). As shown in Figure 2, the number of areas, that have implemented KM even partially is different at each HEI. The areas, that have the least number of standards implemented are the areas of culture and people (employees).

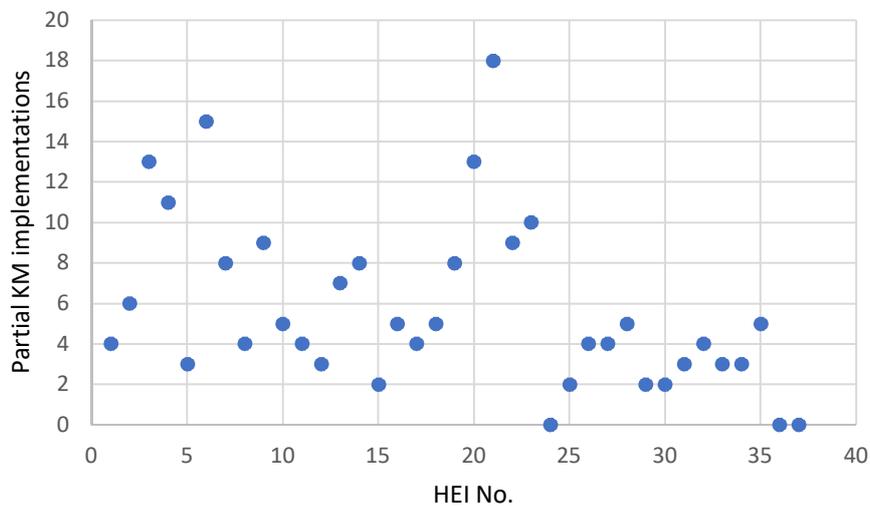


Fig. 2. Relationships among the knowledge management barriers Source: author's research

The data for foreign HEIs could not be obtained, so assessment of partial implementations could not be done

4.1 Aggregated results from the semi-structured interviews

Most of the interviewed HEIs acknowledge the need to implement KM to increase their competitiveness. They are also aware of most of the possible benefits, that such an implementation could have, but all of them argue, that many of the barriers that are to be overcome for complex KM implementation can't be overcome. The main barrier, that is acknowledged by all the interviewees is lack of funding. This barrier is affecting many other related barriers like lack of technological infrastructure, lack of methodology, but it affects many barriers that are employee centered as well, like lack of motivation and rewards, lack of KM training, etc.

Another barrier, that especially public and state HEIs acknowledge is difficulty with codifying tacit knowledge. As tacit knowledge is difficult to transfer to another person by means of writing it down or verbalizing it. It often depends on personal interaction and collides with another barrier - fear of losing personal value if giving up know-how to share the knowledge. This goes hand in hand with lack of motivation and rewards to the employees, which are important barriers acknowledged especially by the private HEIs.

Lack of time or other priorities then KM implementation is another often mentioned barrier, especially by the public and state institutions. It also correlates with arguments of losing staff to retirement and staff defection to either private HEIs or to the business world. This last argument was often joined with reference to above mentioned underfunding. The most prominent barriers identified by the interviews for all the categories of Slovak HEIs are shown in Table 2.

Table 2 Most important barriers of knowledge management implementation at Slovak HEIs.
Source: author's research

Category of HEI		
Public	State	Private
Lack of financial resources	Lack of financial resources	Lack of sufficient KM expertise
Lack of methodology	Lack of technological infrastructure	Lack of financial resources
Lack of technological infrastructure	Difficulty in codifying tacit knowledge	Fear of losing personal value if giving up know-how/unwilling to share knowledge
Difficulty in codifying tacit knowledge	Lack of organizational culture	Lack of motivation and reward
Lack of organizational culture	Lack of sufficient KM expertise	Lack of organizational culture
Lack of time or priority of users	Fear of losing personal value if giving up know-how/unwilling to share knowledge	Lack of ownership of the KM problem

As seen in Table 2, most of the organizations face several barriers, that require attention in order to implement knowledge management successfully. Eliminating the identified barriers provides an organization with sustainable competitive advantage through the continued creation of knowledge while maintaining present knowledge resources and creating an environment in which the knowledge management activities can survive and grow.

5 Conclusions and policy implications

When assessing the KM awareness of Slovak HEIs, we must acknowledge the relatively high level of awareness at the public HEIs (85%). Often, it's not only declarative

awareness, but many institutions actively take steps to improve their KM issues in different areas. The main areas, that are focused on by these institutions are information technology environment and structure (roles and responsibilities). The most overlooked areas were culture (with lack of directives and guidelines for employees as well as other stakeholders) as well as the area of employees (with no motivation, no clear guidelines, etc.). Private and state HEIs are in not only implementation, but acknowledgement of KM importance much behind the public HEIs. Only 33% of them even acknowledge KM importance and declare to try to implement it.

While all three categories of HEIs face many of the same barriers to KM implementation, there are some significant differences as well. Lack of financial resources and lack of organizational culture are barriers, that all the categories of HEIs have in common, with the first one being usually the most relevant barrier. Together with long agreed upon fact about chronic underfunding of Slovak higher education, this is an objective barrier that is hard to overcome for the institutions alone and goes hand in hand with lack of technological infrastructure – another identified barrier mainly at public and state HEIs. Lack of culture, on the other hand, is a barrier that, while it can take long to overcome, can be worked on without the need for additional funding.

The most significant difference between public/state and private HEIs is the acknowledgment of private HEIs, that they lack sufficient KM expertise and lack of ownership of KM. They are also most aware of the problems at the employees' site - fear of losing personal value if they give up know how/unwilling to share knowledge, as well as lack of motivation and reward to do so.

Eliminating the identified barriers would provide organizations with sustainable competitive advantage through the continued creation of knowledge while maintaining present knowledge resources and creating an environment in which the knowledge management activities can survive and grow.

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LEADING PRACTICES IN SUSTAINABLE BANKING

Oprea Ionela PhD.

West University of Timisoara
Doctoral School of the Faculty of Economics and Business Administration
16, J.H. Pestalozzi str.
Timisoara, Postal code: 300115
Romania
oprea.ione@yahoo.ro

Abstract. The deepening interdependences between the economy, society and environment areas led to the emergence of the new banking model meant to support this trend. The banking systems as business and know how models have the ability to trigger the reformation of businesses by nudging them towards sustainability through lending constraints. Moreover, banking systems worldwide are involved in project partnerships with academia and public authorities. As practice shows, sustainable banking contributes to more effective allocation of resources through sustainable investments and the prevention of economic and financial vulnerability. The paper refers to the sustainability of Scandinavian banks that serve as best practice due to the significant policies that enhance not only their durable profitability but also sustainable development at macroeconomic level. The analysis is made against the Baltic countries that, despite their vicinity with Scandinavia) and mutual cultural heritage, present a different state of the matter. The level of nonperforming loans are considered as a proxy for sustainable banking policies since they reflect the ability of the bank to be perform on a long term, without diminishing the quality of its assets. The paper concludes that there is a direct correlation between the sustainable bank profitability and the level of nonperforming loans.

Keywords: sustainable banking, nonperforming loans, sustained banking profitability.

JEL classification: G21, C59, G01

1 Introduction

"Economists will have to do their best to incorporate the realities of finance into macroeconomics...." Paul Krugman (2009), statement that has been proven correct once a causal correlation between the economic and financial crises has been demonstrated. In this context, the reformation of financial systems under the constraints of sustainability is imminent.

Sustainability is a concept with many facets, covering a wide range of economic social and environmental issues. From a banking perspective, it becomes even more complex, since banks, as traditional financial intermediaries, are nowadays challenged to shift their mainstream business paradigm toward a sustainability-oriented one. The question that academics and policymakers raise is whether the traditional banking models meet the challenges of sustainable development that has emerged in the 1980s as an alternative to the mainstream economic growth approach.

The deepening interdependences between the economy, society and environment areas led to the emergence of the new banking model meant to support this trend. The banking systems as business and know how models have the ability to trigger the reformation of businesses by nudging them towards sustainability through lending constraints. Moreover, banking systems worldwide are involved in project partnerships with academia and public authorities. As practice shows, sustainable banking contributes to more effective allocation of resources through sustainable investments and the prevention of economic and financial vulnerability.

Sustainable banking, though not clearly defined, incorporates elements that provide financial capital and risk management products in a manner that supports economic prosperity, a healthy environment and social well-being as argued by Strandberg (2005). Most importantly, though, is how the Environment, Society, Governance (ESG) approach can influence investment decisions on the long run, i.e. risk reduction, durable profits as well as transparency in reporting sustainability related performance goals according to GRI (2006, p.3).

Consequently, banks can treat sustainability issues as an integrated business philosophy, accepting, in their portfolio, only companies that pursue these requirements and/or provide the tools and levers that can contribute to prevent business failures and, consequently, support the decrease of nonperforming loans in the banks' balance sheets.

The paper refers to the sustainability of Scandinavian banks that serve as best practice due to the significant policies that enhance not only their durable profitability but also sustainable development at macroeconomic level. The analysis is made against the Baltic countries that, despite their vicinity with Scandinavia) and mutual cultural heritage, present a different state of the matter. The level of nonperforming loans (NPL) are considered as a proxy for sustainable banking policies since they reflect the ability of the bank to be perform on a long term, without diminishing the quality of its assets.

The paper proceeds as follows: 2. Literature review; 3. Not all that glitter is gold. The case of nonperforming loans; 4. Methodology and data; 5. Results and leading practices in sustainable banking. The remainder of the paper is dedicated to Conclusions and Policy implications.

2 Literature review

Due to the relative novelty of the sustainable banking approach, the normative driven literature is scarce, rather relying on the positive approach and best practice analysis of

emerging banking. The literature cites a number of works that are more and more concerned with sustainability. Though most of them are dedicated to industrial and carbon footprint (D'Amato et al., 2017) one cannot ignore the role of banks in providing the necessary funding to tackle environmental problems, thus leading to a new branch of economics, i.e. green banking. Since this is an emerging topic, academic debates cannot overlook the fact that most authors use different standpoints and defend different paths and policies to deal with sustainability. Starting from Schumpeter's seminal work (1934) that stresses the role of innovation as creative destruction, bank loans can be regarded as premises of sustainability-driven innovation in businesses. Pursuing the same logic, Pagano (1993) suggests that banks can impact economic development by supporting the productivity of investments and the reduction of transaction costs. Schmidheiny and Zorraquín (1996) reflect on the extent banks enhance or hinder sustainability, encourage durable investments and long-term profits or simply declare their support for wellbeing and environment, concluding that the banking system has the ability to stimulate and nudge towards sustainability.

To emphasise the role of the banking sector in promoting sustainable development and for a better understanding of the impact, (Bouma and Jeucken, 1999) separate the endogenous and the exogenous issues, i.e. the integration of environmental and social responsibility in managing the bank's own procedures and the integration of environmental and social approach in designing the bank policies, products and strategies, respectively.

According to Lydenberg (2007), there is an intense debate on the negative externalities induced by the short-term profit maximisation in the financial sector (Tonello, 2006) that leads to market volatility and financial instability with consequences on the society in its entirety.

Literature (Schmidheiny and Zorraquín, 1996; GRI, 2006) also raises the question of financial risks when sustainability indicators are not transparently reported. Related social and environmental risks become also very important given the unrestricted flow of information that may impact on the banks' reputation associated with sustainability.

The banking systems have become, lately, sensitive to sustainability problems. The repeated unfavourable situations they have been confronted with and the contagion that has touched all systems, in the context of the crises, lead to a vote of no confidence, forcing banks to reconsider the traditional business models. Therefore, a sustainability-oriented banking system is mandatory to regain the trust of the community.

Historically, literature refers to the evolution of sustainable banking that range from banks relying on religious ethical principles, cooperative banks addressing the needs of entrepreneurs and the middle class, internal environmentally concerned bank management, banks that manage sustainability-driven and carbon impact risks (Weber, 2013).

Sustainable banking is a business philosophy relying on a complex system of values according to which not only bank shareholders and employees should benefit from the bank profitability, but also the clients and the economy as a whole. Considering the environmental and social aspects of investment decisions, economies can shift towards durable businesses (Imeson and Sim, 2009).

In the aftermath of the 2008 financial crises, the question of credit risk management policies has emerged alongside the impact of nonperforming loans (NPL) on the banking system's stability. Given the role of financial intermediaries in supporting sustainability driven innovation and projects, the information incorporated in various banking products is either helping to mitigate or increase risks. Scholtes and Weensven (2003) consider risks as an ingredient of economic decisions and of financial intermediation, banks being responsible for its amelioration. In this context, NPL should be undoubtedly considered in the credit risk management when sustainability is incorporated in banks' policies (Anagnostopoulos et al., 2018).

One of the most well-known publications in this field is "The dos and don'ts of sustainable banking" authored by Gelder (2006). The book offers a view on the actions that banks can undertake to become internally and externally sustainable.

To evaluate the sustainability of banking decisions two sets of criteria have been developed: a. the Equator principles to evaluate and monitor structural funding using the social and environmental indicators issued by the International Finance Corporation – IFC; b. the criteria of The Sustainable Asset Management Group (SAM).

On the other hand, The Global Alliance of Banking on Values (GABV, 2012) has issued the main principles of sustainable banking:

1. A three folded approach of the banking business (that includes the economy, social and environmental aspects);
2. The main drivers of the banking activity are the needs of the real economy and of the community;
3. Long term relationship with the clients as well as a better understanding of the nature of their business and the risks involved;
4. A long term self-sustained activity and resistance to external shocks;
5. Transparent and inclusive governance;
6. The integration of these principles in the banking culture.

When discussing values-based banking, literature offered disparate opinions concerning the significance of „value” within a corporation (Oladele, 2013), but, in the context of the discussed topic, they can be summarised as the worthiness of the money invested by banks with a long-term impact of society's welfare. Obviously, it exceeds mainstream views concerning shareholders' value and profitability.

Nevertheless, one of the determinants that support and enhance innovation in banking is the quality of the human capital that, eventually, differentiates long term profitability (Cabrita and Bontis, 2008) from the market value of the bank. In view of these trends, traditional banks and financial institutions are being challenged to rethink their business models and how they engage with customers in the environmental and social aspects of their business. It can be argued that banks need to better understand, quantify and even evaluate the risks and opportunities of environment and society to enhance their future value. There is also the possibility for banks to allocate more capital to sustainable sectors and more sustainable business practices.

Against the backdrop induced by the crises, the financial market has finally become aware of the importance and benefits of corporate sustainability for investment (as a result of asset value growth in the long run). This achievement, in turn, has speeded up

the development of the concept of "sustainable banking / green banking". For example, The Bank of India (Pravaka and Bibhu Prasad, 2014) defines comprehensively the term green banking as *an ordinary bank that takes into account all social and environmental factors in order to protect the environment and conserve natural resources and which is based on principles considered ethical and sustainable*.

Bhardwaj and Maholtra (2013) argue that green banking is the effort of financial intermediaries make to industries to reconsider their operational policies and restore the quality of the environment. Also, the green banking concept can be beneficial for the environment, the banking industry and the economy, and will ensure not only a greening of industries but also an asset quality improvement in the future Biswas (2011).

Starting from the multitude and complexity of the benefits outlined above, which incorporate sustainability-oriented management, many initiatives have considered facilitating the adoption of such models. An example of this is the adoption of sustainable development objectives which consists in a set of targets for international development in the future. They are created by the United Nations and promoted as global targets for sustainable development. They have replaced the Millennium Development Goals which expired at the end of 2015 and are based on 17 targets and 169 specific targets for these targets.

3 Not all that glitter is gold. The case of non-performing loans

Nonperforming loans (NPL) represent a challenging issue for banks since they reflect an increased credit risk that should be tackled in order to maintaining a sustainable profitability of the banks.

Overall, the assessment of credit risk is a critical part of the macro-prudential analysis, with the aggregate non-performing loan (NPL) ratio serving as a proxy for the economy-wide probability of default of the banking sector's overall loan exposure. High NPL ratios impact on banks' balance sheets and profitability, slowing down economic growth. Therefore, the factors driving NPL ratios in different EU countries have gained a lot of interest in recent years.

Non-performing loans (NPL) have been constantly and diligently analyzed in the context of the 2007-2008 global financial crises. For example, during the financial turmoil, the NPL to Gross portfolio ratio reached 24% in Lithuania and 16% in Latvia, threatening not only selected banks but also the entire banking system. On the contrary, in Estonia, the NPL ratio was around 5% thus the country was not hit severely by the "bad debt crises" as were the other two Baltic countries.

In Scandinavia, Denmark recorded an increase of the NPL from 0.6% in 2008 to 4.6% in 2013, indicating the largest balance sheet problems among the Scandinavian countries. Sweden, on the other hand, proved to be the most resilient during the financial turmoil since the NPL only doubled. Under these circumstances, international financial institutions, like the ECB and the World Bank (2018) have stressed that a high ratio of NPL is a barrier for the durable effectiveness of the banking industry, that fail to adequately meet the financial needs of businesses and investors.

There are several reasons why different banks go bankrupt, but no doubt, contingency in the assets portfolio and high rate of NPL have contributed to the critical situation of the liquidity of the bank. There were several banks facing problems in Scandinavian and Baltic region; i.e. in 2008, Parex bank in Latvia, Roskilde Bank in Denmark were overtaken by the respective governments after declaring insolvency in order to prevent contagion that could engulf the entire banking system.

Another large bank in Denmark was Amagerbanken that was declared insolvent and overtaken by the competitor's bank. In Lithuania, Snoras and Ūkio bankas have also closed their activities. In earlier decades, Finland and Sweden were heavily hit by the financial crises in late 1990s, but surprisingly it turned out that there were no banks that defaulted following the 2008 global financial crises. There are several articles (Kazys and Arvydas, 2017) that take Swedish and Finnish government restructuring and recovery program in 1990s as an example for dealing with the banking crises. In Sweden, despite the recovery after the severe banking crises two decades ago, the rising real estate prices and possible real estate bubbles put forward the effects of the real estate market on the rising level of non-performing loans.

Figure 1, shows that overall, the appropriate risk management measures and careful investment decisions in the Scandinavian banking systems, led to a decreasing NPL and a sustained level of ROA and ROE after 2008. To be noticed that the regulatory capital risk weighted assets (CRWA) was also increased only slightly, meaning the “cost” of sustainability did not grow significantly, reflecting the adequate quality of the lending portfolio and low credit risk.



Fig. 1. The evolution of NPL and performance indicators of Scandinavian banks. Source: authors' calculations using data from the IMF.

By comparison, in the Baltic countries, there is a significant difference in terms of NPL which is much higher than in the Scandinavian ones, mainly after 2008. In Lithuania, for example, despite the good progress in reducing the level of bad loans, private sector lending has yet to return to positive growth which shows that risk aversion among potential borrowers as well as debt overhang in many households is still significant.

Moreover, in terms of regulatory capital, there are no significant differences between the two regions; however, higher rates are reflected in Baltic countries (Figure 2).

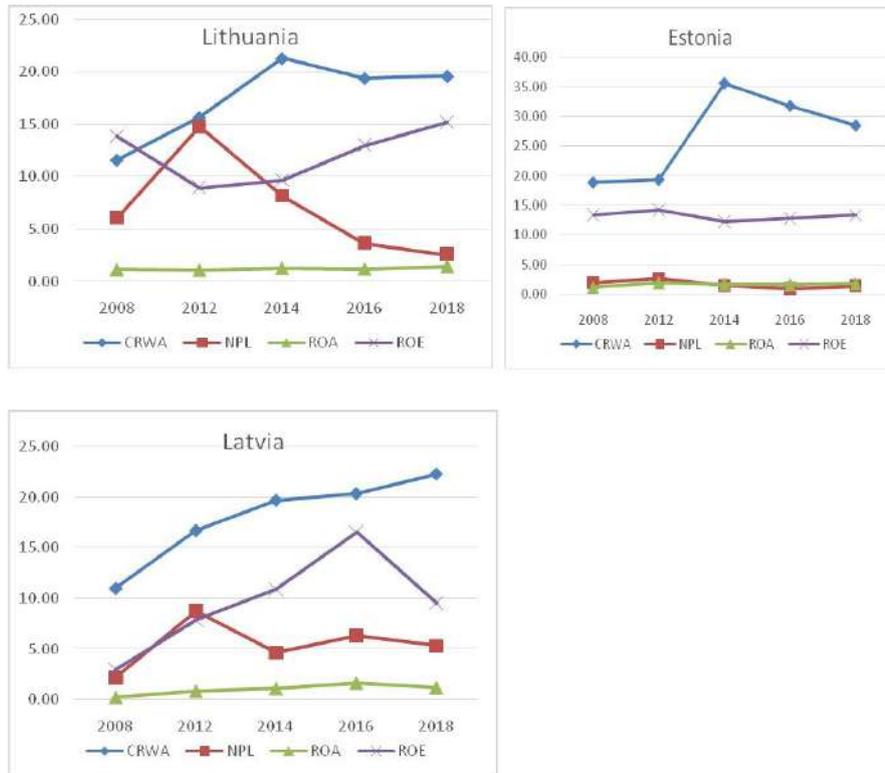


Fig. 2. The evolution of NPL and performance indicators in The Baltic countries. Source:IMF – Financial Soundness Indicators

The fall and restoring the positive levels of performance indicators Figure 2 shows that in the Baltic countries a significant percentage of loans were nonperforming and only became visible in the aftermath of the crises strongly influencing the levels of ROA and ROE. Among these countries, Estonia proved most resilient with a fairly constant value of the indicators. The capital adequacy seems appropriate, counterbalancing.

4 Methodology and data

The hypothesis of the study is that NPL is a significant indicator for banking business sustainability that is strongly correlated with their propensity to support sustainability related projects.

The multiple linear regression (forward stepwise) method was used to estimate the variance of selected variables in time perspective. The methodology consists in analyzing the interdependence between the rate of return on equity (ROE), rate of return on assets (ROA) and regulatory capital risk weighted assets (CRWA), as independent variables, and non-performing loans (NPL), as dependent variable.

The equation is:

$$\text{NPL} = \beta_0 \text{CRWA} + \beta_1 \text{ROA} + \beta_2 \text{ROE} + \varepsilon \quad (1)$$

Where: - NPL – bank bad loans rate (annual% of total loans); CRWA - regulatory capital risk weighted assets (%); ROA - rate of return on assets (%); ROE - rate of return on equity (%).

NPLs are used to evaluate the credit risk given that a significant level of non-performing assets in the bank balance sheet wears out its capital base and which eventually explains the necessity to quantify the level of credit risk. In addition, the costs of running the bank increase causing the decrease of profitability even undermining the viability and sustainability of the bank.

Another important indicator is CRWA that measures the capital adequacy of deposit holders. Capital adequacy and availability ultimately determine the degree of robustness of financial institutions to withstand shocks to their balance sheets.

Explicitly, ROE estimates the efficiency of the bank's equity use and ROA measures how efficiently a bank can manage its assets to produce profits.

The sample of countries, Scandinavian countries (Sweden, Finland, Denmark, Iceland, Norway,) was chosen given their economic, cultural and historical similarities.

The data covers the 2008-2018. The data source is the International Monetary Fund (Financial Soundness Indicators - FSI) and statistics available on IMF. The average value for each indicator was used, calculated considering individual figures for each Scandinavian country.

According to the results, there is a significant correlation between the rate NPL and the other variables, 0.71% of the variance being explained by independent variables.

Table 1. Results of regression

<i>Regression Statistics</i>	
Multiple R	0.843155
R Square	0.71091
Adjusted R Square	0.587014
Standard Error	1.055208
Observations	11

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	19.16707	6.389025	5.737972	0.026613
Residual	7	7.794247	1.113464		
Total	10	26.96132			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9.602103	1.997475	4.807122	0.00195	4.878826	14.32538	4.878826	14.32538
ROA	4.457697	2.807223	1.587938	0.156323	-2.18033	11.09572	-2.18033	11.09572
ROE	-0.5426	0.268697	-2.01936	0.083208	-1.17797	0.092771	-1.17797	0.092771
CRWA	-0.25319	0.104305	-2.42741	0.045594	-0.49983	-0.00655	-0.49983	-0.00655

Source: authors 'calculations using data from IMF

Table 1 shows that NPL variation has a significant negative correlation with ROE growth and CRWA growth and strong positive correlation with ROA growth.

5 Results and leading practices in sustainable banking

In assessing the sustainable banking sector from a financial perspective, the question refers to indicators that can be considered pertinently to measure as effectively as possible the performance of the banking sector and the time period for which banks generate value for stakeholders, including society, customers and investors.

The review of the literature reveals that there is no clear concept or indicators used to assess the performance of financial institutions. The performance is mainly evaluated objectively or subjectively through a given measures that differs from one study to another.

ROA is expected to be negatively correlated with the NPL as a decrease in earnings occurs when loans are written off or provisions are set up. According to Makri et al.

(2014), highly profitable banks have fewer motives and do not want to be engaged in any risky banking business. On the other hand, Cai and Huang (2014) claimed that there is no adverse relationship between the NPL and ROA.

The ROE variable is another profitability ratio used in the banking industry to assess the effectiveness of the equity and is expected to be negatively correlated with NPL. According to Karapetyan (2016), the ROE incurs elements of risk-taking behaviour i.e. higher returns would presumably result in a higher rate of NPL, when asymmetric information, adverse selection and moral hazard occur. However, according to Basel III framework, all high-risk loans demand provisions that eventually will reduce the earnings and the ROE.

The NPL ratio increased two times in Sweden and three times in Finland in 2014. For Sweden, one of the main reasons was that the central bank had expressed its concern over the possible inflated collateral value in the private credit market and demanded a more risk-aware credit policy from the commercial banks.

The figures obtained are confirming the hypothesis of the study, according to which the NPL ratios on Scandinavian banking decreased over time proving the fact that the banks have adjusted their business to the current economic and financial situation and are making efforts in the direction of a sustainable banking environment.

Scandinavian banks were less exposed to the 2008 financial crisis than banks in other European countries. Evidence for the performance of the Scandinavian banks in the context of the 2008 crisis implies they have learned the lessons and have raised to the challenge of changing their business model.

As a result of various external analyzes, but also on the basis of internal reports (Annual Sustainability Reports and Annual Business Sustainability Report), it can be argued that the Scandinavian banks are well on the way to adherence and implementation of sustainable bank policies.

This is due to the fact that banks such as Ekobanken (Sweden), Folkesparekassen (Denmark), Merkur Resource Bank (Denmark) are members of the GABV alliance, but also because Nordea (Finish bank, but with branches extended in all Scandinavian countries and Europe) has ranged among the top 100 most sustainable corporations in the world in 2018 for the second consecutive year. At the same time, Nordea is the first bank to develop sustainable green and customer solutions to finance Swedish SMEs, while SEB was the first bank to implement green mortgages for sustainable housing finance. (KPMG, 2016)

The responsibility assumed by these banks towards sustainability is to contribute to economic growth through capital allocation and cooperation with companies. This is achieved by adapting to new business models, increasing the level of automation, and considering climate change in decision-making.

At Nordea, Sustainable Financing takes place in two dedicated teams, the Sustainable Finance Group and an investment team that covers environmental, social, and asset management research in the asset management department (Nordea Asset Management).

Scandinavian banks, in recent years, have seen significant growth in implementing sustainable targets, also hoping to inspire the sector to progress more and faster. These include: 88% have both risk-oriented and opportunity-oriented strategies, 78% are

based on environmental and social risk policies, 89% use specific applications for risk assessment environmental and social aspects of credit granting. (KPMG, 2016)

In the last year, the pressure on the financial market in Sweden has increased. The Swedish Government and the Swedish Financial Authority have initiated a discussion on how the Swedish financial sector can increase transparency as to how social and environmental risks are assessed and taken into account when granting loans. Greater transparency would allow customers, investors and partners to better understand how their savings reflect corporate lending and would also allow for comparisons between banks.

For Handelsbanken, one of the major banks in Sweden, the development of new criteria and products progressed in 2018, and new green loan products were launched for solar energy and multi-family dwellings. These are crucial areas for a transition in line with the Paris Agreement, in which key elements such as a renewable energy system and less impact from the construction and property sector on climate and the environment are included. To ensure that the environment and climate are taken into consideration when a green loan is used for funding investments, Handelsbanken has developed technical criteria that must be met by all green loan products. According with Handelsbanken Sustainability Report for 2018, green loans summed up about SEK 1.8 billion in 2018. (Handelsbanken, 2018)

However, Green bond demand is booming in the Scandinavian countries, and green links are generally often cited as an important source of funding for meeting the climate targets of the Paris agreement.

Driven by many new borrowers, the Scandinavian market for green bonds expanded strongly in 2018. For example, the volume issued in Swedish kronor reached SEK 70.2 billion, representing growth of almost 90 per cent. Handelsbanken is very active as an advisor to new and existing issuers of green bonds, in formulating terms and conditions as well as in issuing green bonds. During 2018, Handelsbanken expanded its cooperation with the Climate Bonds Initiative, which published a Scandinavian market report with the support of the Bank. Green bonds are firmly established in the Scandinavian region and in 2018 accounted for about 13% of total Swedish kronor borrowing in Swedish capital markets. (Handelsbanken, 2018).

6 Conclusions and policy implications

Significant uncertainties in the market are induced by widely differing national approaches and practices within EU banks to respond to concerns about the quality of assets and debt. Lack of comparability of asset quality among EU banks causes an additional challenge because of different approaches of key aggregates e.g. the definition of bad loans and sustainability related indicators.

The development of the crisis has revealed a massive regulatory failure and inconsistency between intervention through regulation and competition policy. As a direct result of the financial crisis, economic uncertainty and regulatory reforms, banks are in process of adjusting to the new business environment. However selected European banks have not yet completed the process of "cleaning their balance sheets".

As the study shows, there is a correlation between NPL, the bank effectiveness indicators and the capital adequacy. Considering the interdependency of these indicators, one can reflect on the importance of bank business policies that impact on their clients' ability to repay the loans and on the other hand the willingness of the clients to reimburse the loans in a timely manner, altogether being reflected in the sustainability of the performance indicators (ROA and ROE). It is noticeable that all countries made efforts to ensure the capital adequacy of banks, but in the Scandinavian countries the CRWA has a constant evolution as a reflection of the quality of the bank policies that did not require additional capital adjustments that would increase the cost of bank operations.

The present challenges of these countries relate to the ability to sustain economic growth, especially as members (or prospective members) of the Euro zone. Significant progress has been made since the crisis in improving the resilience of the Baltic countries financial systems, but they are yet to provide adequate lending to support the ongoing recovery. Lending is still declining in Latvia and Lithuania in spite of the recovery, while it is weak in Estonia—in other words, the Baltic countries are experiencing a recovery not supported by bank loans. Reviving the lending process will be essential to sustain growth and, in the longer term, foster convergence.

Theoretical and empirical research has shown that a sound and effective financial system is critical for economic development and growth. Under the general global trend toward sustainable development, the banking sector has been involved as a significant player due to its role as financial intermediary. Therefore, the interest in sustainable banking has gradually grown and has come to be regarded as a goal for the banks to pursue. Lately, the banking sector has taken steps to stimulate sustainable development, but much needs still to be done.

Scandinavian bank sector can be considered an example of good practice which is heading in the right direction in terms of instruments that can accelerate sustainable development.

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MODELLING OF SOCIO-ECONOMIC PRIORITIES OF THE STATE MIGRATION POLICY IN UKRAINE

Olena Chuprina¹ and Olga Balueva² and Oleksandr Nestorenko³ and Yuliia Popova⁴

¹ Donetsk State University of Management, Department of Marketing 58 Karpynskogo str. Mariupol, 87500 Ukraine

² Donetsk State University of Management Department of Personnel Management and Economy of Enterprise 58 Karpynskogo str. Mariupol, 87500 Ukraine

³ University of Economics in Bratislava Faculty of National Economy Dolnozemska cesta 1 852 35 Bratislava Slovakia

⁴ State University of Infrastructure and Technology Department of Business Logistics and Transportation Technologies 19 Ivan Ohienko str. Kyiv, 02000 Ukraine

¹echuprina@ukr.net

²balueva@ukr.net

³oleksandr.nestorenko@ukr.net

⁴Yuli-p@ukr.net

Abstract. The socio-economic priorities in the sphere of internal forced migration in Ukraine on the basis of cognitive modelling methods are formed. Authors used of cognitive modelling and related scenario that stipulate the ability to direct the activities of complex objects in weakly structured problematic situations that arise in the migration process. According to the stages of scenario modelling of object development on the basis of cognitive technologies and expert estimation methods, the system of regulatory factors of internal forced migration processes has been formed and their analysis has been made. A cognitive model of factors influencing the number of internally displaced persons has been constructed. Based on the cognitive map, scenario modelling has been carried out and appropriate scenarios for the situation development with internal forced displacement have been formed. The expediency of using the vectors of regulatory stimulating influence on the groups of factors aimed at the socio-economic support of internally displaced persons, the development of the labour market, business support, microenterprise and self-employment have been substantiated. The methodical approach to the substantiation of the regulatory influence vectors in the field of internal forced migration as a component of the state migration policy, based on scenario modelling using cognitive maps has been proposed. The results of the study are the basis for adjusting the strategic priorities of the state migration policy in Ukraine in terms of socio-economic support for internally displaced persons.

Keywords: internal displaced person, socio-economic priorities, Ukraine.

JEL classification: J6, C6

1 Introduction

The intensification of internal migration processes in Ukraine, the uprising of internally displaced persons (IDPs) is associated with the negative consequences of events occurring in the Crimea, as well as in parts of the Donetsk and Luhansk oblasts. As of the end of 2018, more than 1.5 million citizens were forced to leave their homes and seek asylum in other parts of the country, which led to a redistribution of population between territories (Ministry of Social Policy of Ukraine, 2018). Leaving their own homes, IDPs faced a whole range of socio-economic problems that require immediate solutions.

The results of the study have made it possible to state that the main challenges associated with the forced displacement of citizens from the temporarily occupied territory of Ukraine and the regions of the combined forces operation appear to be increasing in the local labour markets, the existence of placement, employment issues etc.

It ought to be emphasized that currently issues related to the IDPs difficulties resolution are relevant and require an integrated approach. There is a need for the prompt formation of a well-founded state migration policy that meets modern challenges. The basis for the state migration policy is researched and the ways of its direction are offered in the papers of O. Malynovska (2015). IDPs main activities and ways of their support are formulated in the papers of T. Doronuk (2014). E. Libanova (2015) pays special attention to the necessity of IDPs support and creating conditions for their integration. O. Makarova (2015) has dedicated her research to the problems of social support of IDPs and their reintegration into the local labour markets. Although the system of refugee reception and the relevant legislation existed in the country, the country was not ready to solve the IDPs matters.

Despite the wide range of research results of the abovementioned and other authors, it has to be acknowledged that many issues still remain unresolved concerning the development, improvement and implementation of scientific approaches aimed at deepening the methodology for regulating migration processes. Thus, based on the current changing situation and needs, the target facilities and socio-economic priorities of migration policy have to be adjusted. As IDPs choose the migration vector themselves, it is reasonable to use Prybytkova's concept of space self-organization of the population as a theoretical basis for study migration motivation. According to her research territorial migration of the population is carried out in a special social space, every point of which is characterized by a special set of welfare (Prybytkova, 1999).

The study of socio-economic processes in the field of migration has made it possible to conclude that they are uncertain and volatile, and to distinguish certain features that are inherent in poorly structured systems. All this limits the possibilities of using traditional methods of searching for optimal solutions and proves the feasibility of using a cognitive approach to develop effective solutions in the field of population migration movement regulation, including internal forced migration.

We should agree with the point of view of the researches (Prangishvili, 2018) concerning the use of cognitive modeling. It is caused by the possibility of the system to form a perspective development depending on the given primary aims and indicators changes. As the researches fairly consider, cognitive modeling makes it possible to solve the problems, which are considered to be traditional for the science, using the

methods containing the processes of perception, thinking, cognition, explanation and understanding (Mozharov, 2018). The system of decision making support “KANVA”, which provides information processing and expert’s analytical activity support, is used as a tool of implementation of the task (Kulinich, 2001).

The purpose of this study is to formulate socio-economic priorities in the field of internal forced migration on the basis of the cognitive modelling methods use.

1.1 Model and Data

In order to achieve the purpose of the article, the use of cognitive modelling and related scenario has been proposed, which is due to the ability to direct the activities of complex objects into weakly structured problem situations that arise in the migration process.

The main stages of the methodological approach to the regulatory influence vector substantiation in the field of internal forced migration, as part of the state migration policy, are based on cognitive modelling: research of problems in the sphere of internal forced migration regulation; formation of the socio-economic system factors of regulatory influence (concepts); construction of the adjacency matrix by groups of regulatory influence factors on the IDPs number; the construction of a directed graph - a cognitive map of the factors influencing the IDPs number; study of the relationship strength between the regulatory influence factors; formation of regulatory influencing scenarios variants for the IDPs number; forecasting. Calculation of system indicators (consonance, dissonance).

2 Study’s results

Taking into account the the urgency of the IDPs issue, the need to adjust socio-economic priorities in this area, the purpose of building a cognitive model is to develop the best solutions for regulating the domestic forced migration processes in Ukraine considering a set of causes and factors. As an initial characteristic (effective indicator) of the investigated system of internal forced migration processes regulation, the index of the IDPs number has been selected. The construction of a cognitive model begins with the creation of a cognitive map that visually represents the basic laws of the investigated situation and allows selecting significant factors, identifying their causal relationships, tracking possible changes in the system as a whole under the influence of various factors, creating and analyzing possible scenarios for the studied object development for the nearest future.

The study of the IDPs needs and the use of peer review enabled the formation of a regulatory factors system affecting the regulation of internal forced migration, as well as the migration attractiveness of IDPs territories, and grouped them into three general blocks, depending on the impact level on the indicator. Those are: factors of state, regional and local influence on the IDPs number. Each group includes a number of indicators. Note that one way of presenting a cognitive map is to map the relations of causality with a square matrix of n th order (matrix of adjacency). The construction of a cognitive model defines the relationships between the chosen concepts, the direction

and the tightness of the influence between them. The presence of causal relationships between the key factors is revealed on the basis of the existence of a logical and functional interdependence between them, which is partially confirmed by the data of the correlation connection.

An analysis of such links is needed to develop regulatory influences on the situation with IDPs. Influence can be: positive (in the table marked with the sign "+ 1", on the map - continuous lines), that is, an increase in the value of the factor-cause leads to an increase in the value of the factor-effect; negative (in the table marked with the sign "- 1", on the map - dotted lines), that is, an increase in the value of the factor-reason, on the contrary, leads to a decrease in the value of the factor-effect; generally absent (there are no signs in the table). The oriented sign graph (sign digraph - one of the types of cognitive map) includes the most important direct links. Such a cognitive map only reflects the position that factors are influenced by each other.

The analysis of the selected regulatory factors, their interconnections, performed in accordance with the stages of scenario modelling of the object's development on the basis of cognitive technologies, allowed to reveal certain trends of changes that could affect the IDP support level and the migration attractiveness of the territories, and present the results in the form of adjacency matrices (Table 1) and oriented graphs (Fig. 1) depending on the level of influence.

Table 1. Matrix of adjacent factors of regulatory influence of the state level on the IDPs number*

	PSC	SHP	CAJ	OAB	GHR	EBS	MWL	CS			
PSC		1	1	1	1	1	1	1	042.1	004.9	.001
SHP						1			057.9	079.7	.001
CAJ					1				070.4	020.3	100
OAB					1	1			004.7	0.475	
GHR	1	1	1	1		1	1	1	073.7	036.8	
EBS			1	1					074.1	059.3	
MWL					1			1	024.2	081.8	
CS	1				1				005.5	019.3	009.1

Source: calculated by the authors on the basis of using the decision support system "KANVA"

Notes: PSC - political situation in the country, level of political security; SHP - paying attention to the solution of the housing problem; CAJ - creation of additional jobs; OAB - assistance in overcoming legal and administrative barriers; GHR - a guarantee of human rights protection; EBS - ensuring the business support; MWL - minimum wage level; CS - compliance with minimum standards and guarantees of the actual cost of living in the country.

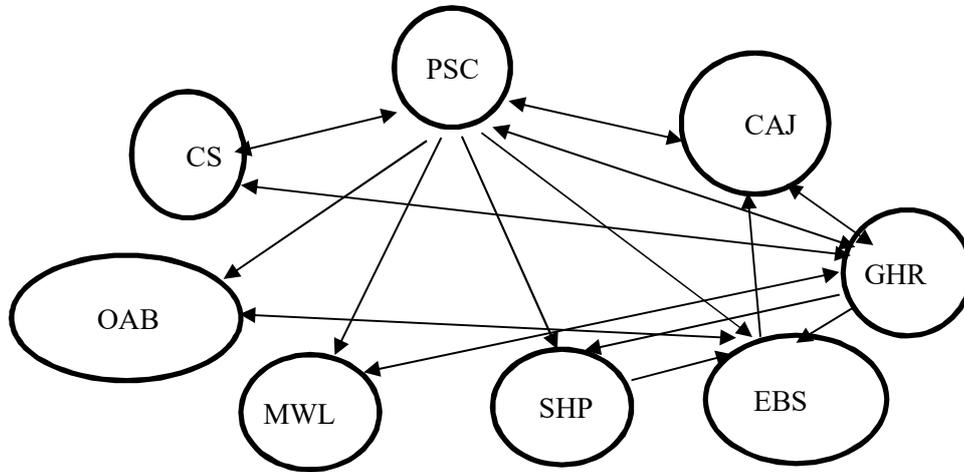


Fig. 1. Cognitive map of regulatory influence factors of the state level on the IDPs. *Source: developed by the authors*

It has to be pointed out that the expert-selected socio-economic factors of regulatory influence at the state level are characterized by positive effects, as evidenced by the results of the analysis of the corresponding contiguity matrix. At the same time, the "Political situation in the country" and "Human rights guarantees" factors have the greatest impact (the maximum number of outbound links). The authors have observed that the presented graph of the factors influencing the state-level regulatory influence on the IDPs quantity is characterized by a large number of causal relationships between the elements, which corresponds to the results of the study of the internal forced migration processes, which were obtained in the previous steps of a cognitive model construction. Interactions between factors of regional influence are not unambiguous, as evidenced by the results of the analysis of the adjacency matrix and the negative impact on a number of indicators (Table 2, Fig. 2).

Table 2. Matrix of adjacent factors of regulatory influence of the regional level on the IDPs number*

	GRP	CI	UR	CR	AMW	LSA	CAC	CL	PS		
GRP		1	-1		1	-1		1	1	017.6	.002
CI			-1							007.3	.002
UR	-1	1		1				-1		005.1	
CR										020.1	100
AMW			-1					1		046.7	
LSA				1	-1			-1		065.7	
CAC								1	1	083.1	
CL					1		1			068.1	
PS	1	1	-1				-1			0.454	

Source: calculated by the authors on the basis of using the decision support system "KANVA"

Notes: GRP is the gross regional product per capita; CI - capital investments by region; UR - the unemployment rate of the population (according to the International Labour Organization methodology); CR - crime rate per 100 thousand people; AMW is the average monthly wage (per employee); LSA - the level of salary arrears; CAC - indirect cost of apartments construction (home); CL - the cost of living in the region; PS - residential programs support.

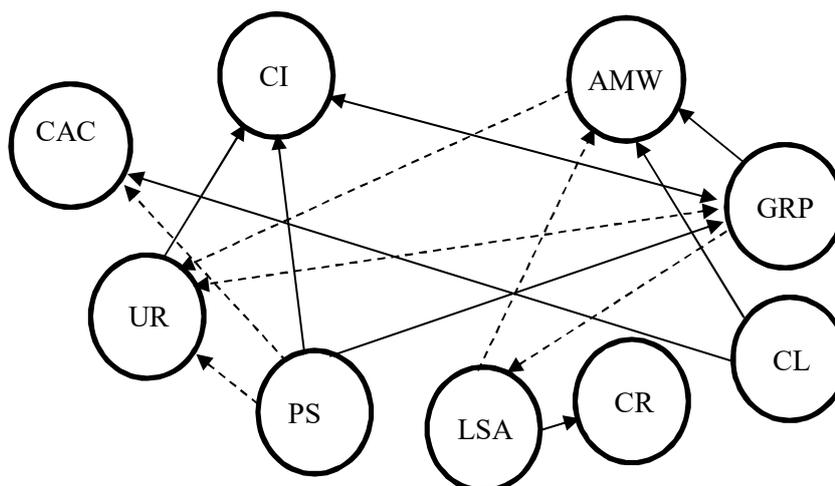


Fig. 11. Cognitive map of factors of regulatory influence of the regional level on the IDPs number

The main factors of regional influence are "Gross Regional Product" and "Support for Residential Programs", but "Capital Investments", "Unemployment Rate" and "Wage Arrears" are also important. Among the local level factors, the largest number of out-bound links is "Support for small businesses and self-employment" (Table 3; Fig. 3).

Table 4. The matrix of adjacent factors of the regulatory influence of the local level on the IDPs number

	CL	SE	ML	AE	CR	PR	AOH	SCP	SSB			
CL									1	012.2	029.8	.001
SE										020.9	011.3	.001
ML										067.3	021.4	100
AE										069.4	038.3	
CR	-1									068.8	050.7	
PR										063.8	066.4	
AOH					-1					048.2	077.7	
SCP										031.1	089.5	
SSB	-1								1	015.9	061.0	

Source: calculated by the authors on the basis of using the decision support system "KANVA"

Notes: CL - the level of competition in local labour markets; SE - availability of specialized enterprises that meet the IDPs qualification level; ML - level of medical care; AE - access to education (preschool and school); CR - the cost of renting an accommodation; PR - presence of relatives; AOH - availability of own housing; SCP - level of social cohesion of the population; SSB - support for small business and self-employment.

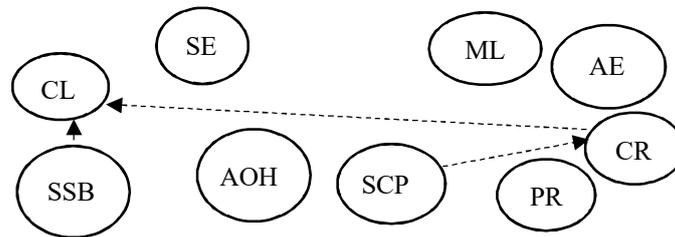


Fig. 3. Cognitive map of factors of regulatory influence at local level on the IDPs number.

Source: developed by the authors

For the purpose of comprehensive cognitive analysis, further impulse modelling and constructing scenarios of regulatory influence on the internal forced migration processes, it is expedient to formulate a contiguity complex matrix. It combines the information of the three previously considered matrices of adjacency.

However, it ought to be noted that in order to avoid duplication of factors at different levels of influence and optimization of the number, it is proposed to group them into blocks (Table 4). At the same time, the overall target level of IDPs support is determined by the target factor.

Table 4. Groups of factor-regulators for a complex adjacency matrix that can affect the IDPs number in selected territories

The name of the factor group	Factors that belong to groups
Housing market considering the housing problem solving	PSC, CAC, PS, CR, AOH
Guarantee of human rights protection	GHR
Access to administrative and social services	OAB, ML, AE, CR
Financial and economic indicators of the territories development	GRP, CI, CL
Business support provision	EBS, SSB
Labour market development	CL, SE, UR, AMW, LSA, CAJ, MWL, CS

Source: calculated by the authors

The complex adjacency matrix is given in Table. 5. The results of its analysis indicate that the main groups of factors of regulatory influence on the IDPs number and the target factor are recognized as "Development of the labour market", "Ensuring business support", "Access to administrative and social services", "Financial indicators of territorial development".

Table 5. Integral adjacency matrix by groups of factors of regulatory influence on the IDPs number in separate territories

	HM	GP	AS	FI	BS	LM	GS			
HM		0.2211		0.991		0.858	0.2313	013.7	008.8	0.001
GP	0.562		0.7073		0.946	0.1652	0.3271	055.7	010.7	0.001
AS		0.1535				0.432	0.5193	075.9	061.7	100
FI	0.4309				0.9577	0.3078	0.3068	061.2	074.3	
BS	0.214			0.2852		0.5848	0.8244	006.9	034.3	
LM	0.1299	0.5112		0.9903			0.99	021.1	078.8	
GS	0.99	0.9888	0.7073	0.4796	0.3275	0.99		038.8	024.6	

Source: calculated by the authors on the basis of using the decision support system "KANVA"

Notes: HM - housing market concerning housing problem; GP - a guarantee of human rights protection; AS - access to administrative and social services; FI - financial and economic indicators of the territories development; BS - provision of business support; LM - development of the labour market; GS - the general level of IDPs support.

On the basis of this information, a cognitive model of the factors of regulatory influence on the IDPs number (Fig. 4) has been constructed where the vertices are the factors of the situation, and the curves are the causal interdependences between them. It has to be noted that for the group of factors such as "Overall level of IDPs support", "Housing market concerning housing problem", "Development of the labour market", "Guarantee

of human rights protection" are characteristic of the most important direct relations, marked on a cognitive map and significant influence on the part of other factors.

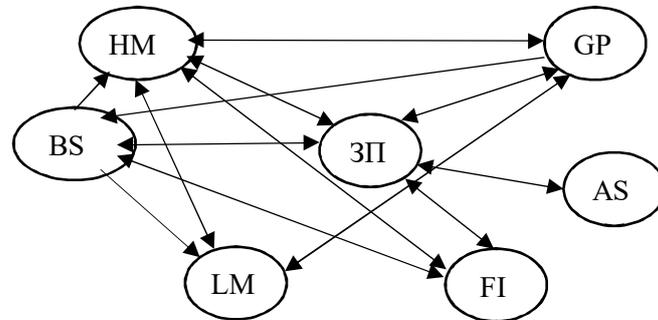


Fig. 4. Cognitive map of factors influencing the IDPs number. *Source: developed by the authors*

The same group of factors and "Financial and economic indicators of the country's development" are most affected, which makes it possible to state the appropriateness of guiding towards their main scenario approaches. Received information is a basis for the further modeling the influence on the internal forced migration. Constructed cognitive models are the basis for the development of case scenarios and formulation of the ways of strategic influence.

The scenario is based on modelling and expert estimation. Let's formulate scenarios and prognoses on their basis considering the processes dynamics in time. At the same time, the step of expert judgment tact is taken as a unit of time. As a result, the following directions of the regulatory influencing scenarios for the IDPs number have been obtained:

1. Basic scenario, which is formed on the minimum possible accumulation of incoming (current) data (self-development situation). In the conditions of the set goals achievement those are based on the scenario taking into account the impact on the environment change situation.
2. Scenarios of the situation development based on the use of regulatory vectors (using the direct account method). The result is four scenarios obtained:
 - 2.1. Scenario 1 is formed under conditions of stimulating influence on the following groups of factors: "Housing market, paying attention to solving the housing problem"; "Access to administrative and social services"; "Development of the labour market". The use of regulatory vectors is not based on the "Human Rights Guarantee" factor. In this case, the consonance is equal to one and is reliable (Table 6).

Table 6. Situation scenario based on the application of Regulatory Impact vectors # 1

	Input	Current Value	Output	Consonance
Housing market concerning the housing problem	Growth by 10.1%	2.05	Growth by 10.1%	Reliable (1.00)
Guarantee of human rights protection	Growth by 0%	4.32	Growth by 0%	Reliable (1.00)
Access to administrative and social services	Growth by 10%	3.01	Growth by 10%	Reliable (1.00)
Financial and economic indicators of the territories development	Growth by 5%	3.00	Growth by 5%	Reliable (1.00)
Providing business support	Increase by 2%	2.86	Increase by 2%	Reliable (1.00)
The development of the labour market	Growth by 7.5%	3.03	Growth by 7.5%	Reliable (1.00)
Overall level of IDPs support	Does not change	3.98	Does not change	Reliable (1.00)

Source: calculated by the authors on the basis of using the decision support system "KANVA"

The meaning of the consonance implies confidence in the conclusion, the correspondence of the expected and received information and the greater the value of the consonant the better. Consonance is minimal if the values of the positive and negative influence of the factor and on the factor j are equal, that is, when there are roughly equal opposite influences. In this case, the consonance is zero, and the dissonance is maximal. Consensus is considered to be maximum (maximum confidence) and equals one if the positive and negative influence of the factor and the factor j equals zero. Such a situation is achieved when there are no factors acting in different directions (Kulynych, 2003).

The total correlation for calculating the consonance has the form:

$$d_{ij} = \frac{|b_{ij+} + b_{ij-}|}{|b_{ij+}| + |b_{ij-}|} \quad (1)$$

where d_{ij} is a mutual consonance between the factors i and j;

b_{ij+} ; b_{ij-} is the value of the negative and positive influence of factor i on factor j

According to this scenario, a forecast was made for the situation development where the simulation was carried out before the fourth tact. The basis for choosing vertices and their aggregates, to which impulse effects were introduced, served expert suggestions, research results, and analysis of statistical data. It has to be noted that the stimulation of the main groups of factors by introducing the resulting vertex vector into this system leads to activation of the remaining factors of the given system and shows that under such conditions, the growth of the overall level of support, as the target factor, is 7.5%.

2.2. Scenario 2 involves the use of vectors of regulatory influence on the following groups of factors: "Housing market, paying attention to solving the housing issue; "Access to administrative and social services"; "Development of the labour market"; "Providing business support". In this case, additional regulatory influence is absent

in the following groups of factors: "Guarantees of human rights protection" and "Financial and economic indicators of territorial development". In this case, the consonance is equal to one and is reliable (Table 7).

Table 7. Situation scenario based on the use of regulatory vectors # 2

	Input	Current Value	Output	Consonance
Housing market concerning the housing problem	Growth by 10.1%	2.05	Growth by 9.8%	Reliable (1.00)
Guarantee of human rights protection	Does not change	4.32	Growth by 9.8%	Reliable (1.00)
Access to administrative and social services	Growth by 10%	3.01	Growth by 7%	Reliable (1.00)
Financial and economic indicators of the territories development	Does not change	3.00	Growth by 9.9%	Reliable (1.00)
Providing business support	Growth by 10%	2.86	Growth by 9.5%	Reliable (1.00)
The development of the labour market	Growth by 10%	3.03	Growth by 9.8%	Reliable (1.00)
Overall level of IDPs support	Does not change	3.98	Growth by 9.9%	Reliable (1.00)

Source: calculated by the authors on the basis of using the decision support system "KANVA"

It has to be noted that the implementation of impulse modelling through the introduction of the resulting vertex vector to this system leads to activation on the fourth tact of indicators, influencing the growth of the target factor by 9.9%, which exceeds the results in scenario # 1.

2.3. Scenario 3 envisages the path of territorial development and is formed on the basis of the stimulating regulatory influence direction on the relevant groups of factors: "Development of the labour market" and "Financial and economic indicators of the territories development", in the absence of vectors of regulatory influence on factors that are able to provide IDPs support and decrease incentives aimed at developing the housing market, paying attention to solving the housing problem (Table 8).

Table 8. Situation scenario based on the use of regulatory vectors # 3

	Input	Current Value	Output	Consonance
Housing market concerning the housing problem	Decrease by 5%	2.05	Growth by 9.8%	Very possible (0.79)
Guarantee of human rights protection	Does not change	4.32	Growth by 9.8%	Very possible (0.79)
Access to administrative and social services	Does not change	3.01	Growth by 7%	Very possible (0.79)
Financial and economic indicators of the territories development	Growth by 10%	3.00	Growth by 9.9%	Very possible (0.79)
Providing business support	Does not change	2.86	Growth by 9.6%	Very possible (0.80)
The development of the labour market	Growth by 10%	3.03	Growth by 9.8%	Very possible (0.79)
Overall level of IDPs support	Does not change	3.98	Growth by 9.9%	Very possible (0.79)

Source: calculated by the authors on the basis of using the decision support system "KANVA"

The use of impulses for the groups of regulatory factors in this system leads to activation on the fourth tact of indicators, influencing the growth of the target factor by 9.9%, which is similar to the main results of scenario # 2. However, if it is possible the practical implementation of such a scenario option has to take into account the value of the consonance, which is at the level of 0.79-0.8 that reduces the consistency of the system components and its realism.

2.4. Scenario # 4 is formed under the conditions of stimulating influence on the appropriate groups of factors: "Guarantee of protection of human rights"; "Financial and Economic Indicators of the Development of the Territories of the Country"; "Development of the labour market" with the reduction of incentives aimed at the development of the housing market, paying attention to solving the housing problem; access to administrative and social services (Table 9).

Table 9. Situation scenario based on the use of regulatory vectors # 4

	Input	Current Value	Output	Consonance
Housing market concerning the housing problem	Decrease by 5%	2.05	Growth by 7.8%	Impossible (0.01)
Guarantee of human rights protection	Growth by 3%	4.32	Growth by 7.8%	Impossible (0.01)
Access to administrative and social services	Decrease by 15%	3.01	Growth by 5.6%	Impossible (0.01)
Financial and economic indicators of the territories development	Growth by 10%	3.00	Growth by 7.7%	Impossible (0.01)
Providing business support	Growth by 1%	2.86	Growth by 9.6%	Weakly possible (0.13)
The development of the labour market	Growth by 5%	3.03	Growth by 7.8%	Impossible (0.01)
Overall level of IDPs support	Does not change	3.98	Growth by 7.9%	Impossible (0.01)

Source: calculated by the authors on the basis of using the decision support system "KANVA"

Using impulses to groups of regulatory factors in this system leads to an increase in the indicators, influencing the growth of the target factor by 7.9%, which exceeds the results in scenario # 1. However, the consonance in this scenario (0.01-0.13) indicates the impossibility of further implementation.

3. Scenario, which is formed on the basis of the definition of a set of measures to achieve the desired changes in the system (invoice). This scenario is complex, which proved the results of simulation (Table 10).

Table 10. Situation scenario based on invoice method

	Input	Current Value	Output	Consonance
Housing market concerning the housing problem	Growth by 216.4%	2.05	Growth by 50.6%	Reliable (1.00)
Guarantee of human rights protection	Growth by 81%	4.32	Growth by 50.4%	Reliable (1.00)
Access to administrative and social services	Growth by 96.2%	3.01	Growth by 57.3%	Reliable (1.00)
Financial and economic indicators of the territories development	Growth by 63.3%	3.00	Growth by 50.0%	Reliable (1.00)
Providing business support	Growth by 60.6%	2.86	Growth by 60.6%	Reliable (1.00)
The development of the labor market	Growth by 50.5%	3.03	Growth by 50.5%	Reliable (1.00)
Overall level of IDPs support	Growth by 51%	3.98	Goal – Growth by 50.0%	Reliable (1.00)

Source: calculated by the authors on the basis of using the decision support system "KANVA"

It has to be noted that the growth of the target indicator and increase of the attractiveness of the territories for the IDPs is possible in the conditions of stimulating regulatory influence on the whole complex of groups of factors.

In this case, the consonance is equal to one and is reliable. It ought to be noted that on the basis of this scenario the development of a set of appropriate measures that can contribute to the growth of the attractiveness of the country's territories for the IDPs seems appropriate and the provision of an adequate level of support for this category of citizens is expedient.

3 Conclusions and policy implications

A comparison of the various scenario options offered by the direct account method proves the optimality of scenario # 2 for regulatory impact on the processes of internal forced migration, since the stimulation of a number of indicators reinforces the positions of the remaining important factors, including the target, other than with other variants.

This scenario is supportive and involves the use of regulatory incentive vectors for groups that focus on IDPs support, labour market development, business support, micro-entrepreneurship and self-employment, which needs to be taken into account when developing strategic directions for regulating domestic forced migration.

It has to be underlined that the implementation of the second variant of the scenario of regulatory influence on the processes of internal forced migration does not make it impossible to implement a scenario, which is formed on the basis of the definition of a set of measures to achieve the desired system changes (invoice) at subsequent stages. This assumption is based on territorial development and regulatory influence on the financial and economic indicators of the country's territories development will contribute to the growth of the territories attractiveness and, in turn, will affect the IDPs state support level.

It has to be emphasized that the results of the survey are the basis for adjusting the socio-economic priorities of the state migration policy in terms of socio-economic support for internally displaced persons, which provides prospects for further research.

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FINANCING OF FAMILY BUSINESSES

Zuzana Jakubová

University of Economics in Bratislava
 Faculty of Business Management, Department of Business Finance
 Dolnozemská cesta 1/b
 Bratislava, 852 35
 Slovakia
 zuzana.jakubova@euba.sk

Abstract. Family business is defined, as such business, where ownership is held in the hands of the family and where the intention to keep him in the family exists. The family business relationships have the significant impact on the running of a family business, what can have a positive impact on decision-making speed. Many studies point out that family businesses try to avoid debt /interest/ because loans and other external sources of funding can lead to loss of family control over the business. However, we cannot say that they would not benefit from such types of funding at all, as they can also bring them certain benefits /interest tax shield/. In order to keep family businesses in the hands of the family, the issue of funding should also be considered, among other things.

Keywords: family business, financing, SMEs.

JEL classification: D25, G32, D91

1 Introduction

On average, around 70 to 80 percent of family-owned businesses (FOB) in Europe, where these contribute to employment in 40 to 50. (Austrian Institute for SME Research, 2008) These face many problems, which are different from those in non-family business, and their overall economic importance is still underestimated. Main goal of FOB, contrary to non-family, is not just maximizing profit or market value of the business. These are non-financial factors arising from the theory of socio-emotional wealth where among the main goals of family businesses belong identity, good relationships inside and outside of community and, at the moment, current and acute topic, handing over the business to future generations. (Berrone et al., 2012) Considering these non-financial goals, financial decision making can be different, in comparison, to the non-family.

2 Definition of family business

There are many definitions for defining a family business (a firm). In general, it is family "enterprise" means an enterprise in which one or more family members are the owners and / or managers who influence the direction of business, based on ownership rights or management powers.

The European Commission (EC, 2019) considers a family business to be:

- a. the majority of decision-making rights is in the possession of the natural person(s) who established the firm, or in the possession of the natural person(s) who has/have acquired the firm,
- b. the majority of decision-making rights are indirect or direct,
- c. at least one representative of the family or kin is formally involved in the governance of the firm.

The business can be described as family if the person(s) who founded or acquired the business, or their descendants or relatives own 25 per cent of the decision-making rights mandated by their share capital

Currently, a definition of family business exists in the legislation only in Italy, Austria, Croatia, Romania and Malta. In Slovak republic, there is only an established definition for a family business, which is composed based on the criteria listed in Table 1.

Table 1. General definition of family business in Slovak Republic

country	ownership	income	management	employment
Slovak Republic	the majority of owners, the intention to transfer ownership to next generation	X	usually managed by family	predominantly employees from the family circle

Source: Austrian Institute for SME Research. (2008). *Overview of Family Business Relevant Issues*. <http://www.europeanfamilybusinesses.eu/uploads/Modules/Publications/overview-of-family-business-relevant-issues.pdf>, [accessed 30.03.2019]

3 Financial structure in family business

The issue of financial structure is not only related to the family business, but it is also related to each business. Financial structure is the mixture of debt and equity used in a company to finance its activities. (Kráľovič et al., 2011)

If V represents value of a company, D represents its debt, and E stands for its equity, the following statements are used to present capital structure of a firm. (Smith et al., 2011)

$$D + E = V \quad (1)$$

D – debt

E – equity

V – value

The equation of the financial structure as a share of own and external resources in total resources is then the following:

$$\frac{D}{V} + \frac{E}{V} = 1 \quad (2)$$

3.1 Sources of financing of family businesses

The financial structure, therefore, tells of the sources of financing the company's assets. It could be, as already mentioned, divided into their own (equity) and foreign (debt), respectively, internal and external resources.

Internal sources of financing for family businesses are mainly deposits, loans, mostly interest-free, from family members. Certainly, there can be also included deposits of current owners, which are, in family businesses, again family members. However, they are directly involved in management.

Another internal source is profit, which is reinvested in activities of business, from which can be concluded that family businesses are patient and they are willing to wait for return on their investments. (Baskin, 2001) Lease of company's property and this way obtained funds can be included into internal sources.

Table 2. Internal sources of family business financing

internal sources	deposits from family members
	deposits of business owners
	reinvested profit
	lease of company assets

Source: own processing based on the studied literature

The external sources can be further subdivided, according to the part of the share in the company's capital which is taken over. We distinguish between debt financing and alternative financing sources, where venture capital, but also business angels can be included. Specifically, venture capital is the kind of external source of funding when in return for providing finance a share in the capital of the enterprise is required, which creates a potential risk of non-maintenance of management control in the hands of the family.

Business angels (BAs) are usually private individuals with equity and experience from

business that are willing to use equity to invest in enterprises with interesting idea and capability. Angels initially buy a small stake in the enterprise and they expect to sell this share back to the company after some time. The added value of BA is their managerial experience, know-how and network of contacts.

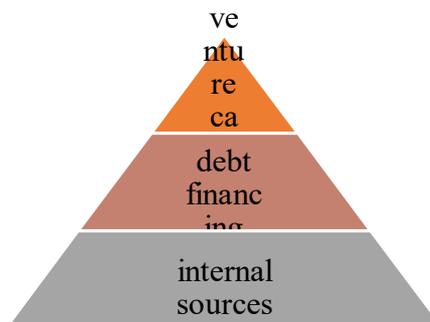
Crowdfunding is a form of financing that connects those who have financial access and want to invest with those who need it to fund their own business project.

Table 3. External sources of family business financing

external sources	debt financing
	government guarantees and loans
	venture capital
	business angels
	crowdfunding

Source: own processing based on the studied literature

To summarize the financial resources of the family business, Scheme 1 is presented, where at the lowest level appear the primary, most commonly used sources of financing, which in no way jeopardize business from the point of view of the risk of the losing control.



Scheme 1. Preference for funding sources in family businesses. *Source: own processing*

On the other hand, we mention the fact that the cost of capital, it means that equity is more expensive than foreign. To justify this, here is the following statements of weighted average cost of capital (WACC):

$$WACC = \left(\frac{D}{V}\right) * (1 - t_c) * r_D + \left(\frac{E}{V}\right) * r_E \quad (3)$$

D – debt

r_D – return on debt

E – equity

r_E – return on equity

V – value

t_c – corporate tax rate

The reason why is equity more expensive, or why debt is cheaper, is possibility to use tax shield in debt financing. Tax shield increases return of equity and also allows a reduction in taxable income achieved through claiming allowable deductions such as mortgage interest.

For the above-mentioned reason, family businesses choose primary, from the group of external sources, the form of debt financing and subsequently venture capital.

3.2 Agency problem in family businesses

The agency problem can be generally defined as a conflict of interest arising from any relationship where one party expects from the other to act at its best interest. In corporate finance, it is the relationship between business owners as one of the parties involved in the business with the other is the relationship of the principal to the agents. (Kráľovič et al., 2011) Interests of managers (agents) are:

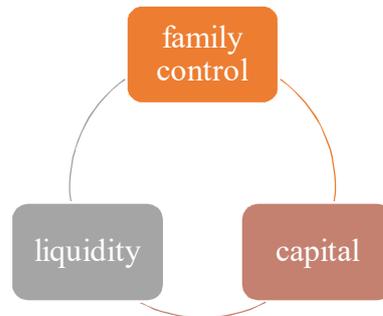
- to get the highest possible reward for work,
- to remain as manager at company as long as possible,
- to get the highest decision-making independence.

In case of family businesses, those who have decision power can benefit from information that is not known to the non-managing family members (i.e. information asymmetries) or take decisions that favour their own interests and not that of the family. (Van den Berghe et al., 2003)

A similar conflict may also occur between owners of a family business. Mostly, the conflict concerns the situation of selling a part of the business to persons outside of this particular family business, which could increase the company's capital or competitiveness in the market by the additional capital thus obtained.

However, family business owners do not want to lose control in family business, so they are therefore particularly interested in dividends and liquidity. The relationship between capital, liquidity and control is referred to as the “family business triangle” presented in Scheme 2. (de Visscher, 2019)

At the top of the triangle is a tendency to maintain management in the hands of the family, on the other hand, the company has to provide enough capital for the current activities, but also for possible growth or defense against the competition. It should be remind that it is not possible to achieve a higher value of capital without reducing the risk of losing control. Therefore, again in terms of financing family businesses, these do not primarily prefer external resources.



Scheme 2. The family business triangle. *Source: own processing based on de Visscher, F. Balancing Capital, Liquidity and Control.*

4 Financing of family businesses

Financing of family businesses is as necessary as in any business, but as mentioned, it has its own specifics. To analyze the sources of financing for family businesses, we chose the V4 countries, Slovak and Czech Republic, Poland and Hungary. The number, or more precisely, the percentage of family businesses of the total number of enterprises in each country is presented as an estimate of experts; in the Czech Republic the number of family businesses is set as a percentage of small and medium-sized enterprises (SMEs).

A large proportion of European SMEs are made up of family businesses, of course, some of Europe's largest companies are also family businesses. However, in the family business sector, SMEs dominate, as well the funding being statistically presented more to SMEs.

Table 4. Estimated share of family businesses of the total number of enterprises in each country

Slovak Republic	80 – 95 %
Czech Republic	80 – 95 % z MSP
Poland	70 – 80 %
Hungary	70 %

Source: Austrian Institute for SME Research. (2008). *Overview of Family Business Relevant Issues*. <http://www.europeanfamilybusinesses.eu/uploads/Modules/Publications/overview-of-family-business-relevant-issues.pdf>, [accessed 30.03.2019]

Table 5. Number of SMEs in 2017

country	Slovak Republic	Czech Republic	Poland	Hungary
amount of SME	397 177	1 010 926	1 608 533	546 758

Conclusions Source: own processing based on SBA Fact Sheet 2017 for each country

4.1 Self-financing of family businesses

Although statistical surveys focus mainly on the possibility and importance of external sources of SME financing, self-financing play a decisive role, but its importance in terms of share varies depending on the location, size or age of the business.

SMEs have a strong tendency to rely on internal resources. According to the EIF, which also include micro-enterprises, these relied exclusively or predominantly on own resources in 2016. For small enterprises (10-49 employees) it is 18,1% and for medium-sized enterprises (50-249 employees) it was 12,8%. (EIF, 2015)

Estimates indicate that approximately one in three SMEs in EU countries rely only on internally generated resources that are used for day-to-day operations or investments.

4.2 External financing of family businesses

Although SMEs primarily choose internal sources, statistics point to the fact that only few of them are able to remain in self-financing and therefore do not have to choose external sources.

Business loans

Table 6 shows the absolute values of business loans granted to SMEs between 2015 and 2017, as well as the percentage of loans to SMEs in the total number of loans granted in Figure 1.

The values of loans granted to SMEs do not change significantly in the time period we choose. Poland is at its highest, which is, of course, related to the number of SMEs in that country. If we divide the values of provided loans in 2017 by the number of SMEs of each country, the average amount of loans for one enterprise within V4 is 54 thousand EUR. Poland increases the average. The average SME loan for countries without Poland is just over 29 thousand EUR.

Table 6. Business loans granted to SMEs in the years 2015 to 2017 in EUR million

	2015	2016	2017
Slovak Republic	13 170	13 523	13 051
Czech Republic	24 149	26 010	28 417
Poland	185 783	193 635	206 570
Hungary	15 642	14 807	14 558

Source: own processing based on data from OECD database

Notes: the values for the Czech Republic and Hungary were converted each year by the ECB exchange rates of the last day of that year

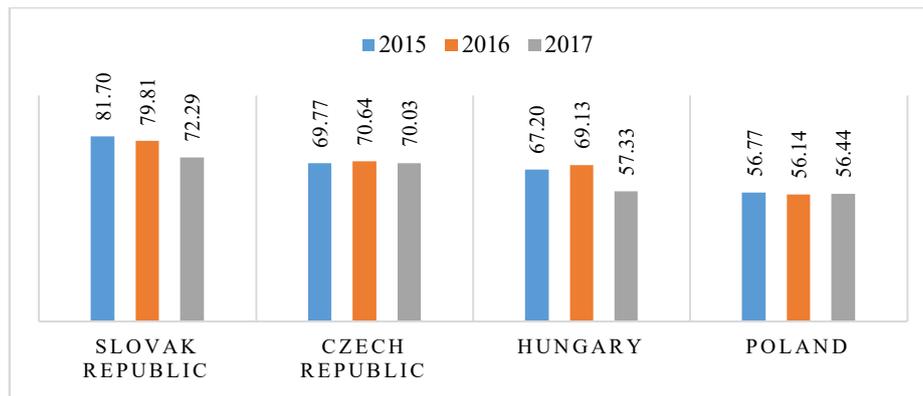


Fig. 1. Percentage of loans granted to SMEs in total business loans between 2015 and 2017 in %. Source: own processing based on data from OECD database

Despite the fact that Poland achieved the highest absolute value of SME loans among the V4 countries each year, it is now at the lowest percentage. Thus, of the total amount of business loans granted, only around 56 % of them in Poland go to SMEs.

Of all the countries analyzed, Slovakia reported the lowest absolute amount of loans received for SMEs, but these represented on average 77 % of all business loans granted over the three years analyzed. Czech SMEs used on average 70 % of the total volume of provided loans and Hungary on average 64 % in three analyzed periods.

Analysis of state aid.

Based on OECD statistics, we have compiled Figure 2, which shows that state aid in the form of guarantees has been increasing only in Poland and Hungary. As the total volume of guarantees provided increases, their real drawdown also increases in these countries, while the percentage remains at the same level. Poland uses 56 % guarantees in each year of the reference period. Hungary increases the volume of government guarantees by 30 % on average year on year, and Hungarian SMEs use this form of state support to 82 % in each year of the chosen period.

The government guarantees provided in Slovakia and the Czech Republic have decreasing nature, as are their drawdowns by SMEs. On average, Slovak SMEs used only 28 % of government guarantees. Of the total amount of 516 millions EUR, Slovak Government guaranteed, SMEs used only 138 millions EUR. Czech SMEs used state guarantees in 69 % share in each year of the analysed period.

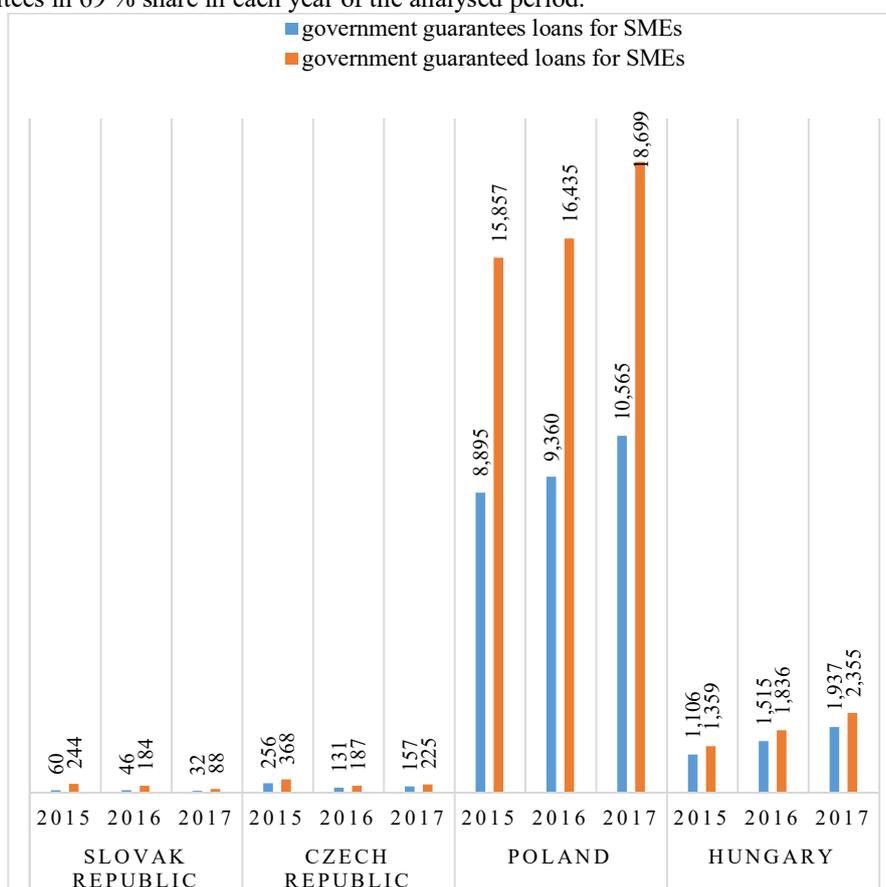
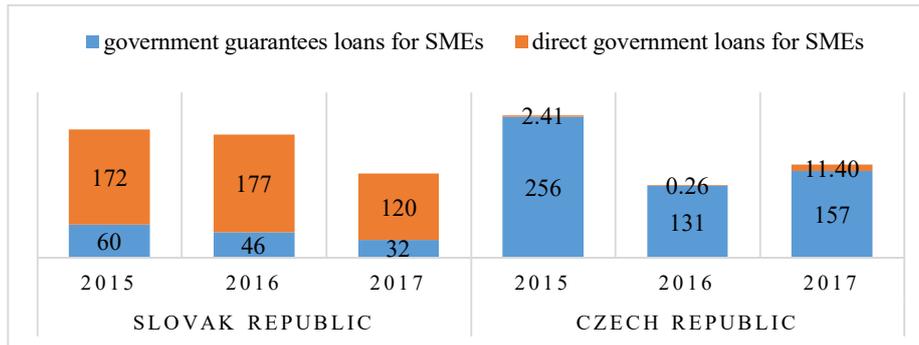


Fig. 2. Government guaranteed and guaranteed loans in V4 between 2015 and 2017 in EUR million. *Source: own processing based on data from OECD database.*

Notes: the values for the Czech Republic and Hungary were converted each year by the ECB exchange rates of the last day of that year

Figure 3 shows the amount of aid provided by the Czech and Slovak Governments in the form of the guarantees and direct government loans. The amount of government direct loans in the Slovak Republic increased by 5 millions EUR in 2016 compared to 2015, but in the following period there was a decrease of 57 millions EUR. As we can see, direct government loans were almost four times bigger than the amount of guaran-



tees.

Fig. 3. Amount of state aid in Slovak and Czech Republic between 2015 and 2017 in EUR million. *Source: own processing based on data from OECD database.*

Notes: the values for the Czech Republic were converted each year by the ECB exchange rates of the last day of that year

In the Czech Republic, it is the guarantees that have a dominant position over direct loans. The amount of direct government loans in the Czech Republic are 70 times lower in 2015 compared to those in Slovakia, up to 680 times lower in 2016, and only 10 times higher in 2017.

Venture capital

Venture capital is mainly used for start-up SMEs, which do not have enough own funds. Venture capital helps finance the start of a business, its development or expansion, when a venture capitalist acquires an agreed share in the company's equity as the provision of a certain amount of funds.

The use of venture capital in the countries we analyze is shown in Figure 4. Slovak SMEs used almost 13 millions EUR in 2015 through venture capital, in 2016 this amount increased slightly to 17 millions, but then fell sharply to 2,91 millions EUR in 2017. Czech SMEs used an average of 10 millions EUR in venture capital. In Hungary, SMEs received almost 88 millions in venture capital in 2015. In the following periods, it was only around 38 millions.

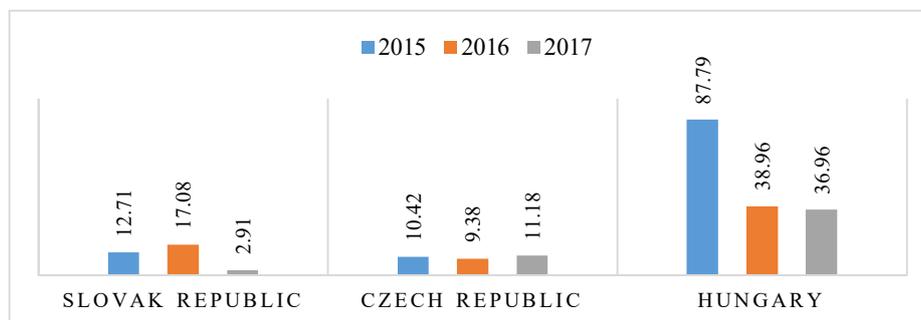


Fig. 4. Amount of used sources through venture capital between 2015 and 2017 in EUR million. *Source: own processing based on data from OECD database*

Notes: the values for the Czech Republic and Hungary were converted each year by the ECB exchange rates of the last day of that year

The potential of venture capital is not realized in these 3 countries. This is due to concerns about the loss of control over the company, independence in decision-making, and the under-representation of venture investors in these countries.

In Poland, this type of resource is used extensively and the amount of funding received from venture investors has increased in each year of the analysed period, from the original 108 billions EUR in 2015 to almost 200 billions EUR in 2017, as shown in Table 7.

Table 7. Amount of used sources through venture capital in Poland between 2015 and 2017 in EUR million

year	2015	2016	2017
amount of venture capital	108 258	134 514	189 909

Source: own processing based on data from OECD database

Other forms of alternative funding sources

The results of the Slovak Business Agency survey show that Slovak family businesses are predominantly dependent on their own resources to start and develop their business. The only alternative or rather complementary source of financing is bank loans. Only about 8,5 % of family businesses have used Eurofunds. (Slovak Business Agency, 2018)

5 Conclusion

FOB face the same financial constraints as non-family businesses, but also face specific problems linked to the choice of financial resources but also to succession. This transfer

of ownership in a family business may cause financial constraints that may affect the future of the business.

The issue of SMEs financing, where we include family businesses, is still a current issue and also one of the subjects of the European Union's policies, its institutions and is further distributed at national level.

According to Slovak Business Agency survey, the financing of Slovak family businesses is lacking in more modern forms of financing such as crowdfunding or venture capital, both in terms of access and use.

The Slovak venture capital market is negligible compared to other European Union countries. This is also evidenced by the fact that Invest Europe must elaborate report separately for the CEE region, because in EU report the Slovak venture and private equity market belongs to the "other" countries of Central and Eastern Europe.

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MOBILE INTERNET BEFORE FIFTH GENERATION CELLULAR SYSTEMS (5G) (Determinants of Internet Coverage and Its Quality)

Patrik Jankovič

University of Economics in Bratislava
Department of Economic Policy
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
patrik.jankovic@euba.sk

Abstract. Cellular network infrastructure is a vital part of everyday tasks. Significant proportion of economy depends on access to the internet. World leading economies compete in development of fifth generation cellular infrastructure (5G). 5G network is crucial for introduction of internet of things (IOT) based on device-to-device communication. IOT will increase living standards, improve communication possibilities and boost productivity through automatization of routine tasks. The main objective of this article is to analyze determinants of mobile internet network coverage among world regions before 5G. Firstly, we use World Telecommunication/ICT Indicators Database to map existing cellular network generations (basic, 3G and 4G) in 228 countries. Later, we introduce internet quality measure with emphasis on 3G and 4G distribution among country populations. Finally, we use simple OLS regression approach to capture main determinants of internet coverage and its quality.

Keywords: internet network coverage, broadband adoption, economic determinants, fifth generation cellular system.

JEL classification: O11, O31, C01

1 Introduction

Debate about fifth generation of cellular infrastructure became a hot topic in the last months. The reason is not just a rivalry between the United States, China and European Union in tech issue, but because the 5G infrastructure has become a key battleground in a broader struggle for control over the industries of the future. Europe has meanwhile been caught on its back foot and urgently needs to develop a strategy to not only guide it through the current 5G debate, but also the tech rivalries that are still to come (Voelksen et al., 2019).

1.1 Why is 5G Cellular Network so Important?

As the next big step on the way to digital transformation, 5G will have an enormous impact on mankind. It will undoubtedly disrupt the way we live and work today. It will go beyond mobile broadband, and impact self-sustaining modern human establishments like smart cities, robotics, self-driving cars, and foster innovation in critical sectors such as healthcare, agriculture and education. It will accelerate the global market, reach and reshape the competitive landscape. The 5G network will become the differentiator that will foster new innovations with its ability to deliver unprecedented productivity gains, while pioneering new distribution and consumption models (Gurnani, 2019). 5G will boost the digital transformation of world economy. It is a great opportunity to take an advantage of internet of things (IoT) based on the device-to-device (D2D) communication. The proliferation of heterogeneous devices connected through large-scale networks is a clear sign that the vision of the IoT is getting closer to becoming a reality. Many researchers and experts in the field share the opinion that the next-to-come fifth generation cellular systems will be a strong boost for the IoT deployment (Militano et al., 2015). IOT is a promising technology which tends to revolutionize and connect the global world via heterogeneous smart devices through seamless connectivity. 5G mobile network, in particular, aims to address the limitations of previous cellular standards and be a potential key enabler for future IoT (Akpakwu et al., 2017).

1.2 Importance of Digitalization

Digitalization can be understood as a transformation from economies based on the analogous data to the society driven by digital form of data. It brings numerous opportunities for further analyses and invention of new data driven technologies. Process of digitalization and previously the usage of ICT technologies were identified as a significant determinant of productivity and economic growth in wide range of economic literature.

Literature is summarized well by Kretschmer (2012). His meta-analysis concludes ICT technology as a type of general-purpose technology. Its adoption increases productivity in all sectors of economy. Productivity effect of ICT adoption is not only significant and positive, but also increasing over time. Kretschmer points out that the investment to the physical ICT infrastructure has to be complemented by education of digital skills and organizational investment.

Analysis by Lehr et al. (2006) on US regional panel data between 1998 and 2002 proves that positive effect of broadband investments on economic growth and employment. Later, results by Koutroumpis (2009) address positive link between a critical mass of internet infrastructure and economic growth. According to their results 10-point increase in broadband adoption lead to 0.7% – 1% GDP growth in 22 OECD countries between 2002–2007. The theory about critical mass of internet infrastructure later validate Qiang et al. (2009). They claim that 10 percent increase in the internet penetration results to 1.38 percentage point increase in GDP and that growth benefit for developing countries is of similar magnitude as for developed economies.

Katz et al. (2013) used complex digitalization measure and collected feasible panel data for period 2004 and 2010. Their econometric analysis suggests that 10-point increase in the digital index increased GDP by approximately 3% in 2004 – 2010 period with an annualized effect of 0.50% GDP. The effect increases with higher development of the country.

Literature finds that digitalization has also positive effect on many social aspects. Greater digitalization enables a society to be more transparent and e-government services to be more effective in a digitized environment. 10-point increase in digitalization increases the Transparency International index by approximately 1.2 points and fosters an improvement in the effectiveness of e-government services (as measured on the UNPAN E-government Development Index) by approximately 0.1 points (Sabbagh et al., 2012). Authors underline that causality acts both ways in many cases – endogenous issue.

1.3 Determinants of broadband adoption

Income, education and previous broadband penetration were identified as key determinants for broadband adoption. We use these variables in our analysis as well. There are also variables like broadband price, internet content and platform competition which are not available or would significantly decrease the number of our observations (Lin et al. 2013, Rogers, 2003).

Issue which we need to have in mind during the article is endogeneity dilemma. Mainly income and education variables are with a risk of endogeneity with broadband as is further examined in the Lin et al. (2013). They use panel data of homogeneous sample of OECD countries to avoid this problem. Unfortunately, we don't have such a rich data and need to rely on existing literature conclusions.

2 Model and Data

2.1 Sources of data and data explanation

We obtained data about percentage of population covered by basic, 3G and 4G cellular network from International Telecommunication Union (ITU). ITU offers the World Telecommunication/ICT Indicators Database with chronological ICT time series 1960-2017 for 236 countries and territories. In this article we focus just on cross-sectional analysis in the last available year 2017. The reason is simple, mobile cellular network started to spread just recently. We can recognize that data about basic internet broadband started to be reported gradually during the first half of 90's. The boost in basic cellular internet network is dated on 1996. Reporting of basic mobile internet decreased in 2006, when 3G cellular network adoption started. 4G infrastructure adoption begun in 2011 (Graph 1).

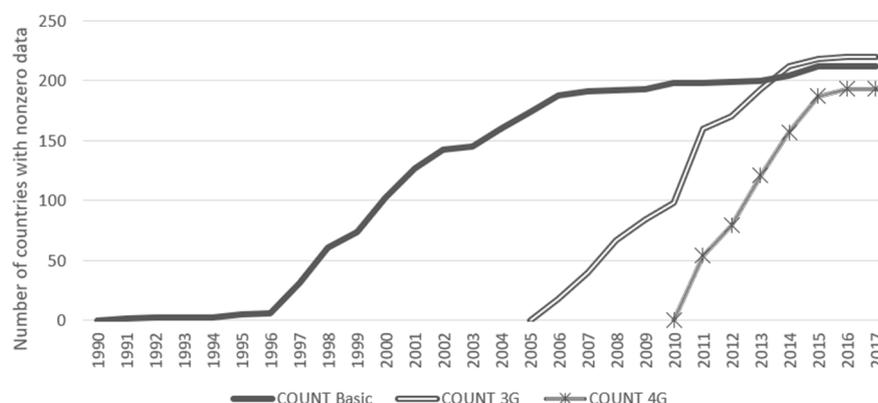


Fig. 1. Reported presence of nonzero data about basic, 3G and 4G cellular network in the particular year. *Source: ITU 2018 and author's calculations*

To avoid issue about unpublished data, we edited ITU dataset empty spaces. If data for 2017 was not available in some case, we used the information about the year before. If the country did not report basic means of cellular network anymore, we relied on the last published data from this level or used higher generation penetration coverage also for basic network (in the case the coverage of basic network was lower than 3G or 4G). Figure 1 describes well the adoption process of broadband infrastructure. We can recognize different slope in each generation adoption. Modest adoption of basic generation of bandwidth created good environment for sharp increase for next generations of cellular infrastructure.

2.2 Special Index to Evaluate Penetration of Each Generation of Cellular Network

To evaluate penetration of all 3 generations of cellular network (our model dependent variable), we had to come up with simple index, which would be able to compare all 3 levels of cellular network penetration for 228 countries. We measure 3 levels of cellular network penetration (Basic, 3G and 4G) using the surface of the square with the size of 1x1 (Figure 2). The height of the square is the sum of equally weighted internet network types (weight is 1/3). Width is 1 – what corresponds 100% population coverage. If the country has no internet at all, the index is equal 0 and if the population is fully covered by Basic, 3G and 4G internet, index reaches value of 1. In the first section of Figure 2 we can recognize that Slovakia's index is close to 1. Belarus covers 100% of population with 3G and 4G network, but its composed index will be lower than the Slovak one.

There is one aspect this Index does not cover. In the last two sections of the Figure 2 we see that Index does not treat unequal distribution of higher internet infrastructure means. There is some intuition behind to think about this dilemma. We should think about if it is better to have wider penetration of basic networks or if it would be more valuable to cover some population with faster bandwidth, but for the price, that some

population will be without any internet at all. Such a case is depicted in the section 2 of Figure 2. Turkmenistan covers with basic internet just 76% of population and its quality Index score is 0.66. Afghanistan provides basic cellular network to 89% of population, but its score is only 0,38. The same trade off can be seen in the section 3 between Madagascar (Basic=78% and Index 0,55) and Eritrea (Basic=85% and Index 0,28). We would address this trade-off to the discussion section.

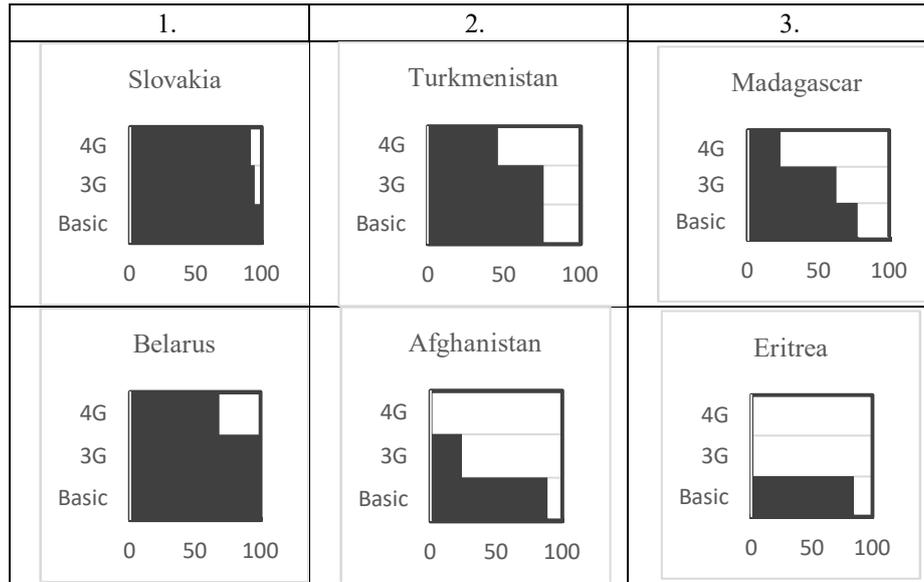


Fig. 2. Percentage of population covered by basic, 3G and 4G means of cellular network.
Source: ITU 2018 and author's calculations.

3 Model – What determines Cellular Network Adoption?

In our model we try to find main determinants of different cellular network adoption in wide range of countries. Cross-sectional dataset about 158 countries (Table 1) allows us to run simple OLS linear regression models and compare the power of independent variables on our Index as well as for Basic and 4G network adoption among the world. The purpose is to find, which determinants significantly influence the internet network adoption in wide range of world regions.

Table 1. Variable Review and Statistics

Code	Variable	Source	Min	Max	Median	Average
Basic	Percentage of the population covered by a mobile-cellular network	ITU (2017)	50.0	100.0	99.0	95.7
3G	Percentage of the population covered by at least a 3G mobile network	ITU (2017)	0.0	100.0	95.0	84.3
4G	Percentage of the population covered by LTE/WiMAX mobile network	ITU (2017)	0.0	100.0	78.3	63.2
Index	Measure introduced in the section 2.2	Own calculation	0.24	1.00	0.90	0.81
GDP pc	GDP per capita, PPP (current international \$)	WB (2017)	738	124609	14588	22684
PD	Population density (people per sq. km of land area)	WB (2017)	2.02	20628.6	87.12	401.26
Urban	Urban population (% of total population)	WB (2017)	12.71	100.00	60.95	59.79
SET	School enrollment, tertiary (% gross)	WB (2015-17)	0.64	118.44	34.01	38.15

Source: ITU 2018, World Bank and author's calculations

In the first set of regressions we focus on dependent variable - Index we came up in section 2.2. We estimate how it is explained by GDP per capita in thousands of PPP current dollars, tertiary school enrolment rate in percentage, share of urban population and population density. GDP per capita is a proxy for country development level, tertiary enrollment rate is the variable representing human capital together with digital literacy and share of urban population as well as population density are aimed as proxies for practical geographical difficulties for network construction. If the population is more concentrated, the cost for network adoption are expected to be lower, it is easier to cover whole population.

$$Index = \beta_0 + \beta_1 GDPpc + \beta_2 SET + \beta_3 PD + \beta_4 Urban + \varepsilon \quad (1)$$

We estimate models 2 and 3 to compare what is the impact of our simple determinants on the spread of basic and fourth generation network. First one is the time aspect. Basic network started to be adopted sooner, what means that underdeveloped countries had enough time to build this basic infrastructure. We also expect that countries which adopted networks sooner have better base for adoption of oncoming generations of mobile internet. We test this hypothesis in model 4 where we check robustness of explanatory variables on 4G. We test if the coefficients for GDP pc and education changes in

the case we account also for previously adopted basic network as explanatory variable in model 4.

$$Basic = \beta_0 + \beta_1GDPpc + \beta_2SET + \beta_3PD + \beta_4Urban + \varepsilon \quad (2)$$

$$4G = \beta_0 + \beta_1GDPpc + \beta_2SET + \beta_3PD + \beta_4Urban + \varepsilon \quad (3)$$

$$4G = \beta_0 + \beta_1GDPpc + \beta_2SET + \beta_3PD + \beta_4Urban + \beta_5Basic + \varepsilon \quad (4)$$

In the last model 5 we check if nonlinear equivalent regression could have better explanatory power. We focus on the variable of economic development in exponential form.

$$4G = \beta_0 + \beta_1GDPpc + \beta_2GDPpc^2 + \beta_3SET + \beta_4PD + \beta_5Urban + \varepsilon \quad (5)$$

In the next section we present results of our OLS cross-sectional models.

4 Results

Results from the first set of regressions (models 1a, 1b, 1c and model 1 with dependent variable Index) show that GDP per capita as well as tertiary education enrollment rate are statistically significant on 99% significance level. Population density and share of urban population are not significant at all (quite surprising for us). When GDP per capita increases by 1000 USD our composite index rises by 0,00317 point (model 1). Similar increase of 0,00303 in index is caused by tertiary education enrolment rise by 1 percentage point on average among countries.

Table 2. Determinants of Cellular Network Index

VARIABLES	(1a) Model 1a	(1b) Model 1b	(1c) Model 1c	(1) Model 1
GDP pc	0.00306*** (0.000575)	0.00342*** (0.000633)	0.00281*** (0.000663)	0.00317*** (0.000717)
SET	0.00331*** (0.000484)	0.00322*** (0.000487)	0.00311*** (0.000552)	0.00303*** (0.000554)
PD		-9.18e-06 (6.90e-06)		-9.04e-06 (6.92e-06)
Urban			0.000571 (0.000757)	0.000542 (0.000755)
Constant	0.615*** (0.0196)	0.614*** (0.0196)	0.594*** (0.0339)	0.594*** (0.0339)
Observations	158	158	158	158
R-squared	0.507	0.513	0.509	0.514

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: ITU 2018, World Bank and author's calculations

Table 2 further discloses that our model 1b and model 1 explain just half (51,4%) of the total variation in our model. Results of this simple regression looks quite robust when we compare coefficients for GDP per capita and tertiary enrolment rate across 4 models – we continue to use model 1 – like constructions in the next analysis.

Table 3. Determinants of Cellular Basic and 4G generations

	(2)	(3)	(4)	(5)
VARIABLES	Model 2	Model 3	Model 4	Model 5
GDP pc	0.0658* (0.0378)	0.647*** (0.127)	0.576*** (0.122)	1.639*** (0.321)
GDP pc ²				- 0.0108*** (0.00304)
SET	0.0759** (0.0291)	0.537*** (0.0980)	0.455*** (0.0951)	0.239** (0.110)
PD	-0.000214 (0.000364)	-0.00167 (0.00122)	-0.00144 (0.00116)	0.000396 (0.00123)
Urban	0.0249 (0.0398)	0.0492 (0.134)	0.0221 (0.127)	-0.0147 (0.123)
Basic			1.084*** (0.258)	0.941*** (0.252)
Constant	89.95*** (1.783)	25.77*** (5.991)	-71.76*** (23.90)	-60.86*** (23.23)
Observations	158	158	158	158
R-squared	0.189	0.531	0.580	0.612

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: ITU 2018, World Bank and author's calculations

In the second part of analysis (Table 3) we use models 2, 3 and 4 to check what is the influence of our determinants on basic and 4G network adoption. The model 5 is a check if the GDP per capita would be nonlinear. We need to be careful about the model interpretations, because we don't use Index ranging 0-1, but percentage of population covered by basic and 4G mobile cellular system ranging 0-100.

Model 2 (Basic) and model 3 (4G) show us that in the case of adoption of basic means of Internet GDP per capita as well as in the case of tertiary education do not show so high and so significant results for coefficients as in the 4G case. This can be caused by low variability in basic internet variable. We proved our hypothesis from the

section 2.1. Basic cellular systems are already developed in the most of countries now independently from education and economic development. In the case of 4G is the situation different. Education and GDP per capita are strong determinants for 4G coverage with potential implications also for further fifth generation of cellular network development. This is underlined by the volatility explained by 2 models. Model 3 explains 53,1% of total volatility and in model 2 it is just 18,9%.

Model 4 explains how important for the adoption of higher generation of cellular system it is to already have developed basic network. In model 4, which explains 58% of overall variability in 4G coverage, an increase of basic network by 1 percentage point increases adoption of 4G by more than 1 percentage point in average among countries (concretely 1,084 percentage point). GDP per capita as well as tertiary education coefficients present quite robust results. Coefficients for GDP per capita and education are still significant even after the introduction of significant explanatory variable Basic in model 4.

The last model 5 brings a strong argument to the discussion. Its result shows that there is rather an exponential than linear relationship between adoption of 4G cellular system and GDP per capita. Model indicates that for poor countries a little difference in GDP per capita means sharp adoption of 4G network and as countries are getting richer, the importance of this explanation variable diminishes. It is quite intuitive that between rich countries are differences in GDP per capita higher in comparison to adoption of internet. Most of reach countries have almost 100% coverage of cellular systems. For this reason, our analysis has better explanatory power for developing world.

5 Conclusions and policy implications

Development and the next race in adoption of fifth generation cellular system will have significant impact on technological dominance as good environment for internet of things and later joint innovative technologies. Recent discussion indicates that 5G internet introduction is a question of few years and we need to be prepared to use its advantages and opportunities. In other case European Union as well as Slovakia would lag behind the dominant technology developers in United States and China.

We introduced simple measure to take account different generations of cellular systems adoption. This approach could bring new insides to the comparison between digital development of countries. The inequality of internet quality network adoption should be further investigated. Proposed index cannot fully treat dis dimension.

Simple OLS regression analysis shed some light on why some countries are more prepared for the digital age and which policies should be used to support process of digitalization. While our dependent variable is limited from both sides (values from 0 to 1 or from 0 to 100), we need to use Tobit model analysis in next step for reliable results.

Results of our analysis is more valuable for developing countries. We significantly prove that policies in the field of education and previous investment in internet systems, prepare countries to adoption of new 5G technology. Endogeneity issue causes that

even GDP per capita has very strong explanatory power it would be nonsense to recommend increase in GDP as a policy for better internet coverage. But this analysis shows that inequality is transmitted from GDP per capita to digital divide among countries. We also need to have in mind that this analysis used the simplest OLS regression model and further hypothesis about endogeneity is required.

Acknowledgement

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INTERNATIONAL INVESTMENT LAW IN THE THEORY OF INTERNATIONAL RELATIONS

Martin Karas

University of Economics in Bratislava
Faculty of International Relations
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic

E-mail: martin.karas@euba.sk

Abstract. Despite the recent decrease in global investment flows, foreign direct investment remains of crucial interest to nation states in the global economic relations. Therefore, investment law represents an important agenda for their foreign policy. This paper presents an attempt to incorporate investment law into international relations theory, on the basis of the discussion between neorealism and neoliberalism. The goal of the paper is to interpret investment law within the framework of international relations theory through the competing concepts of national sovereignty and international investment protection.

Keywords: national sovereignty, investment protection, international relations theory

JEL classification: K33

1 Introduction

Although the recent global trends have been those of reduction in the volume of investment throughout the world, foreign direct investment (FDI) remains a key factor in the global economy, both for the host countries and transnational corporations (UNCTAD, 2019). Recent decade has seen significant changes to international regimes which provide the framework for FDI. This paper focuses on one type of these regimes, namely the investment law regimes. While there has recently been a lively debate on the issues of international investment law, sparked mainly by several contentious cases of international investment arbitration¹ (Franck, 2007) (Brocková, 2016), this discussion has generally not been situated within the larger framework of international relations theory, which I will attempt to rectify. The goal of the paper is to provide a framework for

¹ Such *Occidental v. Ecuador*, or *Chevron v. Ecuador*

analysis of investment law, which situates the issues outside a strict legal interpretation and within the broader theory of international relations.

In the first part of the paper, I will present the two (arguably) main theoretical approaches to international relations: neorealism and neoliberalism. I will show how the discussion of these two approaches on the relative relevance of nation states, international organizations and transnational corporations provides a framework of understanding for investment law and the changes that it has gone through in the past decade and a half. In the second part, I will show how this conflict manifests itself on the level of investment law, by presenting the competing concepts of investment protection and national sovereignty. In the third part, I will present the possible directions that research in this area can proceed in order to have relevance for the theoretical framework presented in the first two parts.

2 Neorealism and Neoliberalism as a Framework for analyzing Investment Regimes

In this part, I will characterize the two main theoretical frameworks of the field of international relations and show how the conflict between them can be relevant for analysis of investment regimes. Neorealism (sometimes called structural realism) is considered to have been founded by Kenneth Waltz in 1979 (Waltz, 1979), and further developed by authors, such as Mearsheimer, Walt and others. Although it builds on the tradition of the classical realism, it plays down the influence of human nature on international affairs, and stresses the structural effects of anarchy and distribution of capabilities on the behavior of states (Burchill, 2009). In the neorealist view, this limits the potential for cooperation between great powers, which will seek to maximize their military potential. Neorealism distinguishes three main distributions of power - unipolarity, bipolarity and multipolarity, which have different implications for the global world order and behavior of the states. Of the greatest importance for this paper is the neorealist view of the state as the main, sovereign, and coherent actor of international relations.

Neoliberalism encompasses multiple approaches² to international relations that have been developed more or less in response to the bleak predictions of neorealism as far as the possibility of cooperation between global powers is concerned. Joseph Nye and Robert Keohane are considered to be the founding figures of neoliberal thought. They contend that the relations between societies are not simply functions of relations between states, but include other crucial actors, such as transnational corporations and international organizations. Neoliberalism stresses economy as a source of power of the state. Most importantly for this article, it stresses the influence of international regimes, which enable cooperation in the global arena on economic issues and limit national

² I will not be providing an exhausting list of neoliberal approaches, but will instead focus on the regime theory and complex interdependence. For more on neoliberalism, see Dunne, T. – Kurki, M. - Smith, S. (eds). 2013. *International Relations Theories: Discipline and Diversity*.

sovereignty of states (Dunne et al., 2013) (Schreuer, 1993). Of the greatest importance for this paper is the neoliberal view of the state and its relationship with other actors in the international arena. While the two approaches of neoliberalism and neorealism have found some common ground in the last decades, important differences remain when it comes to the importance that the two theories accord to economic issues and different actors (Burchill, 2009).

For the purposes of this paper, international regimes can be characterized as “implicit or explicit principles, norms, rules and decision-making procedures around which actors’ expectations converge in a given area of international relations” (Krasner, 1983). This means that investment regimes include on the one hand the principles of international investment law, and the regulatory framework of the host state on the other. They consist of the network of bilateral and multilateral investment treaties and international institutions, such as UNCTAD, and institutions of investment arbitration. The relevance of investment law for the theory of international relation rests in its effect on the state and transnational corporations as actors in the international arena. This effect will be illustrated in the next chapter by through the concepts of national sovereignty and investment protection. I will show that the purpose of regimes of investment law differs within the two main theories. Within the neoliberal framework, the goal of investment regimes is to protect foreign investment. Within the neorealist approach, the regimes are set up to provide maximum economic advantage while protecting the regulatory power of the sovereign states.

3 Investment Law as a Conflict between Sovereignty and International Investment Protection

Before I can proceed to sketch out in more detail how can the framework presented in the previous chapter be applied to analysis of investment law, I first need to define the two concepts central to investment law within the theoretical framework presented in the previous chapter. These concepts are 1) national sovereignty and 2) international investment protection. International investment protection can be defined as a set of provisions inscribed in investment treaties whose purpose is to promote foreign investment by setting limits on government intervention vis-à-vis foreign investors, granting rights to foreign investors and protecting these rights through an international arbitration mechanism. These provisions generally include: fair and equitable treatment (FET), full protection and security, most favorable nation treatment (MFN), national treatment (NT), provisions against discriminatory and arbitrary treatment, provisions against unlawful expropriation, free transfers, subrogation, right to international arbitration of investment disputes, and other. As far as sovereignty is concerned, it will be defined here as “a distinct lack of other authority over the state than the domestic authority” (Krasner, 2001:11-12). This definition of the so-called Westphalian sovereignty represents an ideal type, which does not reflect reality, but provides an analytical starting point useful in this context.

It is immediately obvious that the two concepts are contradictory, as investment protection defines specifically those situations, where the state does not have exclusive authority (OECD, 2004). It is this conflict that makes investment law an interesting topic for analysis from the viewpoint of the theory of international relations. If the discussion of neorealism and neoliberalism can be seen as a discussion on the relative importance of nation states and international organizations and transnational corporation, and the issues of sovereignty and interdependence, this discussion can be on the level of investment law translated as the discussion on the issue of national sovereignty versus investment protection. In other words, to view the regimes of investment law through the lens of the theoretical conflict between neoliberalism and neorealism is to view it as a conflict between national sovereignty, which strengthens the state as the main actor of international relations, and investment protection, which strengthens transnational corporations and international institutions.

4 Conflict between the Concepts of Sovereignty and Investment Protection as a Research Problem

In this part of the paper, I will show how can the conflict between national sovereignty and investment protection that I have presented in the previous chapter used as a framework for analysis of regimes international investment law. Regimes of investment law have two main elements. First, the network of bilateral and multilateral investment treaties and second, the mechanism of international investment arbitration (Dolzer - Schreuer, 2012). Applying the framework based on the conflict between national sovereignty and investment protection to investment law opens up several questions which are relevant to the theory of international relations as presented in the first chapter. Perhaps the most pertinent out of these questions is: What are the recent trends in international investment law in relation to the conflict between national sovereignty and investment protection?

An answer to this question would have serious implication for the theory of international relations, as the question essentially asks whether the regimes move towards a neorealist, or the neoliberal view of the international arena. If the investment law moves towards protecting sovereignty, it moves towards the neorealist view. If the investment law moves towards protecting foreign investment, it moves towards the neoliberal view.

In order to answer this question, we can look at both elements of regimes of investment law. On the level of investment treaties, we can perform a content analysis (Kohlbacher, 2006) of a sample of treaties from two different eras, and compare them in terms of the prevalence of the concepts of national sovereignty and investment protection. If there are more provisions that protect national sovereignty than before and the same amount of provisions protecting investors, we could conclude that international investment law moves towards the neorealist view of sovereign states. On the level of investment arbitration, we would need to look at the awards of the transnational tribunals. We would be comparing decisions from different eras in terms of their use of the concepts of national sovereignty and investment protection in a similar way. If the

tribunals give more weight to argument based on the sovereignty of states than before, we could plausibly claim that investment law is moving towards the neorealist view of international relations.

5 Conclusion

This paper presented a theoretical framework for analysis of regimes of investment law based on the theory of international relations. I provided an overview of the two main approaches of neorealism and neoliberalism and presented the conflict of these approaches on the issue of sovereignty and relevance of nation states, transnational corporations and international organizations in the global arena as the basis for theoretical analysis of investment law. I then proceeded to provide a closer look at the conflict between the concepts of investment protection and national sovereignty as the basic for this analysis and linked these concepts to the neoliberal and neorealist approaches. In the last part I sketched out a way of how to apply this framework to research in the field of international investment law, where this framework can help to answer questions regarding the direction that investment treaty-making and investment arbitration are taking in relation to the concepts of sovereignty and investment protection.

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MATHEMATICAL METHODS FOR ASSESSING THE FINANCIAL CONDITION OF AN ENTERPRISE AND DIAGNOSING BANKRUPTCY

Tatiana Katkova¹ and Hanna Aliksieieva² and Larysa Horbatiuk³
and Nataliia Kravchenko⁴

¹University of Customs and Finance Department of Cyber security, Department of Innovative Technologies V. Vernadsky street 2/4 Dnipro 49000 Ukraine,

^{2,3,4}Berdyansk State Pedagogical University Faculty of physical, mathematical, computer and technological education Shmidta St., 4 Berdyansk, Zaporozhye region Ukraine, 71112

¹777-kit@ukr.net

²alekseeva@ukr.net

³loravas@ukr.net

⁴natalyvkrauchenko@gmail.com

Abstract. For assessing and predicting the financial condition of the enterprise for many years, mathematical methods are widely used. The paper analyzes the well-known methods of diagnosing the financial condition using the methods of rank and regression analysis, the method of pairwise comparisons, expert bankruptcy diagnostics technologies and production systems. Their common drawback is revealed, it is insufficient consideration of uncertainty. It occurs when solving the problem of diagnosing the state due to the possible inaccuracy of setting the values of financial indicators. In addition, the described methods for assessing the financial condition are not structurally oriented towards using the exact correspondence between the numerical values of the controlled parameters and the state of the object. A more effective tool for assessing the state of controlled objects is a fuzzy expert system. The accuracy of assessing the state in such a system can be made arbitrarily high and limited only by the number of controlled parameters, the accuracy of their measurement, and the correctness of the conclusions that make up the rules.

Keywords: Bankruptcy, Financial Condition of an Enterprise, Mathematical Methods.

JEL classification: C02, G30

1 Introduction

In modern conditions of a market economy, the correct assessment of the financial condition and timely diagnosis of bankruptcy is the key to the survival of the enterprise. The financial condition is the state and effectiveness of the use of financial resources

for the time being. The financial condition of the enterprise is a determining factor in the effectiveness of its functioning. Moreover, of the many possible states, the most interesting is the critical state – the bankruptcy of the enterprise.

The purpose of the work is to analyze known methods of diagnostics of financial condition such as rank and regression analysis, method of paired comparisons, expert technologies of bankruptcy diagnostics and production systems, to identify their shortcomings, as well as to justify the use of fuzzy expert system as a more effective tool for assessing the state of controlled objects.

Bankruptcy is one of the legal grounds for the closing down of enterprises. The importance of on time diagnosis of bankruptcy is associated with the following reasons (Ansoff, 1979). Firstly, at present, the crisis of non-payments has become a fairly typical phenomenon for the economy of our country. This fact makes it economically feasible to redistribute funds and property from inefficient business entities to efficient ones. The possibility of implementing this procedure arises precisely from the results of bankruptcy diagnostics. Secondly, due to the high level of insolvency of a significant part of the Ukrainian economic entities of the country, measures to prevent crisis situations and stabilize the financial condition of the enterprise are becoming increasingly important.

In (Ansoff, 1979; Holt, 1993) the main external and internal causes of bankruptcy of an enterprise are listed. External factors arise as a result of the dynamics of macroeconomic development indicators of leading countries and depend on the level of the world financial system, the stability of international trade and the movement of capital, and the characteristics of customs activity. Internal factors are determined by the unjustified economic policy of the government, political instability of the society, imperfection of the legislative base, low level of integration of the domestic economy, inefficient use of foreign capital investments, worsening domestic and foreign markets. In (Holt, 1993) specific symptoms of approaching bankruptcy are given. One of the first signs is a drop in the company's profitability below the cost of capital. At the same time, the interest on the loan and the dividends paid by the company no longer correspond to the market conditions of management. The profitability of investments in this company decreases, due to the decline in the value of equity capital, the price of shares falls, the risk of non-return of funds increases, and cash difficulties arise. As a result, the crisis is growing due to a sharp change in the structure of the balance sheet of the enterprise; difficulties arise with cash and a sharp decrease of cash in the accounts; there is an increase in accounts payable and receivables, etc. The subsequent natural processes resulting from this lead to bankruptcy and the possible closing down of the enterprise.

For evaluating and predicting the financial condition for many years, mathematical methods have been widely used.

1.1 Methodology

While working on the theoretical part of the article, a secondary study of the available literature on issues in mathematical methods for assessing and predicting the financial condition of an enterprise was carried out.

The traditional mathematical methods for assessing the financial condition analyzed, such as: multidimensional discriminant analysis, methods of rank and regression analysis, pairwise comparisons, expert bankruptcy diagnostic technologies and production systems.

2 Diagnostics of financial condition by the system of financial indicators

For a start, we examine classical statistical methods. Corresponding models determine the classification procedure, which with a certain degree of accuracy classifies the analyzed company as a group of potential bankrupts or a group of companies with a favorable financial situation. The use of such models is fraught with the possibility of the appearance of two types of errors (Watsham, 2002; Gilyarovskaya, 2015). Mistake of the first type: a bankrupt company is classified as a company with a favorable financial position. Mistake of the second type: a company with a normal financial condition is classified as a potential bankrupt. Both errors can lead to serious consequences and losses.

Known methods for assessing the financial condition of a company are different, but they all use and rely on a certain system of financial indicators (coefficients). In (Watsham, 2002), these indicators characterize certain areas of financial activity of firms. In (Sheremet, 2014), these indicators (coefficients, criteria) are classified and grouped in accordance with their economic sense, the sources of settlement data (forms and accounts of accounting), and formulas for their calculation are indicated. Unfortunately, these techniques are not adapted to the Ukrainian financial statements and the legislative framework of Ukraine in the field of economics, which negates their advantages and makes their direct application impossible.

These shortcomings are eliminated in the system of indicators proposed in (Martynov, 2007), which is based on the classification of criteria for assessing the financial stability of a company. This system provides a comprehensive analysis of the functioning of the enterprise in a market economy. It fully takes into account Ukrainian legislation, financial reporting forms developed and approved by the Ministry of Finance of Ukraine.

The proposed set of relative financial indicators in accordance with their economic meaning is divided into a number of characteristic groups: assessment of the property status of the enterprise; liquidity assessment; assessment of financial stability; profitability assessment; assessment of business activity; assessment of market activity. This set of indicators can be used in the methodology for assessing the financial condition of a company in order to predict bankruptcy.

Forecasting bankruptcy as an independent problem arose in the middle of the last century.

The first serious results of solving the problem led to the formation of two main approaches to forecasting bankruptcy. The first is based on the analysis of financial data (Altman Z-coefficient (USA), Tuffler coefficient (Great Britain), etc.). The second

uses data on bankrupt companies and compares them with the corresponding data of the company under study.

2.1 Multivariate discriminant analysis

The first approach to solving the bankruptcy diagnosis problem is based on the use of multidimensional discriminant analysis methods. These methods are included in the class of methods developed to solve a more general problem – pattern recognition (Duda, 2001). On the other hand, experts in the field of statistics believe that this problem is a special case of the standard task of mathematical statistics – testing statistical hypotheses (Afifi, 1982).

The well-known technology for solving these problems is based on the following (Afifi, 1982; Michie, 2009). There is a collection of n objects extracted from two (or more) populations. Each, for example, j object is characterized by a set of p controlled parameters $X_j = (x_{j1}, x_{j2}, \dots, x_{jp})$, $j = 1, 2, \dots, n$. In this case, alternative situations are considered: first, conditional distribution densities are known $\phi_j(x_{j1}, \dots, x_{jp})$ each of the parameters $k \in \{1, 2, \dots, p\}$ provided that the object belongs to the population W_j , $j \in \{1, 2, \dots, J\}$; second, these densities are not known. The task is to build some kind of decisive rule that allows you to determine whether each of the objects belongs to one of the general populations. In problems of discriminant analysis for a particular case when a two-alternative problem is solved, this rule is implemented by constructing the so-called discriminant plane

$$a_1 x_{j1} + a_2 x_{j2} + \dots + a_p x_{jp} = z_0, \quad (1)$$

dividing the p -dimensional factor space into two subspaces. Let the set $X_j = (x_{j1}, x_{j2}, \dots, x_{jp})$ – corresponds to measurements of p parameters of the j object. Substituting X_j into (1), we obtain either

$$a_1 x_{j1} + a_2 x_{j2} + \dots + a_p x_{jp} \geq z_0, \quad (2)$$

or

$$a_1 x_{j1} + a_2 x_{j2} + \dots + a_p x_{jp} < z_0, \quad (3)$$

In the first case, the object is attributed to the population W_1 , in the second – W_2 . It is assumed that the aggregates W_1, W_2 are distributed normally with mathematical expectations $(m_{11}, m_{12}, \dots, m_{1p})$ and $(m_{21}, m_{22}, \dots, m_{2p})$ respectively, with the same covariance matrix (σ_{ij}) .

The numerical values of the coefficients of the discriminant function and the value of the discriminating parameter z_0 are found using the technique (Afifi, 1982).

A similar technology is used when the parameters of multidimensional distributions for W_1, W_2 are unknown. Unknown parameters $(m_{11}, m_{12}, \dots, m_{1p}), (m_{21}, m_{22}, \dots, m_{2p})$

and (σ_{ij}) , are preliminarily estimated statistically from a set of real data in accordance with standard methods for estimating the parameters of distributions of random variables (Afifi, 1982; Michie, 2009). After that, the parameters of the discriminant function are calculated, and relations (2) and (3) are used to solve the classification problem.

It is clear that this situation is more realistic and therefore implemented in practice. At the same time, the design features of the described procedure for constructing discriminant functions determine the reasons why the standard technology of discriminant analysis does not allow to obtain universal ratios for assessing the financial condition of enterprises (Matviychuk, 2010). Actually, the accuracy of forecasts using specific discriminant multifactor models substantially depends on what constitutes the sample processed during model building. It is important to consider: the composition of indicators of financial condition; sample size; high-quality structure of those parts of the sample that contain bankrupt enterprises and enterprises operating safely; whether enterprises belong to the same industry; level of homogeneity of the parts of the sample; level of representativeness of the sample.

Consider the most famous bankruptcy detection techniques.

In the model of W. Beaver (Beaver, 1966), real values of state indicators are compared with their normative values for the three states of the company, calculated by W. Beaver for successful companies, for companies that went bankrupt within a year, and for companies that went bankrupt within five years.

One of the simplest models for predicting the probability of bankruptcy is the two-factor Altman model. It is based on two indicators: current liquidity ratio – x_1 and leverage ratio – x_2 . These indicators are multiplied by empirical weights, and the results are then added up with some constant value (const). If the result is negative, the probability of bankruptcy is small. A positive result indicates a high probability of bankruptcy. This technology allows, to a first approximation, to divide business entities into potential bankrupt and not bankrupt.

Altman models (1968).

The two-factor model has the form (Altman, 1968):

$$Z = -0,3877 - 1,0736 x_1 + 0,579 x_2.$$

x_1 – the ratio of the residual value of fixed assets to the total balance; x_2 – the ratio of depreciation of fixed assets to the carrying amount of depreciation of fixed assets.

If $Z > 0$, then the probability of bankruptcy is high, if $Z < 0$, then it is low. The accuracy of this model is 65%.

More accurate is the five-factor Altman model (Altman, 2005):

$$Z = 1,2 x_1 + 1,4 x_2 + 3,3 x_3 + 0,6 x_4 + x_5.$$

x_1 – current assets to current liabilities ratio (coverage indicator); x_2 – ratio of retained earnings to total assets; x_3 – the ratio of operating profit to total assets; x_4 – ratio of market value of shares to debt; x_5 – ratio of revenue to borrowed capital.

Standards for Z:

$Z > 2,99$ – the probability of bankruptcy is less 0,1;

$2,77 < Z < 2,99$ – low probability of bankruptcy – from 0,15 to 0,2;

$1,81 < Z < 2,77$ average probability – from 0,35 to 0,5;

$Z < 1,81$ – high probability of bankruptcy – from 0,8 to 1,0.

Altman models can be used to diagnose the risk of bankruptcy for a period longer than 1 year, but the accuracy in this case will decrease.

Lis model (1972) (Fuchedzhy', 2010).

This model was developed for enterprises in the UK, and has the following form:

$$Z = 0,063 x_1 + 0,092 x_2 + 0,057 x_3 + 0,001 x_4.$$

x_1 – working capital to total assets ratio; x_2 – ratio of retained earnings to equity; x_3 – net profit to total liability ratio; x_4 – the ratio of retained earnings to attracted capital.

In case if $Z < 0,037$ there is high probability of bankruptcy; $Z \geq 0,037$ - the probability of bankruptcy is low.

Tuffler model (1977) (Fuchedzhy', 2010)

$$Z = 0,53 x_1 + 0,13 x_2 + 0,18 x_3 + 0,16 x_4.$$

x_1 – the ratio of profit from sales to the cost of production; x_2 – ratio of cash and liquid securities to current liabilities; x_3 – working capital to total assets ratio; x_4 – ratio of retained earnings to total assets.

The value of the Z-account, greater than 0.3, indicates that the company has good long-term prospects, if less than 0.2, then bankruptcy is more than likely.

Springeit model (1978) (Fuchedzhy', 2010)

$$Z = 1,3 x_1 + 3,07 x_2 + 0,66 x_3 + 0,4 x_4 .$$

x_1 – current assets to current liabilities ratio (coverage indicator); x_2 – ratio of retained earnings to equity; x_3 – ratio of sales revenue to average receivables; x_4 – the ratio of operating profit to total assets.

If value Z is less than 0.862, then the company is a potential bankrupt with a probability of 0.92. If $Z < 0$, then the enterprise is bankrupt.

Conan and Holder model (1979) (Conan, 1979).

French economists Conan and Holder proposed a model for calculating the probability of delayed payments that has the following form:

$$Z = -0,16 x_1 - 0,22 x_2 + 0,87 x_3 + 0,10 x_4 - 0,24 x_5.$$

x_1 – the ratio of cash and receivables, calculations and other assets to the balance sheet; x_2 – equity to balance sheet ratio; x_3 – ratio of equity to total liabilities; x_4 – net profit to total liability ratio; x_5 – ratio of revenue to borrowed capital.

A large number of other models for diagnosing the financial condition of enterprises are known.

These well-known models cannot be directly applied to assess the financial condition of Ukrainian enterprises, since they implement their own country-specific methods for reflecting inflation factors and take into account their own characteristics of capital structure and legislative framework (Altman, 2005).

These circumstances initiated the emergence of serious studies of the problem of assessing the financial stability of enterprises conducted by Ukrainian scientists. We note the papers (Matviychuk, 2010; Matviychuk, 2008). In particular, the model (Matviychuk, 2008) has the form:

$$Z = 0.333x_1 + 0.268x_2 + 0.045x_3 - 0.018x_4 - 0.004x_5 - 0.015x_6 + 0.702x_7,$$

where: x_1 - current / non-current assets; x_2 - net sales / current liabilities; x_3 - net sales income / equity; x_4 - balance / net income from sales; x_5 - (current assets - current liabilities) / current assets; x_6 - (long-term liabilities + current liabilities) / balance sheet; x_7 - equity / (provision of the following expenses and payments + long-term liabilities + current liabilities).

The described methods for diagnosing bankruptcy are based on the use of multivariate discriminant analysis, which is based on the following limiting assumptions already noted (Duda, 001; Afifi, 1982): independent variables included in the model are normally distributed; the variance and covariance matrices of a group of successful companies and a group of bankrupt are equal, which in practice are very rarely satisfied.

In addition, a significant drawback of the multivariate discriminant analysis method is that, in most cases, that it is constructively focused on identifying the state for a two-alternative situation: the enterprise is a potential bankrupt or not bankrupt (the probability of bankruptcy is high or small). More informative are methods that provide a more multi-alternative differentiation of the possible conditions of the enterprise. These include ranking and regression analysis methods.

2.2 Rank and regression analysis

Consider the assessment of financial condition by methods of rank and regression analysis.

The simplest version of the method of rank analysis is implemented as follows (Kendall, 1970).

A set of controlled parameters (f_1, f_2, \dots, f_n) – is introduced, the specific values of which characterize the financial condition of the company. The range of possible values of each parameter is divided into several subranges. The range $(f_j^{(c)}, f_j^{(d)})$ of possible values j – parameter is divided into m subbands as follows:

$$(f_j^{(c)}, f_j^{(d)}) = [(f_j^{(c_1)}, f_j^{(d_1)}) \cup (f_j^{(c_2)}, f_j^{(d_2)}) \cup \dots \cup (f_j^{(c_m)}, f_j^{(d_m)})],$$

moreover

where

J^+ – multitude of those indicators for which the best is the highest value. J^- – multitude of those indicators for which the best is the lowest value. J^0 – multitude of those indicators for which the optimal value can be determined $f_j^{(0)}$.

From the extreme values of the indicators obtained using (4), we make up the “ideal” set:

$$(f_1^{ext}, f_2^{ext}, \dots, f_n^{ext}).$$

Now we will choose the most successful enterprise from the condition of proximity to the “ideal” according to the criteria:

$$R_i^{(1)} = \sum_{j=1}^n (f_{ij} - f_j^{ext})^2 \Rightarrow \min$$

or

$$R_i^{(2)} = \sum_{j=1}^n |f_{ij} - f_j^{ext}| \Rightarrow \min.$$

Note that the described traditional bankruptcy risk assessment techniques have the following structural deficiencies.

1. There is no justification for the number of subbands into which the range of possible values for each indicator is divided, and the technology for determining the boundaries of these subbands.
2. A clear border between the subbands resulting from this division of the range can lead to the fact that firms with similar values of the same indicators will be assigned to two different classes.
3. The decision on the risk of bankruptcy is determined using additive criteria. Moreover, the “bad” values of some indicators can be neutralized by the “good” ones, or due to the small weight of the “bad” indicators.
4. When calculating the final bankruptcy risk assessment, firms with close ratings can be assigned to different classes.

A possible way to overcome these shortcomings is to build a multivariate regression equation that relates the value of the final assessment of the financial condition of the company with the numerical values of a set of indicators (Draper, 1986).

Let $f_j, j = 1, 2, \dots, n$, – a set of indicators (factors) of the financial condition of the company;

$a_j, j = 1, 2, \dots, n$, – a set of weights that take into account the relative importance of indicators;

y – final assessment of financial condition.

Then the ratio

$$y = a_0 + a_1 f_1 + a_2 f_2 + \dots + a_n f_n \quad (5)$$

is a regression equation that determines the value of y depending on the values of indicators $f_j, j = 1, 2, \dots, n$.

To evaluate unknown parameters $a_j, j = 1, 2, \dots, n$, equation (5) can be used one of the following approaches.

The first is the implementation of the least squares method in combination with the expert assessment procedure (Raskin, 1979). At the same time, a matrix H of test situations is formed, the elements of which are composed of a combination of sets of numerical values of factors in these situations

$$H = \begin{pmatrix} 1 & f_{11} & f_{12} & \dots & f_{1n} \\ 1 & f_{21} & f_{22} & \dots & f_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ 1 & f_{m1} & f_{m2} & \dots & f_{mn} \end{pmatrix}. \quad (6)$$

Here

f_{ij} – numerical values of j -factor of i -situation $i = 1, 2, \dots, m$; $j = 1, 2, \dots, n$

In addition, the following is formed: a vector Y of expert assessments of the final indicator corresponding to the selected situations,

$$Y^T = (y_1, y_2, \dots, y_m), \quad (7)$$

and also vector A of unknown parameters a_j , $j = 0, 1, 2, \dots, n$,

$$A^T = (a_0, a_1, a_2, \dots, a_n). \quad (8)$$

Then vector HA is a vector of predicted model (5), and the result of y , and functional

$$J = (HA - Y)^T (HA - Y) \quad (9)$$

sets the sum of the squared deviations of the predicted model estimates from the expert ones.

Minimizing (9) by a vector A determines the best set of parameters from the point of view of the least squares method. This vector has the form $\hat{A} = (H^T H)^{-1} H^T Y$. Substituting the components of the vector \hat{A} in (5), we get the opportunity to evaluate the value of the financial condition for any set of numerical values of specific indicators.

An alternative possibility for the implementation of least squares method is to use the available static data on the position and condition of enterprises in the past to construct a matrix H and Y vector.

The least squares method procedure provides a reasonable (based on real data or the results of expert evaluation) correlation, which allows assessing the financial condition of the client by the numerical values of specific indicators of his activity.

In this case, the correct use of the described methodology is possible only if the number of considered factors of the financial condition is not too large. At the same time, about 20 indicators are used in well-known methods for assessing the financial condition of an enterprise. The actual value of the number of parameters of the regression equation can be significantly larger by taking into account the interactions of factors. The difficulty that arises here is that in order to estimate the parameters of the regression equation it is necessary to have a number of experiments substantially greater than the number of parameters.

2.3 Pairwise Comparison Method

Another approach to constructing a regression equation with a deficit of input data uses the pairwise comparison method proposed by T. Saati in (Saati, 1973), called the hierarchy analysis method.

Consider how the coefficients of the regression polynomial are estimated by the method of pairwise comparisons

As it has already been noted, in many practical situations, organizing and conducting the proper number of experiments is not feasible. In these cases, the real alternative is a hierarchy analysis method. The corresponding technology is implemented as follows (Saati, 1993). The expert group forms a set of matrices of pairwise comparisons of the significance of factors. These data are averaged and as a result we receive a matrix $A = (a_{ij})$, where a_{ij} - the average significance level of factor i compared to factor j .

In this case, it is necessary that the following conditions are satisfied for the matrix A elements:

- a) reverse symmetry, i.e. for any pair (i, j) , there was $a_{ij} a_{ji} = 1$;
- b) transitivity, that is, for any triple (i, j, k) there was the equality $a_{ik} = a_{ij} a_{jk}$.

A matrix that has these properties is called consistent. Moreover, as shown in (Saati, 1973), the vector of the desired estimates of the coefficients of the regression equation is defined as the eigenvector of the matrix $A = (a_{ij})$, corresponding to the maximum eigenvalue of this matrix. Later, in (Raskin, 2003), it was shown that for a matched matrix A , the desired vector can be calculated much simpler using the formulas:

$$w_i = \frac{\sum_{j=1}^n a_{ij}}{\sum_{i=1}^n \sum_{j=1}^n a_{ij}}, \quad i=1,2,\dots,n. \quad (10)$$

At the same time, the matrix of pairwise comparisons actually obtained as a result of expert evaluation is not consistent. A simple procedure for iterative matching of a real matrix of pairwise comparisons was proposed in (Raskin, 2003). After the l iteration of matching, there is the matrix $a_{ij}^{(l)}$, $i=1,2,\dots,n, j=1,2,\dots,n$. Then at the next $(l+1)$ iteration, the elements of this matrix are calculated by the formulas:

$$a_{ij}^{l+1} = \left(\frac{\sum_{k=1}^n a_{ik}^{(l)} a_{kj}^{(l)}}{\sum_{k=1}^n \frac{1}{a_{ik}^{(l)} a_{kj}^{(l)}}} \right)^{\frac{1}{2}}, \quad a_{ji}^{(l+1)} = \frac{1}{a_{ij}^{(l+1)}}, \quad (11)$$

where $i=1,2,\dots,n, j=1,2,\dots,n$.

The iterative matching procedure continues until any natural stopping criterion is met. The matrix obtained as a result of matching is used in accordance with (10) to calculate the coefficients of the regression equation. The accuracy of the bankruptcy risk assessments calculated in this case is determined by the accuracy of the matrices

of pairwise comparisons of the importance of particular indicators formed by experts. Moreover, the real accuracy of pairwise estimates is difficult to evaluate.

Assessment of the importance of indicators by pairwise comparisons with scalarization of the vector criterion was considered in detail in (Katkova, 2015).

2.4 Expert Bankruptcy Diagnostics Technologies

Further serious improvement in the quality of technology for assessing the financial condition consists in the use of expert systems successfully used in other areas of modern information technology of artificial intelligence.

Consider expert bankruptcy diagnostic technologies and production systems.

General principles for building expert systems. Expert systems were born as a result of the implementation of success in the field of artificial intelligence. Expert systems are among the intelligent computing systems and are designed to simulate the behavior of experienced experts in solving problems on a particular issue (Jarratano, 2006).

The main element of expert system is the logical inference mechanism, which, using the knowledge base, provides database processing to obtain a solution.

Traditionally, when constructing expert system, logical inference mechanism is used, based on a system of production rules. In this case, the basis of the knowledge base are the rules (they are called production) of the following form: "IF a controlled parameter A_1 of the object has the value a_1 , parameter A_2 has the value a_2, \dots , parameter A_n has the value a_n , THEN the object with probability $P(a_1, a_2, \dots, a_n)$ is in state $H(a_1, a_2, \dots, a_n)$ ".

Production rules, on the one hand, are the most natural way for a person to present knowledge, on the other hand, when solving real problems, their use can be seriously difficult. For a complete description in the form of a system of rules of all possible values of parameters and states, it is either necessary to drastically increase the number of rules used, or to make their significant simplifications.

At the same time, the required number of rules R needed to process n controlled parameters, if the i parameter can take m_i values, is $R = \prod_{i=1}^n m_i$.

For example, if $n=150$, a $m_i=2$, to $R=2^{150} \approx 10^{45}$. It is clear that it is impossible to really build an expert system with so many rules.

An acceptable alternative is the method of constructing logical inference mechanism, which is based on the application of Bayes' theorem. To build the corresponding knowledge base, a set of a priori probabilities of the possible states of the object is needed, and for each parameter-state pair it is necessary to know a priori probability that the parameter will take a specific value if the object is in a specific state. Application of Bayes' theorem allows one to obtain a set of posterior state probabilities from the analysis of controlled parameters of an object (Raskin, 2002).

Let

A_1, A_2, \dots, A_n is independent controlled expert system parameters;

H_1, H_2, \dots, H_m is possible state of the object;

$P(H_k)$ is a priori probability of finding an object in a state H_k ;

$P(A_{ij}/H_k)$ is the probability that the parameter i will take j on the condition that the object is in a state H_k ;

$P(H_k/A_{ij})$ is a posterior probability of finding an object in a state H_k , provided that the parameter i takes a value j .

Then, using Bayes' theorem, we can write:

$$P(H_k/A_{ij}) = \frac{P(A_{ij}/H_k) \cdot P(H_k)}{\sum_{l=1}^m P(A_{ij}/H_l) \cdot P(H_l)}, \quad k = 1, 2, \dots, m.$$

The resulting posterior probability distribution is used as a priori at the next step.

Thus, the logical inference mechanism of such an expert system provides a recurrent calculation of the posterior probability distribution of the state of the object, removing the problem of the dimension of the problem. Note that for the case when the requirement of parameter independence is not fulfilled, a procedure was proposed in (Minenkova, 2003), which makes it possible to share production and Bayes' approaches.

In this fuzzy Bayes' expert system, the fuzzy source data is displayed in the description by the accessory functions $\mu^{(k)}(x_j)$ fuzzy values of a priori probabilities of observing values of controlled parameters x_j provided that the object is in a state S_k . Bayes' system converts a controlled parameter set $X^{(0)}$ taking into account the totality $\{\mu^{(k)}(x_j^{(0)})\}$ into a set of posterior probabilities $P\left(\frac{S_k}{X^{(0)}}\right)$, $k = 1, 2, \dots, p$. It is clear that the inaccuracy of the raw data implies the inaccuracy of the result. The fuzzy a priori probabilities are described by triangular membership functions. The functions of belonging to posterior probabilities of states are then obtained.

Suppose that the main statistical characteristics (mathematical expectation and variance) of the values of the a priori probabilities of observing each of the controlled parameters are obtained by preliminary processing of real data or expert evaluation x_j , $j = 1, 2, \dots, n$, provided that the object is in each of the possible states S_1, S_2, \dots, S_p , that is, there are $(m_1^{(k)}, m_2^{(k)}, \dots, m_n^{(k)})$, $(D_1^{(k)}, D_2^{(k)}, \dots, D_n^{(k)})$, $k = 1, 2, \dots, p$.

According to Bayes' formula, a set of posterior probabilities of states of an object in a situation where a vector of parameter values is obtained as a result of the control $X^{(0)} = (x_1^{(0)}, \dots, x_n^{(0)})$, is found as a result of the consistent application of formulas

$$P\left(\frac{S_k}{x_1^{(0)}}\right) = \frac{P\left(\frac{x_1^{(0)}}{S_k}\right) \cdot P(S_k)}{\sum_{k=1}^p P\left(\frac{x_1^{(0)}}{S_k}\right) \cdot P(S_k)} \quad (12)$$

$$P\left(\frac{S_k}{x_1^{(0)}, x_2^{(0)}}\right) = \frac{P\left(\frac{x_2^{(0)}}{S_k}\right) \cdot \hat{P}_1(S_k)}{\sum_{k=1}^p P\left(\frac{x_2^{(0)}}{S_k}\right) \cdot \hat{P}_1(S_k)}, \quad (13)$$

$$\hat{P}_1(S_k) = P\left(\frac{S_k}{x_1^{(0)}}\right), \quad k = 1, 2, \dots, p, \quad (14)$$

$$P\left(\frac{S_k}{x_1^{(0)}, x_2^{(0)}, x_3^{(0)}}\right) = \frac{P\left(\frac{x_3^{(0)}}{S_k}\right) \cdot \hat{P}_2(S_k)}{\sum_{k=1}^p P\left(\frac{x_3^{(0)}}{S_k}\right) \cdot \hat{P}_2(S_k)}, \quad (15)$$

$$\hat{P}_2(S_k) = P\left(\frac{S_k}{x_1^{(0)}, x_2^{(0)}}\right), \quad k = 1, 2, \dots, p \quad (16)$$

etc.

In (Raskin, 2013) provides a methodology for calculating the mathematical expectation and variance of the numerator and denominator in relations (12), (13), (15), etc. Thus, for relation (12), the mathematical expectation and variance are determined by formulas:

$$\begin{aligned} M\left[P\left(\frac{S_k}{x_1^{(0)}}\right)\right] &= M\left[\frac{P\left(\frac{x_1^{(0)}}{S_k}\right) \cdot P(S_k)}{\sum_{k=1}^p P\left(\frac{x_1^{(0)}}{S_k}\right) \cdot P(S_k)}\right] = \frac{m_1^{(k)} \cdot P(S_k)}{\sum_{k=1}^p m_1^{(k)} \cdot P(S_k)}. \\ D\left[P\left(\frac{S_k}{x_1^{(0)}}\right)\right] &= (D_1^{(k)}) \cdot P^2(S_k) \cdot \frac{4(D_1^{(k)})}{P^2(S_k) \left[(m_1^{(k)})^2 - \frac{D_1^{(k)}}{1-\gamma} \right]^2} + \\ &+ (m_1^{(k)})^2 \cdot \frac{4D_1^{(k)}}{\left[(m_1^{(k)})^2 - \frac{D_1^{(k)}}{1-\gamma} \right]^2} + \frac{1}{(m_1^{(k)})^2} \cdot D_1^{(k)} \end{aligned} \quad (17)$$

As a result, sets of values of mathematical expectation are obtained $(m_A^{(1)}, m_A^{(2)}, \dots, m_A^{(p)})$ and variance $(D_A^{(1)}, D_A^{(2)}, \dots, D_A^{(p)})$ for all components of the posterior probability distribution of the object states. These sets are used to describe the membership functions of the corresponding fuzzy numbers, for example, for a Gaussian model we have

$$\mu_A(P(S_k)) = \exp\left\{-\frac{(P(S_k) - m_A^{(k)})^2}{2D_A^{(k)}}\right\}, \quad k = 1, 2, \dots, p. \quad (18)$$

A more effective tool for assessing the state of controlled objects is a fuzzy expert system (Raskin, 2013). The accuracy of assessing the state in such a system can be made arbitrarily high and limited only by the number of controlled parameters, the accuracy of their measurement, and the correctness of the conclusions that make up the rules.

3 Conclusions

The possibilities of solving the problem of assessing the financial condition of the company using the methods of discriminant, rank and regression analysis are considered. A significant drawback of these approaches is revealed – the need for a large amount of source data.

An alternative procedure for constructing a regression equation using the method of pairwise comparisons is described. The disadvantage of this approach is the fatal effect of subjective errors arising from an expert assessment of the importance of indicators.

A fundamental drawback of the considered methods of strategic financial planning and management is formulated, which consists in the absence of the possibility of accounting for and counteracting the uncertainty arising from their practical implementation. In addition, the described methods for assessing the financial condition are not structurally oriented towards using the exact correspondence between the numerical values of the controlled parameters and the state of the object.

These deficiencies impose the need to improve the methods of financial planning and management in the face of uncertainty, implemented in the expert decision-making system and the increasing use of fuzzy expert systems.

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COMPARISON OF ETFS AND MUTUAL FUNDS @ EUBA 2019

Miroslav Klimek

University of Economics in Bratislava
Faculty of Business Economics with seat in Košice
Department of Quantitative Methods
Tajovského 13
Košice, 041 30
Slovakia
miroslav.klimek@student.euke.sk

Abstract. Our goal is to evaluate the investment options and to identify the advantages and disadvantages of a particular fund choice. The way we look at them is much more than selecting individual titles for a portfolio, or hedge funds, but in terms of the nature of the costs, these options assume that they will not fit our chosen profile. This work presents the current state of the solved issue in Slovakia and abroad together with the methodological procedure and methods of research with respect to the aim of the work. We will use these methods to compare investment approaches and tools. In research we compare the ETF funds with the mutual funds, we calculate how many funds have beat the benchmark over the period of time. In the results of the work we assume that a total of 28 of the 33 Franklin Templeton Equity Funds could not beat the benchmark for the information ratio and the Sharp ratio. The work should result in a complete guide for investors that meets the constraints in order to create the most appropriate strategy for the investor.

Keywords: investment, investment strategy, comparison of investment instruments.

JEL classification: C02, C87, G10, G11

1 Introduction

The main goal of each investor when investing capital is to recover funds. The current market brings us unlimited opportunities in creating an investment strategy. This strategy is highly dependent on the investor's preferences, his attitude to risk, financial capacity, expected return, self-interest, and many other factors that determine what is best for the investor.

The submitted work concerns investors who will comply with strict restrictions. In this way, we can create an investment strategy for a selected group of investors. The

next step is to select the appropriate investment instrument. We assume that the most suitable option will be mutual funds, or ETF-traded funds.

1.1 Collective investment

The main feature of collective investment is that funds are collected from a large number of investors in order to effectively invest and save costs associated with the appropriate selection of assets for investment, asset management, diversification and other costs of investing in capital markets. Collective investment has allowed the general public easy access to financial markets often through mutual funds and pension funds. Collective investment funds today manage large amounts of assets and become important players in the financial markets. It is precisely because the general public puts their savings into them, and there has been a relatively extensive regulation over these funds, and state supervision, so as not to harm the interests of small investors.

Investment funds are divided into:

- Closed-end collective investment funds - these funds will initially issue a certain number of their shares (shares) and then it is no longer possible to enter the fund because the fund no longer issues new shares. The Fund does not repurchase its shares, but these shares are either traded on the secondary market (stock exchange) or investors must hold their shares until the fund is closed, when the money obtained from the sale of assets is distributed back to investors according to their fund share.
- Open Collective Investment Funds - these funds issue new shares throughout their lifetime and are also obliged to publish (usually on a daily basis) the prices at which shares purchased by the fund can be sold back.

1.2 Index vs. active investment

Whether markets are efficient or not has a significant impact on investors and the portfolio of managers in terms of investment strategy choices. The efficiency of capital markets is one of the most controversial areas of investment because there are different views on this issue (Rejnuš, 2008).

The effective market hypothesis is a highly esteemed thought model (Liška - Gazda, 2004). The main intellectual basis of the arguments against the view that markets are in fact prone to disproportionate, ie. creating speculative bubbles is a theory of effective financial markets. Extensive scientific research on market efficiency is generally seen as evidence supporting this theory. The Efficient Market Theory argues that the prices of all financial instruments at all times accurately reflect all publicly known information. In other words, financial instruments are always properly valued with respect to publicly available information, constantly. Prices may seem too high or too low from time to time, but according to the theory of efficient markets this is an illusion. According to this theory, stock prices can be roughly described as "random walks" over time: price changes are unpredictable because they occur only in response to new information that is not predictable just because it is completely new (Gladiš, 2005).

All current information is already "embedded" in market prices. Tomorrow's stock price developments cannot be foreseen unless we are able to predict the contents of tomorrow's news (Siegel, 2011).

Effective Market Theory includes 3 assumptions:

- A large amount of profit maximizing participants analyzes and evaluates actions
- new stock-related information arrives at random
- investors adjust share prices quickly, taking into account the effect of new information (Valach, 2011).
- The efficient market hypothesis is based on the following assumptions:
 - price - reflects all information
 - investor - has risk aversion, knows the importance of information and knows how to interpret it, all investors evaluate the information equally
 - memory - markets have no memory, so yesterday's events do not affect today's events
 - distribution - profit is independent, normally distributed (Steigauf, 2003).

There are many true arguments in favor, but also against this theory. Therefore, it is up to the investor to choose what approach. Whether they believe in the TETs and will pursue a passive investment strategy ("buy-and-hold" strategy), or choose an active investment strategy (trading strategy, market timing). In the first case, the market yields and the risk of investment will also be market risk. Its return will be the average yield achieved on a given market because passive investment strategies follow a certain index that is the average of all the results obtained from the actions included in it. If an investor prefers such an approach to investing his disposable cash resources, he can do so through a variety of market-based financial instruments. Such instruments include: index funds (open-end funds), ETFs (index shares) or index certificates (Haslem, 2010). In the latter case, the investor can achieve better returns but also worse than in the market at higher or lower risk. This means that this strategy allows for higher returns. However, higher yields are mostly offset by higher risk, i.e. higher risk, higher volatility. If an investor wants to invest his money in this way, he can do so through open equity funds. These funds should not copy the index. Their goal should be to beat the index by searching for either undervalued or overstated stocks, or by searching for stocks with high growth potential (Liška, 2004).

2 Methods and analysis

When verifying the effectiveness of active investment management, we will use available data from actively managed mutual funds. We will use the data available to one of the most successful fund managers in the history of franklintempleton.com. When verifying the most successful funds in the Slovak Republic, we will have to manually implement a suitable benchmark because they do not mention these benchmark funds. We will build on the description and characteristics of the fund. We will use the ranking on <https://openiazoch.zoznam.sk/podiel-fondy/rebrickly> to find the most successful funds

in Slovakia. For index searches we will use data from individual exchanges www.nyse.com, www.nasdaq.com and the like.

When comparing the ETF's fee benefits, mutual funds and title collection, we use the fees of the oldest and most trusted ETF providers, Vanguard.com and IShares.com. We need to know the broker's fees when estimating ETF fees and solo titles. These can be found by a simple survey among the options for a Slovak user.

Using quantile analysis, we can track the fund size, investment strategy, denomination, fund information policy. In this comprehensive analysis, we can also see the various hidden risks and factors that influence the creation of the right investment strategy.

Fund qualitative indicators of the fund that we will monitor:

- Fund size
- date of establishment
- investment strategy
- denomination and currency exposure
- tax domicile
- information policy

Due to the quantitative focus of the research, the primary quantitative methods of investigation and mathematical-statistical methods will be used, induction, deduction, comparison method and verification of assumptions will be used within basic scientific methods (especially in relation to statistical significance of regression coefficient parameters).

Fund quantitative indicators:

- Fund performance

The fund's absolute performance or appreciation over a given period of time can then be calculated using the following formula:

The Fund's absolute performance

$$(R) = \prod_{i=0}^n \frac{NAV_{i+1}}{NAV_i - D_i} - 1 \quad (1)$$

- NAV_i - NAV value per share or share valid on the last day of dividend entitlement (not yet reduced by dividend), where NAV_0 is the NAV at the beginning of the period and NAV_{n+1} is the NAV at the end of the period,
- D_i - Dividend amount per share or share, with $D_0 = 0$,
- n - number of dividends in given time period, D_0 is 0,
- i - dividend serial number.

When evaluating the performance of mutual funds, it is necessary to draw attention to the problem of so-called. annualizations, i. mechanical recalculation of fund

performance over a short period of time per year. The fund's absolute performance can be annualized by the formula, and the "p.a."

Information ratio.

The information ratio indicator tells you how you managed the fund against the risk benchmark, while the higher the number, the better. If we reach a negative number by calculation, the fund manager managed inefficiently compared to the benchmark.

$$IR = (R - R_m) / (\text{Tracking Error}) \quad (2)$$

R - Fund Performance (%)

R_m - market performance, i. index (%)

Tracking error - annualized standard deviation of the fund's annual performance and benchmark difference.

Sharp's ratio.

The original Sharp indicator compares the fund's performance to risk-free returns. We decided to simplify the calculation and compare the performance of the fund with the performance of the index. In this way, we will immediately reach the necessary result, and if the result is a positive number, then the fund was doing better than the index, if the negative number, so the fund manager managed inefficiently.

$$SR = (R - R_f) / c_m \quad (3)$$

R - Fund Performance (%)

R_f - Index Performance (%)

c_m - annualized standard deviation of annual fund performance (%)

Correlation analysis - we measure the extent to which the performance of the two funds is interdependent. It is true that if the funds are highly positively correlated, their coefficient is close to 1. We recommend working with funds that are not correlated. They have a coefficient of correlation of around 0. When creating a strategy, then the investor can compensate the losses from one fund by profit from the other fund.

We assume that index investment is more effective for our investor profile than an active approach to beat the benchmark.

In my work, we are developing an appropriate investment strategy for an investor who regularly invests in shares of between € 200 and € 1000 per month. Its investment lasts on average 20 to 40 years.

Table 1. Investor's profil

Preferred stock	Assets
Method of investing	Monthly
Length of investment	20 – 40 years
Value of deposits	200 € - 1000 €

Source: Author's processing

3 Research

The following table shows how many funds have outperformed the benchmark over a period of time. In this table, the performance results of the Funds were summarized. Of course, we cannot compare the success of managers against the index only in terms of performance, but these results already tell us about success or failure, then we will use a more comprehensive comparison and take into account the risk.

Table 2. Overcoming the benchmark

In 5-year period analyzed 43 funds	8	19 %
In 10-year period analyzed 30 funds	4	13 %
In 15-year period analyzed 22 funds	4	18 %
From the beginning analyzed 40 funds	12	30 %

Source: Author's processing

A total of 28 of the 33 Franklin Templeton Equity Funds could not beat the benchmark for the information ratio and the Sharp ratio. If we were talking about a percentage, 85% of the funds could not beat the benchmark. Since the beta result and volatility in mutual funds are not positive, we will only look at the performance of these funds compared to the benchmark, especially for the calculation of the management fee, which is calculated annually from the total value of the client's fund.

In the analysis of Franklin Templeton funds in the longest single measurement period of 15 years, out of 22 equity funds, only 4 of them outperformed the benchmark, but if we also include regular fees to reflect the benefits to the investor, the benchmark was not beat in this period or one from the funds measured.

The information ratio indicator shows how the fund is managed compared to the reference point, taking into account the risk. The higher the positive number, the better the fund as a benchmark. The higher the negative number, the more fund inefficiently invested against its benchmark.

A total of 28 of Franklin Templeton's 33 equity funds subjected to this analysis have a negative information ratio and a negative Sharp ratio. When analyzing funds from the largest funds in the Slovak Republic, the results were even worse to the detriment of actively managed funds.

These results support the claim that index investments may be better for investors than let the portfolio be managed by managers. In particular, investors are burdened with annual management fees, which are much higher than investment in indexes, and, coupled with the fact that managers are unable to beat their benchmarks, the index portfolio to which they are bound is very questionable whether active investment is worth.

After analyzing active and passive management, we focused on a suitable investment tool. The investor's profile is only suitable for collective forms of investment due to

fees that would cut a significant portion of the invested amount. Here we compared mutual funds with ETF, each of these forms has its own specifics. From our model, which simulated the development of ETF investment and mutual fund, it is clear that these forms have a different charge burden. In mutual funds, the annual management fee is the most expensive. For an ETF, it is an entry into a business that is fixed, which implies that the higher the amount invested, and the longer the deposits, the ETF's profitability increases. Our output is also the model itself, which will be publicly available and will help the investors themselves to decide on the choice of investment instrument.

In the last step, we have looked at what is the most appropriate portfolio layout and the idea behind it, leaving out some of the emerging markets may be more damaging, because this way may reduce risk and increase revenue. Finally, we introduced the ETF, which is suitable for most investors in our profile because it can save a lot of money thanks to low fees. We have designed ETF the world's oldest and most reliable ETF managers. The big advantage is that we can cover all these shares by buying one ETF, which will significantly reduce the cost of the fee.

4 Comparison of ETFs and mutual funds

A suitable alternative for ordinary people is passive investment without trying to achieve above-average results, as it results from the study, rather than hurting it. You don't have to be an expert in passive investing, just find the time 10 minutes per month and buy a share. That's all, and we just saved about 1,5% of the capital a year, which we can continue to invest.

The best tool to serve us is the ETF (Exchange-traded funds) - traded funds on the stock exchange.

Table 3. Comparison of ETFs and mutual funds

ETF funds	Mutual funds
Stock market trading (secondary market)	Not traded on stock exchange
Purchase / sale through your own trading account with a securities dealer (transfer funds to a trading account and execute an order)	Purchase / sale via a management company, a financial intermediary (permanent payment, postal order)
Copying benchmark performance	Trying to beat the benchmark

Source: Author's processing

The fact that mutual funds are not traded on the stock exchange does not mean that they do not invest in stock exchanges. If we decide to invest passively with the ETF, we have to earn trading fees. The first task is to select a broker.

Comparison of brokers available for common Slovak:

Table 4. Fee Comparison

	FIO	Patria	SAXO
Account creation and management	free	free	free
Trade entry fee (ETF)	7,95 \$ business over 100 pcs: 9,95 \$	min. price 13 \$, then 0,10 % of the trade volume	up to 299 999 CZK 14,90 \$
Trade exit fee (ETF)	7,95 \$ business over 100 pcs: 9,95 \$	min. price 13 \$, then 0,10 % of the trade volume	up to 299 999 CZK 14,90 \$
Submission of an order electronically	free	free	free

Source: Author's processing

In next calculations we will use the FIO bank's fee structure. Now we compare the investment in Vanguard Total Stock Market ETF, which replicates the development of the US market with a selected mutual fund that invests in the same market and tries to beat it, which, of course, has failed in the past, but in the first calculation we will assume that achieve at least the same results.

Table 5. Equity Mutual Fund vs. Vanguard Total Stock Market ETF

	Vanguard Total Stock Market (ETF)	AXA Selection Global Equity
Entry fee	0 %	0 %
Exit fee	0 %	0 %
Management fee	0,05 %	1,5 %
Minimum investment	109 \$	165 € (first deposit) 16 € (next deposits)

Investment related fees	Entry fee 7,95 \$	Any
	Exit fee 7,95 \$	
	Bid / Ask spread 0,01 %	

Source: Author's processing

The question of the investment approach has been answered and the question of the investment instrument is coming up. Here, after analyzing the current state of the problem, we consider 2 investment instruments to be appropriate. Mutual fund and ETF.

Table 6. Mutual fund vs. ETF

		ETF 12 deposits/year	
		Invested amount without fees	208 \$
Mutual fund 12 deposits/year		Average annual recovery	7,5 %
Invested amount monthly	215 \$	Management fee	0,05 %
Average annual recovery	7,5 %	Entry fee to broker	7,95 \$
Management fee	1,5 %	Exit fee to broker	7,95 \$
Entry fee	0 %	Total amount invested regularly	216 \$
Exit fee	0 %	Price for 1 fund share	208 \$
		Purchased shares	1
		Bid / Ask spread	0,01 %

Source: Author's processing

In the first comparison we have a mutual fund in which we have entered the lowest management fee of 1,5 % from our list. Although, as we have seen, active managed funds are unable to achieve the same benchmark performance benchmarking, we have given identical performance to ETFs and mutual funds according to the historical performance of the 500 largest US companies over the past 30 years. We can see that at the 215 \$ entered, the ETF withdrawal against the mutual fund will only pay off after

9 years of investment, but then the ETF investment is significantly faster than in the mutual fund.

5 Conclusion

After analyzing active and passive management, we focused on a suitable investment tool. The investor's profile is only suitable for collective forms of investment due to fees that would cut a significant portion of the invested amount. Here we compared mutual funds with ETF, each of these forms has its own specifics. From our model, which simulated the development of ETF investment and mutual fund, it is clear that these forms have a different charge burden. In mutual funds, the annual management fee is the most expensive. For an ETF, it is an entry into a business that is fixed, which implies that the higher the amount invested, and the longer the deposits, the ETF's profitability increases. Our output is also the model itself, which will be publicly available and will help the investors themselves to decide on the choice of investment instrument.

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RUSSIA'S IMPLEMENTATION OF HYBRID WARFARE

Ing. Monika Kochajdová

University of Economics in Bratislava
Faculty of International relations
Dolnozemska cesta 1/b
852 35 Bratislava
Slovakia
monika.kochajdova@euba.sk

Abstract. Hybrid warfare as a new tool of international politics changed the view in which we look at the war. This concept is not new to the international researchers; however, it was never used by state against another state. Hybrid warfare was always viewed as a strictly theoretical concept used for describing actions of non-state actors and their warfare. Recently a world was shocked by Russia's actions and their use of hybrid warfare. Russia managed to gain territory without using conventional warfare. This ambiguous, secret and unconventional strategy, called by international community "Russia's hybrid warfare" shall be the main subject of this research paper. We will focus on hybrid warfare in general, then we will describe each phase of Russia's operations in Ukraine. In the end we should be able identify hybrid warfare and open discussion for future research.

Keywords: hybrid warfare, Russia, Crimea.

JEL classification: F51, F52

1 Introduction

History of humanity is written by conflict. In the past, when peaceful or diplomatic way to achieve goal failed, leaders chose warfare to achieve their political or other goals. Warfare was considered an effective tool to achieve political and other objectives. This theory is countlessly quoted by great military strategists, for example by Clausewitz, who in his book *On War* stated that: "*war is controlled by its political object, which will sets its course, prescribe the scale of means and afford which is required*" (Clausewitz, 2003) Since then many things changed and one the most important milestones was the adoption of United Nations Charter (hereinafter referred as "Charter"). In this Charter not only countries agreed on commitment of collective defense, but also explicitly stated in article 1 sec. 4 that: "*All members shall refrain in the international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the*

United Nations.” (United Nations, 1945) Warfare according to Cambridge dictionary is: “*activity of fighting a war or strongly competing, esp. with reference to the type of weapons used or the way the fighting is done.*” (Cambridge dictionary, 2019) With this said, the concept of warfare became limited and was destined to change. As a result of this change new concept of warfare was introduced by Russia in state to state conflict. This new type of warfare was called Hybrid warfare. This term immediately gained popularity and was subjected to further research. Galleoti defines this term as a combination of means used in conflict that knows no boundaries, but is limited by ethics of war. (Galleoti, 2016) Weismann and Mansoor states that hybrid warfare doesn’t change the nature of conflict, it changes the way the military forces interact. (Mansoor, 2012) Weismann poetically defined this term as a “old wine in a new bottle.” (Weismann, 2019) Reichborn-Kjennerud and Cullen describes hybrid warfare, to put it simply, as carefully planned series of attacks to exploit weaknesses of actor in order to defeat him. (Reichborn-Kjennerud et al., 2016) On the other hand term hybrid warfare didn’t evade criticism, due to the fact that this term was used as a popular phrase without clearly stated meaning or definition. (Renz et al., 2016)

Since Russia is the only country that has effectively and successfully used hybrid warfare in state to state conflict, we find it gravely important to open a debate on this topic. This topic includes not only warfare, but also economics, law, public sector, freedom of information, etc. Result of this analysis should provide us with basic description of means used in Russia’s hybrid activities on the territory of Ukraine and set the ground for future discussion and in-depth research.

2 Methodology

2.1 Non-state actors of hybrid warfare

To understand and analyze how Russia was so successful in implementing hybrid actions in Ukraine, we must look at the quasi origin of hybrid warfare. The term hybrid warfare changed in past 15 years. “*Hybrid warfare was originally used to describe growing sophistication and complexity of non-state actors on the battlefield in places like Chechnya and Lebanon and was later applied to Afghanistan and Iraq.*” (Reichborn-Kjennerud et al., 2016) In these conflicts western powers anticipated clear and fast victory over the enemy, who was smaller in force and poorly armed. However, all western strategies implemented in these cases failed. These smaller forces were able to face much larger and stronger opponents by applying unconventional use of weapons and tactics. From this we can try to define the non-state hybrid warfare. Non-state actors were able to effectively and successfully combine the use of conventional weapons with unconventional tactics. Aside from classic western thinking battlefield, these non-state actors broadened the battlefield space. They for instance used cyber space to attack enemy and its infrastructure. Combined with the use of weaponry and unconventional tactics, the western powers were taken by surprise. Aside from this military aspect the non-state hybrid warfare includes also non-military uses of tools. Among these belong increased focus of non-state actors on creating chaos by using terrorism or organized crime. Creating chaos, confusion and instilling fear amongst the civil population, makes

the military objectives harder to achieve. Also, the control of flow of information and propaganda proved to be essential in gaining the support and advantage on the battlefield. For example, online propaganda and ideological recruitment proved to be crucial for rise of power of Islamic state.

2.2 State actors of Hybrid warfare

The recent behavior of Russia and its latest accomplishments stunned the world. These actions carried similar pattern as the actions we have described above. Combination of ambiguity, non-conventional tactics, use of propaganda, control of information, para-military operations, cyber control, etc. have labeled these actions as hybrid warfare.

The main difference between state actors and non-state actors is as follows: *“State HW involves the full integration of the military and non-military means of state power to achieve political goals, in which the use of force or the threat of force plays a central role. States with highly centralized abilities to coordinate and synchronize their instruments of power (government, economy, media, etc.) can create synergistic force multiplying effects.”* (Reichborn-Kjennerud et al., 2016) The state has vast resources at its disposal to exploit its target vulnerabilities. Such exploitation carries certain risks. Secrecy and misinformation are the key aspects of such operation. We must keep in mind that any open aggression against another state is forbidden under the Charter of the UN and the aggressor might face retaliation from the rest of the member states of the UN. Therefore, state actor of hybrid warfare must be especially careful with the planning and execution of its plans. The main objective of hybrid warfare is to achieve political goal while at the same time avoiding the conventional warfare or to put it simply, open aggression. State actor and non-state actor hybrid warfare possess certain similarities. Both use unconventional means to achieve their goal, both must operate in “gray zones”, hide their intentions from the enemy, control the flow of information and many others. Considering all previous information international researchers provide us with following description of hybrid warfare: *“It is asymmetric and multi-modal along a horizontal and a vertical axis, and to varying degrees shares an increased emphasis on creativity, ambiguity, and the cognitive elements of war.”* (Reichborn-Kjennerud et al., 2016)

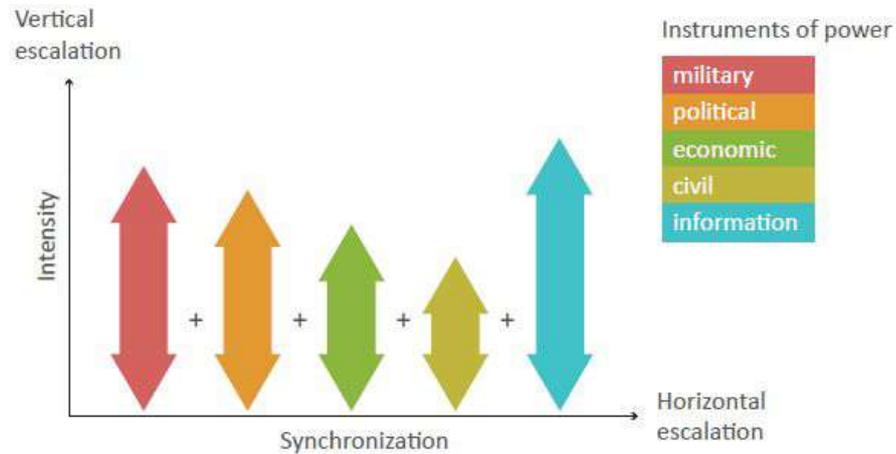


Fig. 1. Hybrid warfare strategy and vulnerabilities exploitation. Source: MCDC Countering Hybrid Warfare Project: *Understanding Hybrid Warfare*, available online: [cited 24.07.2019]

To break down such a complicated description we would first focus on the instruments of power. As we can see from the graph above hybrid warfare is not typical warfare that focuses on attrition and destruction of enemy. We can see broad spectrum of powers on which it focuses. All the powers above create necessary combination of elements that are required for state to properly function. To successfully implement hybrid warfare, one has to carefully exploit vulnerabilities in each of shown powers. Data collection, secrecy, vulnerability exploitation, synchronization, ambiguity are just the few necessary steps for successful implementation of hybrid warfare. For instance, controlling the flow of information, spreading misinformation or broadcasting your own propaganda can hugely impact the opinion of civil population. This set of powers needs to be effectively exploited in order to successfully implement hybrid warfare strategy.

2.3 Horizontal and vertical escalation

As we mentioned above, carefully prepared strategy is the necessary key for successful execution of hybrid warfare. This strategy should be all about synchronization and coordinated attack on all the opponent's weaknesses. To put it simply: *"Synchronization is the ability of a hybrid warfare actor to effectively coordinate instruments of power in time, space and purpose to create the desired effects."* (MCDC, 2017) It is crucial for the attacker to synchronize all of his military and non-military means in order to escalate or deescalate all of the powers mentioned above.

Horizontal escalation describes all the powers that need to be exploited in synchronized manner. To successfully implement hybrid warfare attacker must not get detected. Broadening the sphere and spectrum of operations is the perfect example of horizontal escalation. The more powers are affected and exploited the more likely the attacker is to succeed in its objective. However, one does not exploit all the powers at

once, otherwise he faces a risk of being detected and proclaimed an aggressor. Therefore, careful planning and strategic synchronization, staging and multi-level horizontal escalation will lead to the desired effects. For example, “In autumn 2013 Iran synchronized terrorist threats, cyber-attacks and propaganda to influence the calculation by the US and allies in order to deter external intervention in Syria.” (MCDC, 2017)

On the other hand, even if attacker exploits number of weaknesses in the opponent’s system, but does not apply enough pressure on such weaknesses, the opponent can come up with suitable countermeasures and whole operation would be for naught. Attacker has to keep in mind that after exploitation, certain amount of pressure needs to be applied to keep the state or entity to come up with effective countermeasures. In the graph vertical escalation describes that it is necessary not only to horizontally exploit number of weaknesses in the opponent’s system, but also has to apply certain amount of pressure on such weak points. However, attacker should keep in mind that, in order to maintain secrecy, he has to carefully adjust the amount of intensity based on the situation.

Vertical and horizontal escalation represents basic operational procedure for effective use of hybrid warfare. Since there are many ways to exploit weakness of powers of entity or state, attacker is provided with a quite broad scope of possibilities. Most of these actions done by attacker are ambiguous, which means that they are hard to detect or trace (for example cyber-attacks), conducted with unclear or hidden intent (such as investing in foreign critical infrastructure) or not cannot be clearly definable as a hostile and aggressive act (instigating non-violent protest, for example). (MCDC, 2017) Such actions provides multiple advantages for attacker:

- Attacker can adjust the strategy based on the vulnerabilities he managed to exploit;
- Ability to use force or other military means, while avoiding detection
- Attacker can easily control the situation, by adjusting the amount of intensity and therefore is able to escalate or if need be de-escalating the situation;
- Attackers actions are ambiguous and are harder for other states or entities to detect, which means that attacker is protected from any form of retaliation from the international community.

The concept of hybrid warfare is ambiguous. No matter how much we try to identify this concept, define it, describe it or name it, we won’t be able to fully comprehend and name all the possibilities of hybrid warfare. That is why this concept is dangerous. Just as we look at all the non-state and state actors of hybrid warfare, the tactics they use vary. We could have seen combination of use of modern military weapons and their unconventional use, we have seen cyber-attacks with combination of terrorist attacks or combination of misinformation campaign with proxy forces on other states territory. Combinations of possible hybrid warfare actions are nearly infinite. With each new technological invention, a new possible threat arises, new possible hybrid warfare option, new vulnerability to be exploited. As mentioned in the definition above, ambiguity and creativity, are the new elements that shape future conflict. As we can see at the example of Crimea and Ukraine as whole hybrid warfare operations have proved very dangerous, due to the fact that there are discovered only after effects of these operations

start to manifest. Therefore, hybrid warfare became a dangerous policy maker in the hand of superpowers.

3 Russia's hybrid actions in Ukraine

In this article we would like to point out the example of the situation that happened in Ukraine, specifically the Crimea. In our opinion this "conflict" between Russia and Ukraine was a perfect example of a use of hybrid warfare-based actions by one state against another. Therefore, we state the Crimea example as a historically first use of state to state hybrid warfare.

Before we get to the situation in Crimea, we have to understand the previous situation in Ukraine. Before the Russia executed their plans with Crimea, they had to shift the focus of the government on different matters. As Phillip II of Macedonia said, "Divide and Rule." (Wordpress, 2014) So did the Russia. Their first objective was to make Ukraine withdraw from the talks with the EU and the association agreement. Since Ukraine has a huge debt towards Russia the manipulation wasn't that hard to achieve. They used a combination of political pressure and a promise of another loans and cheaper gas. This plan let's call it Phase one hybrid warfare, exploited Ukraine's political and economic vulnerabilities and started series of even to Russia unforeseen events.

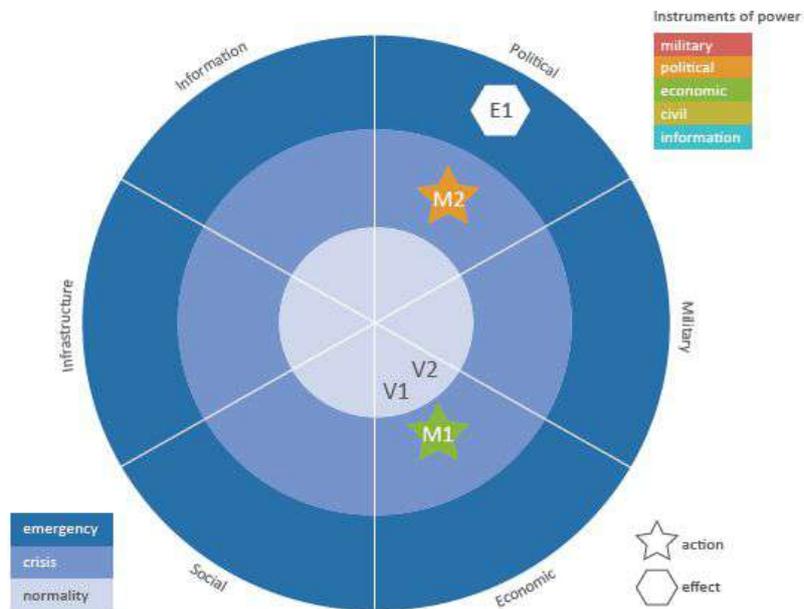


Fig. 2. Russia's hybrid warfare Phase one. *Source: MCDC Countering Hybrid Warfare Project: Understanding Hybrid Warfare, available online: [cited 24.07.2019].*

Letter V represents economic vulnerabilities of Ukraine at time of Phase one. In this case it was the huge debt to Russia and economic dependence on Russia's gas. Letter

M represents the means by which the vulnerabilities were exposed. M1 stands for the price control and flow of gas into Ukraine from Russia. The other M2 represents the political pressure on president Yanukovich to abandon talks with EU. E stands for effects, which resulted from all the means used in the Phase one. However, in our opinion another letter E2 should appear in the graph above. E2 should stand for the civil unrest and protest that destabilized the whole country and crippled it for months before the actual Phase two. We can say that Phase one hybrid warfare was a success for Russia, president Yanukovich ended talks with EU, didn't attend the summit in Vilnius, where he was supposed to sign the association agreement. Instead he attended meeting with president Putin and again shifted Ukraine more towards Russia. With country in turmoil and constant protests, inefficient or incapable leadership, Ukraine was not able to react to exploited weaknesses and other emergencies arising around the whole country. When they reacted, it was too late, and the damage was already done.

Russia's Phase one hybrid warfare in the end not only exploited the political and economic, but also civil powers of the country. Country is left divided, vulnerable and without capable leadership that would quickly react to occurring emergencies. These new emergencies arose primarily in territories of Donetsk, Luhansk and Crimea. For the purpose of this article we will closely look at the situation in Crimea, which led to the annexation of this peninsula by Russia. Aside from the effects mentioned in the Phase one, another factor enabled Russia to take hold of Crimea in such quick way. Among these other factors are "largely pro-Russian civilian element, the presence of Russian military installations and personnel – making the infiltration of special operations forces inconspicuous; again weakened political leadership; the almost complete absence of military resistance, and the lack of reaction from an international community that was stunned and surprised at the swiftness of Russian actions." (Renz et al., 2016) Following graph shows us how these instruments affected each power of state.

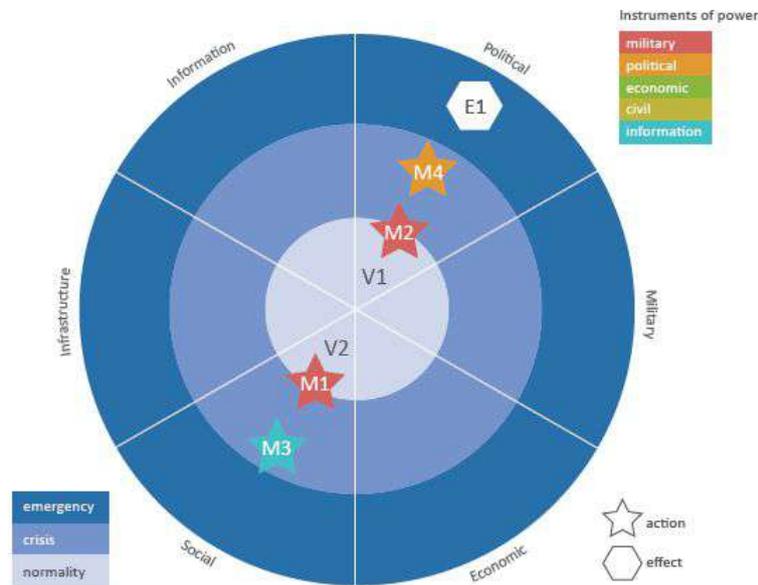


Fig. 3. Russia's hybrid warfare Phase two. *Source: MCDC Countering Hybrid Warfare Project: Understanding Hybrid Warfare, available online: [cited 24.07.2019]*

As we mentioned before the crucial vulnerabilities of V1 and V2 at that time were: weakened political leadership and disrupted social cohesion in Ukraine. With such turmoil and chaos in the country, Russia used a combination of military and non-military means to exploit these vulnerabilities. M1-M4 stands for covert military operations in Crimea, full scale fighting in Donetsk, huge use of cyber propaganda and spread of misinformation and at last to make all look legally perfect, they used local referendums and let people decide their fate. As it is well known Russia has military base in Crimea, which made it perfect as a base of operation. Also, when first the “green men”, as people use to call these soldiers without insignias, nobody gave much attention, because everybody thought that they are part of the Russian forces, even though Russia strictly denied any affiliation with these forces. Before anybody noticed Ukrainian forces were surrounded in their own bases and Crimean Peninsula was cut from the rest of Ukraine. (Guardian, 2014) Then at last when they managed to isolate Crimea, Russia came up with the referendum. However, some sources mention that this referendum was manipulated either by military or cyber means. Due to the ambiguity and secrecy of these actions, we will probably never know what is 100% true and what is not. In the end these means created two different types of effects for Russia. First type, under letter E stands for the annexation of Crimea, which in the end was a huge success for Russia, because they managed to gain territory without a bloodshed. However, on the other side Russia has to face economic sanctions from EU and other countries and worsened relations with west and Ukraine the most.

4 Conclusions and policy implications

In case of the situation in Crimea, based on available information, we have seen a strikingly fast and masterfully synchronized combination of use of military and non-military means by Russian administration. This hybrid warfare combination was so precise and so fast that it shocked the whole world. Nobody anticipated that Russia has such capabilities. Still to this day the ambiguity of the concept and the secrecy in which this was done leaves the world in more questions than answers. Most the international researches agree on, that the concept of hybrid warfare is so ambiguous that it is so hard to analyze. In spite of such ambiguity, researchers came up with theoretical description of hybrid warfare: *“In the aftermath of Crimea, ‘hybrid warfare’ was turned from a military concept into a quasi-theory of Russian foreign policy, further decreasing the concept’s utility for analysis or as the basis for policy making. The idea that Russia is pursuing a campaign of ‘hybrid warfare’ against the West is at best an extreme oversimplification and at worst a misuse of the word ‘war’ that could lead to dangerous unintended consequences.”* (Renz et al., 2016) Therefore based on what we know, we can assume that Russian’s hybrid warfare might consist of combination of military special operations and non-military: cyber operations, misinformation campaigns, political pressure, unrest incitement and political referendums, all of which are executed in a several phases in synchronized manner to exploit target’s vulnerabilities and destroy it from within. In the end, the concept of hybrid warfare and all its whereabouts are still unclear. We deem that hybrid warfare, especially Russian’s hybrid warfare, pose a huge danger to all the countries around the world and therefore future discussion and research is required on this topic.

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CONTRIBUTIONS TO OTHER CAPITAL FUNDS AS THE FORM OF FINANCING FOR BUSINESSES THROUGH OWN FUNDS (EQUITY) - LEGAL, ACCOUNTING AND TAX ASPECTS

Anna Harumová¹ and Branislav Kováč²

¹University of Economics in Bratislava Faculty of Business Management Dolnozemská cesta 1
Bratislava, 852 35 Slovak Republic

² VGD SLOVAKIA s.r.o.

University of Economics in Bratislava Faculty of Business Management Dolnozemská cesta 1
Bratislava, 852 35 Slovak Republic

¹anna.harumova@euba.sk

²branislav.kovac@vgd.eu

Abstract. This paper deals with the new regulation of the contributions to other capital funds as a form of financing businesses through own funds. As the new regulation is quite new (valid as of 1 January 2018), the legal, accounting and tax aspects are dealt with in the paper. The new regulation has positive effect on the business environment, however, the papers addresses some deficiencies and problems in relation with the new regulation.

Keywords: other capital funds, equity, contributions.

JEL classification: H21, H26

1 Introduction

The aim of this paper is to introduce other capital funds as an opportunity to finance the needs of the company with resources of the owners. Other capital funds were one of the most discussed topics in recent years due to the lack of regulation in Slovak commercial and tax law. The amendment to the Commercial Code¹ as well as the amendment of the Income Tax Act² with effect from 1 January 2018 brought more light to this area and it represents a “safe harbour” for entrepreneurs how to proceed in accordance with the legislation in force. It turns out that legal certainty and enforceability of law is much more important for entrepreneurs than for example massive tax cuts, resp. massive loosening of regulations. The professional controversy that arose on the topic of other cap-

¹ Act no. 513/1991 Coll. (Commercial Code) as amended

² Act no. 595/2003 Coll. on income tax as amended

ital funds stemmed mainly from the fact that accounting procedures in the Slovak Republic knew such a form of strengthening the net equity of companies (although only due to a very brief adjustment in Accounting procedures for entrepreneurs³) and this was in contrast with the Slovak commercial law, where the topic of other capital funds seemed to be non-existent (in the Slovak Commercial Code until 2018 was no mention of other capital funds, resp. mention of capital fund from shareholder contributions). Therefore, in the discussion of academics and practitioners, the opinions were heard "from both camps" - from the view that other capital funds cannot be created within the meaning of the Slovak legal order, through the view that other capital funds can be created but cannot be divided between the owners (shareholders) and to the opposite, that other capital funds can be created and distributed without any restrictions (Patakyová, 2010).

The aim of the paper is to point out the previous commercial law, tax law and accounting adjustment of other capital funds before the amendment of the relevant regulations as of 1 January 2018, as well as the current legislation. The previous legislation is important, because the new Commercial Law, pursuant to the transitional provisions, applies to other capital funds created after the amendment to the Commercial Code. Therefore, for other capital funds created before the amendment came into effect, the previous legislation (ergo "non-existing legislation") applies also in the future. In this paper, we start with the perspective of the financial management of the company, where we explain the possibilities of financing the needs of the company through other capital funds. We will focus on cases where it is advantageous for the company, resp. necessary and how the business practice copes with it.

In the next section we will clarify the legal aspects of the creation and use of other capital funds. Then we will go through the accounting and tax regulation of this topic. The conclusion will form an overall assessment of today's regulation. Throughout this seminar paper we will use the term other capital funds, although different legal codes use different terms for this category (e.g. the amendment to the Commercial Code uses the term capital fund from shareholder contributions).

2 Current status quo of research in relation to the discussed topic

Enterprises may also be financed through equity contributions. Financial managers are well aware of the theories of capital structure and the theory that the cost of equity is higher than that of liabilities (borrowed capital) (Brealey – Myers - Allen, 2014). There are several methods to calculate the cost of equity, such as the basic methods (e.g. the CAPM method – capital asset pricing model, the modular method) or ancillary methods (dividend model, average profitability or the deduction of the cost of equity from the

³ Measure of the Ministry of Finance of the Slovak Republic No 23054/2002-92 of 16 December 2002 laying down the details of accounting procedures and a framework chart of accounts for businesses using the accrual accounting system as amended (Accounting procedures for double-entry book keeping)

cost of liabilities) (Kráľovič – Vlachynský, 2011 and Jakubec – Kardoš, 2016). In practice, we could say that situations where a strengthening of net equity is required comes primarily from external agents, especially creditors. The most common example is when a bank makes the granting of a loan or the issuance of bonds conditional on a reasonable amount of own funds. In these cases, the company has the possibility to increase its registered capital, which is a lengthy process, as the decision of the shareholders at the general assembly is needed, it is necessary to prepare an application for registration of the capital increase and wait for the registration court to register the increase. This process takes approx. 1 month. Other options are monetary and non-monetary contributions outside the registered capital, such an increase in equity is not recorded under the registered capital and is booked on account 413 - Other capital funds. It should be pointed out that the procedure for the creation of other capital funds was very simple till the end of 2017, as the decision of the sole shareholder was sufficient, resp. decision of the general assembly of several shareholders, that they undertake to invest into other capital funds monetary resp. a non-monetary contribution. This was subsequently the basis for booking, i.e. the receivable towards the shareholder was booked and in the accountancy the other capital funds were increased. This process, led to an improvement of the financial indicators of the company's financial structure in favour of equity (Zalai, 2002, Kráľovič – Vlachynský, 2011 and Šlosárová – Blahušáková, 2017). The introduction of the institute "Company in Crisis" also prompted companies to improve their capital structure, in particular, in favour of equity by using accounting. It has to be said that this was essentially only an extension of the balance sheet, which had no effect on the Company's better health, in the sense that only the receivable that was not necessarily repaid was booked on the asset side, unless the General Assembly's decision also contained exact maturity, when the contribution to increase other capital funds is to be deposited. A bank analyst should not consider such an increase in other capital funds in its analysis of the company as such, as it is only an entry in accounting that has no direct effect on the health of the business.

A company in crisis is an institute that defined for the first time in the history of the Slovak Republic, how the adequate capital structure of a company should be, so that it does not fall into the category, when the shareholders, resp. members of the statutory body of the company restrictions that arise directly from the provisions of the Commercial Code. Pursuant to this Act, the company is in crisis as long as the ratio of equity to external funds does not reach 8 to 100. This ratio became effective from 1 January 2018, for 2016 the ratio was set at 4 to 100 and for 2017 the ratio was 6 : 100. There was a start-up curve so that companies could gradually improve their capital structure in favour of equity. What is the reason for the introduction of the institute of company in crisis? It is mainly for the protection of creditors. It is necessary to say that the creditors in the legal order of the Slovak Republic are protected only by standard instruments and if the law enforcement function is not working properly, especially the judicial, but also extrajudicial, the position of the creditor is endangered. The Slovak legal system knows the institutes of bankruptcy and restructuring⁴ (formerly settlement). It turns out

⁴ Act no. 7/2005 Coll. on bankruptcy and restructuring as amended

that these institutes have not yet fulfilled their function, resp. abuse of these institutes exists.⁵

What exactly means that the company is in crisis and what restrictions it has. With the amendment to the Commercial Code no. 87/2015 Coll. the concept of "company in crisis" has been introduced. These provisions came into effect on 1 January 2016. The reason for the introduction of this concept is to limit the activities of the company, if it does not meet the statutory ratio of equity to foreign sources. In the event that the company does not comply with the conditions of this limitation, which will be describe below, it is necessary that the liability of the members of the company statutory body for non-compliance arises. This is how the provisions on a company in crisis are formulated. Company is in crisis if it is bankrupt or under threat of bankruptcy. The company is bankrupt if it is insolvent (in the sense of the Bankruptcy and Restructuring Act, the company is insolvent if it has at least two creditors and defaults more than 30 days after their due date⁶) or is over-indebted⁷ (also in the sense of the Bankruptcy and Restructuring Act – this state occurs when the liabilities of the company are higher than the assets, and for the purposes of calculating the over-indebtedness, liabilities towards the related companies are excluded from the liabilities - subordinated liabilities).

Company is also in crisis if the company is threatened by bankruptcy (if the ratio of net equity to liabilities is less than 8:100, in this calculation, all liabilities including liabilities to related parties are used). What limitations exist for company in crisis? If in crisis, the company cannot disburse to its shareholders performance replacing company's own capital, whereas based on the definition these are for example loan or equivalents to that provided to the company in crisis. This also applies to those provided to the company before the crisis, whose maturity was postponed or extended during the crisis.⁸ Both, the theory and also the practice have taken the view that, in the case of a company in crisis, it is not possible to distribute profits, nor dividends. By introducing a new regulation of other capital funds in the Commercial Code from 1 January 2018, it is not possible to redistribute other capital funds (contributions from capital funds) among owners in the case of a company in crisis⁹.

Another factors that have made other capital funds a popular instrument of financing by using own funds is the requirement of the banking sector for minimum own financing, especially in development projects. Nowadays, we see a minimum requirement of self-financing between 20 - 30% of the project value. Given the uncomplicated possibility of creation, but also the disbursement of other capital funds till 1 January 2018, such a possibility of demonstrating own financing for credit institutions among the entrepreneurs was very popular. M&A transactions also involve the use of other capital funds. Until the rules on the taxation of the distribution of other capital funds in the Income Tax Act have not been clearly defined, it was possible for structuring acquisitions to use the option of so-called asymmetric redistribution of other capital funds

⁵ We put into your attention case of Váhostav a.s.

⁶ § 3 para. 2 Act no. 7/2005 Coll. on bankruptcy and restructuring as amended

⁷ § 3 para. 3 Act no. 7/2005 Coll. on bankruptcy and restructuring as amended

⁸ § 67c para. 1 of Commercial Code

⁹ § 217a para. 2 od Commercial Code

among owners (simplified scheme outline is the accession of a new shareholder through a new low capital contribution and a higher contribution to the other capital funds, and as a consequence asymmetrical redemption of other capital funds to the outgoing shareholder and subsequent sale of the share at a lower price). Since 1 January 2018, such a structuring of the transaction has lost its economic justification.

Case Study no. 1

Structuring of acquisition transaction till 31 December 2017

Natural person A, being the sole shareholder in company C, sells its 100% share. Agreement with the buyer - Company B is for 1 million EUR. The purchase price is not paid on the basis of the share transfer contract, but the parties have chosen different transaction structures. Company B accedes to the memorandum of association of company C as a new shareholder, committing itself to pay the monetary contribution to the registered capital, for example in the amount of 5,000 EUR (he will accede as a new shareholder and increase the registered capital by 5,000 EUR) and, in addition, a contribution to other capital funds of EUR 1 million EUR. Subsequently, pursuant to § 179 para. 4 of the Commercial Code, the shareholders agree that the other capital funds will be distributed, whereas the shareholder A receives 1 million EUR and shareholder B will not receive any deposit back. As there was no regulation on the taxation of the distribution of other capital funds until 31 December 2017 for individuals, according to the practice, income up to 1 million EUR for natural person was not considered as taxable income and hence, was not taxed.

3 Research Design

The object of the research are the other capital funds in line with the new Slovak regulation. Legal, accounting and tax implications are thoroughly addressed in this paper.

4 Results of the research

4.1 Legal aspects of other capital funds

As already mentioned above, until 31 December 2017 the term other capital funds or capital funds from contributions was not defined in the Commercial Code. Until then, such possibility was considered only in the commentaries to the Commercial Code (Patakyová, 2010 and Ovečková, 2012), which both accepted this way of contribution. At the same time there was a practice of taking advantage of creation and distribution of other capital funds massively. Moreover, there also a group of mostly advocates¹⁰, which did not accept any possibility create and distribute other capital funds. In this respect, it is important to point to the principle of private law, according to which the entities are allowed to make use of thesis “Everything which is not forbidden is allowed”. On the contrary, the bodies of public authority are should follow the constitutional legality principle, i.e. “bodies of the public authority are allowed to only act in

¹⁰ Mostly articles on this topic by Ján Čarnogurský Jr.

accordance with the constitution, law and other general binding rules”¹¹. The subjects of the private law shall be limited by imperative of certain provisions of the Commercial Code and supporters of restrictive approach to other capital funds argued by the imperative of the Commercial Code part on business law.

With effect from 1 January 2018, the Amendment to the Commercial Code no. 264/2017 Coll. introduced term “Capital Fund From Shareholders Contributions” in Art. 217 and relevant provisions for creation and distribution of such fund. Four paragraphs define the conditions of creation and distribution of fund, refer to other applicable provisions, and determine how the fund shall be distributed among shareholders and company obligations before the distribution. These new provisions apply to joint-stock company and appropriately to limited liability company (Art. 123 (2 and 3) of Commercial Code). Creation of capital fund from shareholders contributions must be regulated by the contract for the formation or the statutes of the company. Upon establishing the company, it has to be approved by the founders. If it is created during the existence of the company, it is approved by general meeting. It should be noted that payment of the shareholder’s contribution to the capital fund is regulated by the provisions on contribution appropriately. By this definition, any non-monetary contribution should be valued by expert opinion which determines the recognized value, the value of contribution in the decision of the general meeting. That is a significant difference compared to common practice before 1 January 2018, when the expert opinion was not required upon capitalization of shareholder’s / partner’s receivables into other capital funds (general meeting decided on creation other capital funds and the liability from the contribution was paid by set-off with the receivable). New rules after 1 January 2018 allow the situation that the expert appraises the shareholder’s / partner’s receivable by lower value than the nominal value and in this value the contribution is recognized as increase of the capital funds from shareholders contributions. Furthermore, new regulation says that the shareholder’s contribution is considered paid at the moment of the payment. We already mentioned the situations where the management of the companies tried to improve the capital conditions of the company in by accounting for the increase of other capital funds against shareholder’s / partner’s receivable. After 1 January 2018, such book record is not allowed until the moment of actual payment of the contribution into the capital fund (i.e. either at the moment of payment of monetary contribution or at the moment of recognition of non-monetary contribution as contribution to the fund). These change was reflected by amendment of Act on Accounting and Accounting Procedures (see also the part on accounting aspects).

According to new legislation, capital funds from shareholder’s contributions can be used for distribution (this term is used instead of usual term “payment”) among shareholders or increase of registered capital, if the general meeting decides so or it is allowed by the contract of formation or company statutes. From this provision it is clear that the capital fund from contributions cannot be used for settlement of the company losses. Other important provision is limitation of the distribution in case the company

¹¹ Art. 2 par. 2 of the Slovak Constitution

is in the crisis, or would enter in the crisis as a consequence of such distribution. Previous to the distribution to shareholders, announcement about distribution should be published in the Trade Journal at least 60 days in advance (Rödl & Partner, 2018). Distribution of the fund in contradiction to the Commercial code is regulated by provisions on prohibited return of payments replacing own sources and is followed by guarantee of the statutory body. According to the transitional provisions Art. 768q (2) of the Commercial Code, the rules for creation and usage of the capital funds from contributions apply on contributions after 1 January 2018, which implies that other capital funds created before 1 January 2018 remain unregulated (also their pay-off / distribution) in the future.

4.2 Accounting aspects of other capital funds

Other capital funds form part of the equity of business companies. Based on the Art. 6 (4) of the Commercial Code, equity is formed by the own sources of funding of the assets of the company as defined in the specific rules (in this case Act no. 431/2002 Coll. on Accounting). According to the Accounting procedures for companies, other capital funds are booked on account 413 – Other capital funds. Accounting group 41 – Registered capital and capital funds includes, besides registered capital and its changes, also the account 412 – share premium, accounts for gains or losses from revaluation and accounts for various funds from contributions of shareholders / partners (e.g. statutory reserve fund from capital contributions, indivisible fund from capital funds). Last but not least, account 413 – Other capital funds belongs in this group. Until 31 December 2017 the Accounting Procedures regulated that the account 413 – Other capital funds serves for booking of other monetary capital contributions and non-monetary contributions, which, upon their creation, do not increase registered capital of the company and for which there is no other synthetic account of this accounting group (Baláž, 2015).

Credit side of the account is used mainly for booking of assets received from the shareholders free of charge, members' shares in Cooperative entities for cooperative housing¹². Since 1 January 2018, the content of the account 413 is following: booking of monetary and non-monetary contributions to other capital fund from contributions. Credit side of the account is used, for instance, for booking assets received from the shareholders and partners free of charge, received shares in Cooperative entities and issued cooperative entities shares. There is a new Art 2 (3) in the Accounting procedures, which directly reflects provisions of the amended Commercial Code defining the moment when the contribution to the capital fund is considered as paid. Based on the new rules, the accounting transaction date of the contribution to the capital fund from contributions is the day of contribution payment; in case of non-monetary contribution, it is the day of takeover of the contribution by the company and for shareholder or partner, it is the date of its handover (Finančné riaditeľstvo SR, 2018).

¹² Art 59 (6) of Accounting procedures for companies in wording until 31.12.2017

In this respect, booking can only be made upon actual payment of the monetary or non-monetary contribution (Farkaš, 2018), and thus, it is impossible that a receivable against the shareholder / partner from the unpaid contribution to other capital funds would appear in the financial statements. Such receivable will be reported in the notes to the financial statements only.

There also is a new Art 27b in the Accounting procedures named Booking of capital funds from the contributions. This article describes in detail the procedure of booking such contributions in case of contributor, as well as the company receiving the contribution (KPMG, 2018). Primarily we would like to comment on booking of distribution of other capital funds for shareholder / partner, who is not its original contributor. In those case the distribution is not booked as decrease of the financial investment of the shareholder / partner, but as Other financial revenues on account 668 (see also related tax treatment of such revenue) (Farkaš, 2018).

Case Study no. 2

Accounting for distribution of other capital funds to shareholders/partners according to Accounting procedures as of 1 January 2018.

Company Alfa LLC has two partners – 2 LLCs, while one partner (company Beta LLC) contributed EUR1 million in the past into other capital funds, and the second partner (company Gama LLC) contributed EUR 2 million in the past. General meeting of Alfa LLC decided on 13 December 2018 that the whole amount of other capital funds would be distributed between the partners so that Beta LLC would receive EUR 1,5 million and Gama LLC would receive EUR 1,5 million. What are the accounting transactions and how should it be booked in Alfa, Beta, Gama companies?

Table 1. Accounting in Alfa LLC

	Debit	Credit	Amount (€)
Distribution of other capital funds based on the decision of GM	413	36x	3.000.000
Repayment of the contributions to partners	36x	221	3.000.000

Table 2. Accounting in Gama LLC

	Debit	Credit	Amount (€)
Distribution of other capital funds - assessment	378	06x	1.500.000
Repayment of money from other capital funds	221	378	1.500.000

Table 3. Accounting in Beta LLC

	Debit	Credit	Amount (€)
Distribution of other capital funds – assessment up to the amount of paid contribution	378	06x	1.000.000

Repayment of contribution to other capital fund in amount of the contribution	221	378	1.000.000
Difference between the value of paid contribution and amount of distribution belonging to partner	221	668	500.000

This example demonstrates the problems of the new rules in case of so called asymmetric distribution of other capital funds. In the company Gama LLC, there is a balance of EUR 500,000 on the account 06x – Financial investment, even after funds distribution, although the company Alfa LLC does not show other capital funds anymore. Further analysis would be required in order to find out whether the amount from account 06x in Gama LLC would be booked in costs upon sale / disposal of share of the company Gama LLC in the company Alfa LLC.

4.3 Tax aspects of other capital funds

It should be noted that until 31 December 2017 any rules for taxation of usage of other capital funds were absent in the Income Tax Act. Repayment of other capital funds to natural person was not considered as taxable income in practice, and therefore was not taxed. In case of legal person, the taxation followed the accounting, i.e. should there be a booking record in the revenues due to repayment of other capital funds, the revenue was taxed. In this respect we remark that the shareholder / partner, who did not contribute to other capital funds their own contribution, however received the repayment of the contribution from account 413 (e.g. contribution of former partner), could account for decrease of the financial investment (without impact on the revenues, only on balance sheet), and thus was not taxed at partner / shareholder – legal person, either. This was possible only provided that the acquisition price of the shares was at least in the amount which was distributed from other capital funds. Only by the amendment of the Income Tax Act effective from 1 January 2018 clear rules were introduced in this area. These include rules for taxation upon distribution of other capital funds applicable for natural persons that are not entrepreneurs, natural persons – entrepreneurs and legal persons. Under Sect. 8 par. 1 s) of the Income Tax Act, for non-entrepreneurs, the income from the redistribution of other capital funds is taxable income and more specifically so-called other taxable income. It is also possible for the non-entrepreneur to claim the relevant expenditure within the meaning of Sect. 8 par. 5 g) of the Income Tax Act, where the amount of the contribution paid is considered to be an expense. This means that if the other equity fund is redistributed to the non-business partners/shareholders and these shareholders have created /redeemed this equity fund it in the past, the non-entrepreneur will report a tax base of EUR 0 on such a transaction.

As for a natural person - entrepreneur accounting in the system of simple accounting or manager, the so-called tax records, the income is considered to be redistribution of other capital funds only in the tax period, when this taxpayer really received such income (cash principle) – Sect. 17 par. 41 of the Income Tax Act. The expenditure is again the amount of the contribution paid by the taxpayer. If the amount of the redistribution exceeds the amount of the contribution initially paid, the difference is the taxable income in the taxable period of the payment of other capital funds. In the case of a legal

entity - partner/shareholder or a natural person accounting in double-entry bookkeeping, according to § 17 par. 40 of the Income Tax Act, the tax base excludes the amount of the redistribution of other capital funds up to the amount of the taxpayer's contribution. The tax base of the taxpayer who did not pay the contribution only includes the amount of the proceeds from the redistribution of other capital funds in the tax period in which the receivable was kept in the records.

Case Study no. 3

As part of the acquisition process, the investor - Top Secret s.r.o. agrees with the partners of the target company Blue Eyes s.r.o. in the following purchase price structure for the transfer of shares: Blue Eyes s.r.o. account shows a sum of 1 million in the 413 account. EUR, which two partners - natural persons non-entrepreneurs contributed each in the same amount of EUR 500 thousand at the foundation of the company in 2005. The purchase price for each share was set at 1 mio. EUR, while the investor gives the company a loan of 1 million. EUR, from which first outgoing shareholders are paid other capital funds and then the investor still paid to each partner 500 thousand. EUR. For natural persons - non-entrepreneurs the taxable income is 500 ths EUR from the payment of other capital funds, with the tax expenditure being the value of paid-up capital or the acquisition cost of the share in the past in the amount of 500 ths. EUR meaning that the tax base amounts 0.- EUR (further 500 ths. EUR of the each natural person from the sale of share means a taxable income with the tax expenditure amounting the value of paid-up registered capital or purchase price of the share in the past.

As for this topic, it is necessary to point out that, for incomprehensible reasons, the legislative body omitted to supplement the disbursement of other capital funds in the amendment to the Income Tax Act to Section 16, which regulates the source of income for non-residents from the territory of the Slovak Republic. For this reason, the payment to a non-resident does not generate taxable income from the territory of the Slovak Republic and is therefore not obliged to tax it (he is not obliged to file a tax return or to withhold tax).

When comparing the new Slovak regulation with other jurisdictions, for example with Austria, it has to be emphasized that the new regulation might be deemed to be relatively strict as the purpose had been to eliminate any kind of fraud or speculation. In line with the Austrian Entrepreneurship Code the capital funds (in German – nicht gebundene Kapitalrücklagen und freie Rücklagen) which are not bound by the bylaws (or if there is no other distribution restriction (Ausschüttungssperre) – e.g. in case of business combinations) can be freely distributed back to the shareholders and are treated like dividends. The distribution can even happen in the year when the shareholders provided the additional funds in form of capital funds (Kammer der Wirtschaftstreuhänder, 2010).

5 Discussion and conclusions

This paper pointed out from our point of view 4 main conclusions in connection with the regulation of other capital funds in Slovakia. They are:

1. Enterprise financing through other capital funds will increase in respect to given requirements of financial institutions (banks, leasing companies, non-banking entities, etc.) for an appropriate capital structure and financing of development projects. This is also related to the efforts of companies to meet the legal criteria that the company should not be in crisis in accordance with the provisions of the Commercial Code (problems with the payment of dividends / profit shares or with the auditor's report).
2. Regulation of other capital funds in the Commercial Code from January 1, 2018 only deals with funds created since that date. This left a legal vacuum as to how to deal with the redistribution of other capital funds among shareholders / partners if they arose before the amendment came into effect.
3. Imperfection of accounting procedures for accounting for the payment of other capital funds to a shareholder who is not fully paid the original contribution but due to the asymmetric redistribution of other capital funds among the owners the entire capital fund is already disbursed. This has to be resolved by another amendment to the Accounting Procedures.
4. In taxing the redistribution of other capital funds, the legislature omitted that a tax non-resident may also be a shareholder. This allows various tax optimizations.

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STATISTICAL ANALYSIS OF EUROPEAN UNION COUNTRIES ON THE BASIS OF MAIN ECONOMIC INDICATORS

Ing. Dominika Krasňanská¹, Ing. Silvia Zelinová²

University of Economics in Bratislava
Faculty of Economic Informatics
Department of Statistics¹, Department of Mathematics and Actuarial Science²
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia

¹d.krasnanskaa@gmail.com

²silvia.zelinova@euba.sk

Abstract. The aim of the paper is to compare the European Union countries on the basis of main economic indicators for the year 2018. Three indicators are selected for analysis: gross domestic product per capita, nominal unit labour cost and employment rate. These indicators were defined by the National Bank of Slovakia as the main economic indicators.

The contribution of the paper is the ranking of countries based on the above indicators, from the best country to the worst country by means of multi-criteria evaluation methods, namely by using the order method, the scoring method, method of standard variable and the distance method from the fictitious object. The aim of these methods is to replace selected indicators, on the basis of which we compare selected objects, in our case the countries of the European Union, with one resulting characteristic - an integral indicator on the basis of which we organize the countries of the European Union. By creating an integral indicator, heterogeneous indicators, which are expressed in different units of measure and therefore cannot be aggregated by direct addition are transformed, to homogeneous indicators. Indicators modified in this way can already be added together. The result of the addition of homogeneous indicators gives the required integral indicator. Application of individual statistical methods is implemented through SAS Enterprise Guide.

Keywords: multi-criteria evaluation methods, European Union countries.

JEL classification: C 10

1 Introduction

In most cases, statistical research focuses on analysing only one statistical feature of interest and its only property in the sample. In many cases, however, this is not enough,

and it is necessary to examine the statistical set from several aspects, taking into account the manifestations of its multiple characteristics, as represented by several statistical features (Hair, Black, Babin, Andersen, 2009).

For such an analysis, it is necessary to use multivariate statistical methods, which include, inter alia, multi-criteria evaluation methods, namely the order method, the scoring method, method of standard variable and the distance method from a fictitious object.

When comparing European Union countries on the basis of main economic indicators (gross domestic product per capita, nominal unit labour cost and employment rate) the paper uses the above-mentioned methods of multi-criteria evaluation, namely the order method, the scoring method, method of standard variable and the distance method from the fictitious object. The aim of these methods is to create an integral indicator within each of these methods and to organize countries on the basis of selected economic indicators from the best to the worst.

1.1 Data

We chose all 28 EU Member States for analysis. Selected countries are compared for the year 2018 through 3 main economic indicators. Selected indicators are briefly defined:

Gross domestic product at market prices (current prices, euro per capita)

GDP (gross domestic product) is an indicator for a nation's economic situation. It reflects the total value of all goods and services produced less the value of goods and services used for intermediate consumption in their production. Expressing GDP in PPS (purchasing power standards) eliminates differences in price levels between countries, and calculations on a per head basis allows for the comparison of economies significantly different in absolute size.

Nominal unit labour cost – annual data, % changes and index (2010=100)

The unit labour cost (ULC) is defined as the ratio of labour costs to labour productivity.

Nominal ULC (NULC) = $(D1/EEM) / (B1GM/ETO)$ with:

D1 = Compensation of employees, all industries, current prices

EEM = Employees, all industries, in persons (domestic concept)

B1GM = Gross domestic product at market prices in millions, chain-linked volumes reference year 2010

ETO = Total employment, all industries, in persons (domestic concept)

The input data are obtained through official transmissions of national accounts' country data in the ESA 2010 transmission programme.

The data are expressed as 1, 5 and 10 years % change and as index 2010=100.

The employment rate is calculated by dividing the number of persons aged 20 to 64 in employment by the total population of the same age group. The indicator is based on the EU Labour Force Survey. The survey covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals. Employed population consists of those persons who during

the reference week did any work for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent.

Model Calibration.

To compare the European Union countries on the basis of the main economic indicators, we used the methods of multi-criteria evaluation, which include the order method, the scoring method, method of standard variable and the distance method from the fictitious object. Next, we will describe these methods in more detail.

The order method is one of the simplest methods that results in an integral indicator. The essence of this method is to rank EU countries according to each indicator. This means that for each indicator we will compile the order of countries. The country with the best indicator (highest for maximization or lowest for minimization) is assigned an order equal to the number of objects in the file (n), the object with the second best value for that indicator will be ranked ($n - 1$), to the object with the worst value of the indicator to which we assign the order (1). Generally expressed, the i -th object for the j -th indicator is assigned the order s_{ij} (Stankovičová, Vojtková, 2007).

Integral indicator d_{li} , according to which we organize selected countries of the European Union, we obtain as the sum of the order according to individual selected indicators:

$$d_{li} = \sum_{j=1}^k s_{ij} v_j \quad (1)$$

where: d_{li} is an integral indicator,
 s_{ij} is the sum of the order individual indicators,
 v_j is the weight of the j -th indicator¹

In the final arrangement of the countries of the European Union, the country that has achieved the highest value of the integral indicator will come first. On the contrary, the country with the lowest value of the integral indicator will be in the last place in the order.

The scoring method – the basis of this method is a score that replaces unequal values of individual indicators, each indicator in the set of objects must be scored. To do this, we look for the best value for each indicator. In the case of a stimulating variable, the maximum value, in the case of the destimulating variable, the minimum value (Hurbánková, 2006).

We will assign 100 points for this object. Other objects will gain from 0 to 100 points, depending on the percentage of their indicator value observed on the object from the best value. If the positive phenomenon of the indicator is its maximization, it is a stimulating variable, we assume the relation:

$$b_{ij} = \frac{x_{ij}}{x_{max j}} \times 100 \quad (2)$$

¹ the formula is given with weights, but we did not apply any weights in the paper

If the positive phenomenon of the indicator is its decrease, it is a destimulating variable, we assign the number of points according to the relation:

$$b_{ij} = \frac{x_{min j}}{x_{ij}} \times 100 \quad (3)$$

where: b_{ij} is the number of points for the i -th pointer,
 x_{max} is the highest value of the j -th pointer (100 points),
 x_{min} is the lowest value of the j -th pointer (100 points),
 x_{ij} is the value j -th corresponding to i -th object.

The integral indicator for the i -th object is calculated as a weighted arithmetic mean of the number of points for each indicator:

$$d_{2i} = \frac{1}{k} \sum_{j=1}^k b_{ij} v_j \quad (4)$$

where: $j = 1, 2, \dots, k$ (number of indicators),
 $i = 1, 2, \dots, n$ (number of objects),
 d_{2i} is integral indicator,
 v_j is the weight of the j -th indicator.

The order of the selected objects is determined so that the first one is the object with the highest value of the integral pointer and the last one is the object that has reached the lowest value of the integral pointer. The scoring method makes it possible to aggregate the values of indicators found in different units of measure, which in the original units of measure could not be counted as a single integral characteristic, which is a dimensionless number. The scoring method is more sensitive compared to the ranking method, given that the assigned number of points expresses the differences of objects within individual indicators also quantitatively. If there are negative signatures in the input file, there are two ways to transform them into points:

1. the number of points is determined as in the case of positive values and the number of points obtained is given a minus sign,
2. we assign zero points to the negative object.

The method of standard variable – since in our paper we have data in various units of measure, it is necessary to transform these data into a comparable form (dimensionless number) of the so-called standard variable. The essence of this method is to convert the different values of the indicators into a standard variable. A standardized quantity is a dimensionless characteristic that has a mean value of zero and a variance of one (Jílek, 1996).

When applying the standard variable method, we first calculate the arithmetic means and standard deviations for the selected variables. In the next step we transform the original values of the indicators into a standardized form. In the case of a maximization indicator, we calculate the value of the standardized variable according to the relation:

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_{xj}} \quad (5)$$

where: \bar{x}_j is the arithmetic mean of the j -th indicator,
 s_{xj} is the standard deviation for each indicator,
 z_{ij} is the normalized value of the j -th object.

If it is a minimization indicator, we determine the standardized variable as:

$$z_{ij} = \frac{\bar{x}_j - x_{ij}}{s_{xj}} \quad (6)$$

where we calculate the arithmetic mean and standard deviation based on the following formulas. First, the calculation for the arithmetic mean (7) is given, followed by the standard deviation calculation (8):

$$\bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij} \quad (7)$$

$$s_{xj} = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2} \quad (8)$$

In the next step it is necessary to express the resulting characteristic - integral indicator, which we calculate for the i -th object as an arithmetic mean of standardized values:

$$d_{3i} = \frac{1}{k} \sum_{j=1}^k z_{ij} v_j \quad (9)$$

where: d_{3i} is an integral indicator.

In the last step, it is necessary to determine the order of objects based on the size of the average value of standardized quantities. The higher the value, is the better the object is in the ordering of all objects. While the original indicator x could basically take values from the interval $(-\infty, \infty)$, the standardized indicator may also take any values, but in the case of a normal distribution of -1 to 1, acquire 68% of the file objects, values from -2 to 2 95% and from -3 to 3, 99,9% of objects. In the case of non-normal distribution, the percentages may vary, but according to Chebyshev inequality, at least 89% of objects have values from -3 to 3 (Stankovičová, Vojtková, 2007).

The distance method from the fictitious object is based on the comparison of individual objects of the file with the so-called. a fictitious object that represents an abstract model, achieving the best value for all selected indicators. In the case of destimulating indicators, the minimum value and, in the case of indicators having a stimulating character, the maximum value. The first step in this method is to calculate arithmetic means and standard deviations for selected indicators. In the next step we have to transform all the indicators into a standardized form to eliminate the problem of different units of measurement of the selected indicators. Last but not least, we calculate an integral indicator of complex evaluation, which expresses the Euclidean distance of each selected object from the modelled fictitious object:

$$d_{4i} = \sqrt{\frac{1}{k} \sum_{j=1}^k (z_{ij} - z_{0j})^2 v_j} \quad (10)$$

where: d_{4i} is an integral indicator,
 z_{ij} is the normalized form of the j -th pointer in the i -th object,
 z_{0j} is the normalized form of the „best value“ of j -th indicator,
 v_j is the weight of the j -th indicator..

The last step in the distance to fictitious object method is to determine the resulting order of objects that we determine so that the best object is the object with the smallest distance from the fictitious object – the object with the smallest value of the integral pointer. The smallest value an object can achieve is zero. An object that would achieve this value would have to achieve the best value in all selected indicators, a fictional object would be modelled from its values. This means that the first-placed object will be the one that is closest to the fictitious object. The object that has reached the farthest distance from the fictitious object will be in the last place in the order of all objects.

2 Application of multi-criteria evaluation methods

Within this section we will show the graphical order of European Union countries based on the main economic indicators resulting from the application of individual methods of multi-criteria evaluation (Hurbánková, Sivašová, 2006).

When applying the weighted sum order method, we first determined the order for each indicator. Subsequently, on the basis of the integral indicator, we arranged the countries in descending order – from the country with the highest achieved value of the integral indicator to the last country, which reached the lowest value. Sweden ranks first in the list of organized EU countries, followed by Germany and Estonia. Greece (27th place) and Croatia (28th place) ranked last.

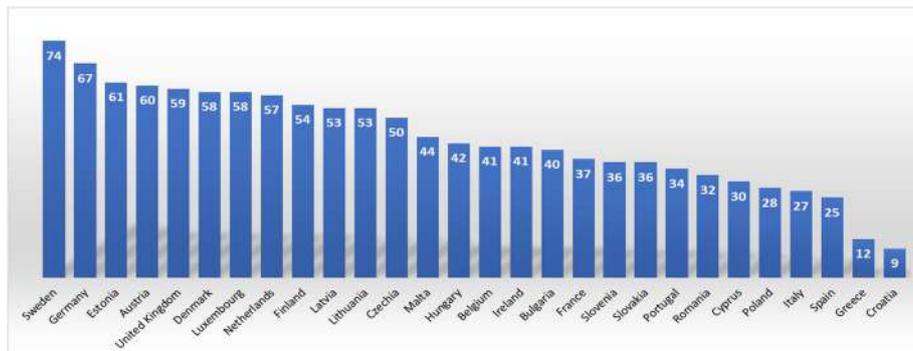


Fig. 1. EU ranking based on the integral indicator by applying the sum order method. *Source: own calculations using programme Excel*

Another method we applied is the scoring method, which is based on replacing the original values of the indicators by the number of points. We assign a maximum score of 100 to the best-performing country. We assign a score to the other countries, which indicates the percentage of the variable from the best value for that indicators. Subsequently, we determine the integral indicator on the basis of which we organize the countries in the resulting order, which is graphically shown below.

Luxembourg, Sweden and Denmark ranked first three. On the contrary, in the last places are the same countries as in the application of the previous method - the order methods – Croatia and Greece.

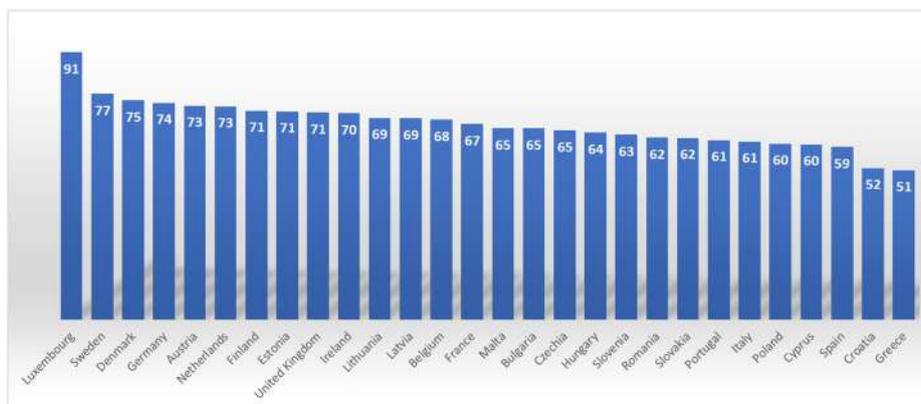


Fig. 2. Ranking of EU countries based on the integral indicator by applying the scoring method. *Source: own calculations using programme Excel*

The third method, in order, is a standard variable method based on the transformation of variables into a standardized form. The values of the integral indicator were calculated as the arithmetic mean of the transformed values of the variables. In the ranking of the ranked countries, the country with the highest level of the observed phenomenon

is in the first place. Luxembourg comes first, followed by Sweden and Estonia. At the other end, there is again Croatia and Greece.

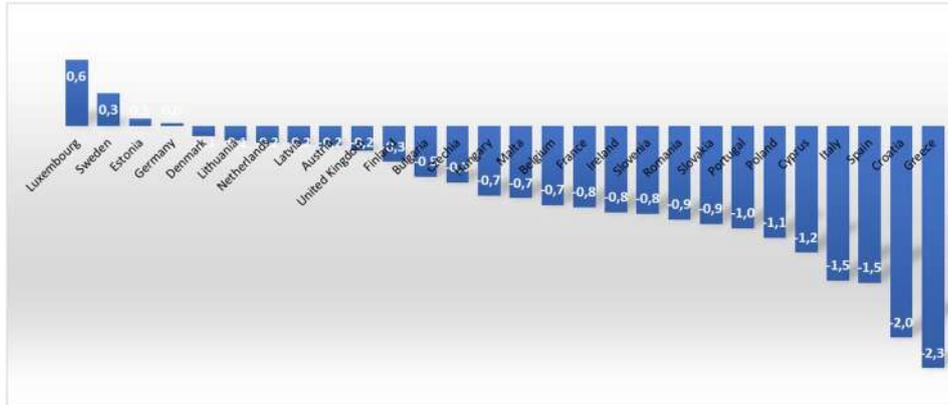


Fig. 3. EU countries based on the integral indicator by applying the standard variable method. *Source: own calculations using programme Excel*

The last method of multi-criteria evaluation is the method of distance from a fictitious object. Application of this method also requires standardized values of variables. We have determined the following method of the standard variable. Subsequently, we identified a fictitious object that achieves the best value in all indicators. The last step was to calculate an integral indicator, which we calculated as the average Euclidean distance from a fictitious object. We determined the final ranking of the countries so that the best object with the order of 1 was the one that reached the smallest distance from the fictitious object. On the last rank is the country, which reaches the rank 28, with the worst rank, respectively, the farthest distance from the fictitious object. Luxembourg comes first, followed by Sweden and then Denmark. Last places were occupied by Croatia and Greece.

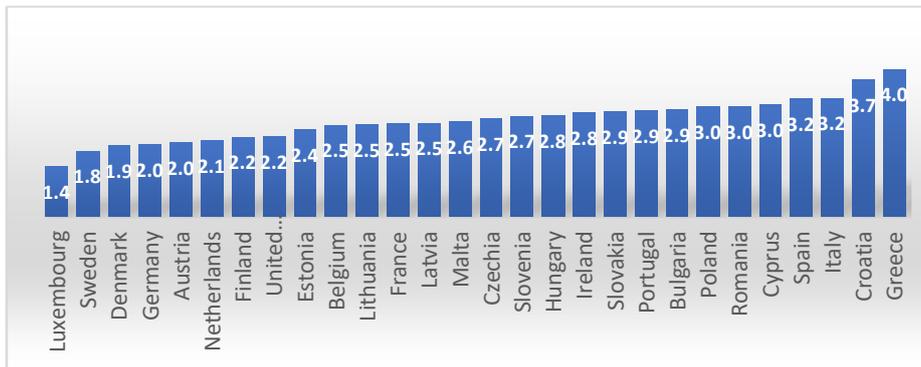


Fig. 4. EU countries ranking on the basis of an integral indicator by applying the distance to fictitious object method. *Source: own calculations using programme Excel*

For a better overview, we also present a table of European Union countries based on the application of individual methods.

Table 1. Country ranking by applying multi-criteria evaluation methods

sum order method	scoring method	standard variable method	distance from fictitious object
Sweden	Luxembourg	Luxembourg	Luxembourg
Germany	Sweden	Sweden	Sweden
Estonia	Denmark	Estonia	Denmark
Austria	Germany	Germany	Germany
United Kingdom	Austria	Denmark	Austria
Denmark	Netherlands	Lithuania	Netherlands
Luxembourg	Finland	Netherlands	Finland
Netherlands	Estonia	Latvia	United Kingdom
Finland	United Kingdom	Austria	Estonia
Latvia	Ireland	United Kingdom	Belgium
Lithuania	Lithuania	Finland	Lithuania
Czechia	Latvia	Bulgaria	France
Malta	Belgium	Czechia	Latvia
Hungary	France	Hungary	Malta
Belgium	Malta	Malta	Czechia
Ireland	Bulgaria	Belgium	Slovenia
Bulgaria	Czechia	France	Hungary
France	Hungary	Ireland	Ireland
Slovenia	Slovenia	Slovenia	Slovakia
Slovakia	Romania	Romania	Portugal
Portugal	Slovakia	Slovakia	Bulgaria
Romania	Portugal	Portugal	Poland
Cyprus	Italy	Poland	Romania
Poland	Poland	Cyprus	Cyprus
Italy	Cyprus	Italy	Spain
Spain	Spain	Spain	Italy
Greece	Croatia	Croatia	Croatia
Croatia	Greece	Greece	Greece

Source: own calculations using programme Excel

We also created a graphical representation of the average ranking of countries based on multi-criteria evaluation methods. Sweden came first, followed by Luxembourg and Germany. On the contrary, in the last places in average order are Croatia and Greece.

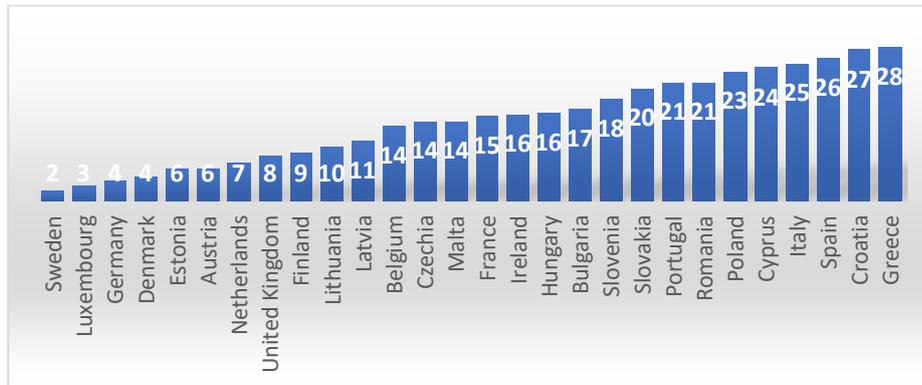


Fig. 5. Average ranking of EU countries. Source: own calculations using programme Excel

3 Conclusion

We could summarize the results achieved by using multi-criteria evaluation methods in the following points:

- Countries such as Sweden, Germany, Estonia, Luxembourg and Denmark alternated in the first three places. When comparing our results with the results of a project carried out by Eurostat, which focused on the organization of countries on the basis of quality of life, we can conclude that in the project developed by Eurostat are in the first places Luxembourg, Ireland, the Netherlands, Austria, Germany, Denmark, Sweden. Just as it worked for us. Of course, we did not compare EU countries on the basis of the same indicators as in the project, but we can also argue that the indicators on which we adjust the countries in our paper affect the quality of life. Luxembourg ranked three times in the applied methods in the first place. This was not only the case of the order method, which was mainly influenced by the employment rate indicator, since only a quarter of people over 55 are working in Luxembourg and, compared to other EU countries, female employment is below the European average.
- Spain, Italy, Greece and Croatia ranked last in applying multi-criteria evaluation methods. This was influenced by the values of selected indicators on the basis of which we organized the countries. The fact that Greece is in the last place in three cases was also influenced by the crisis that took place in Greece. However, the country continues to suffer from high unemployment as a result of the crisis.

Acknowledgement

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THE RISE OF ISLAMIC FEMINISM IN THE CONTEMPORARY MILIEU OF INTERNATIONAL RELATIONS

Kristína Krupová

University of Economics in Bratislava
Faculty of International Relations
Dolnozemská cesta 1
Bratislava, 852 35
Slovak Republic
kristina.krupova@euba.sk

Abstract. In the context of current international relations, the issue of Islam is a very sensitive and controversial issue. Several phenomena related to this world-leading religion are misinterpreted. Thus, the main aim of our paper is to illustrate the concept of Islamic feminism, which is gaining popularity in the background of political Islam and offer the definition framework and describe the main differences between Islamic and secular feminism. We often come across the notion that Islamic feminism contradicts the very idea of the original term. In our paper we also try to explain aspects that led to the development of Islamic feminism in society.

Keywords: Islamic feminism, Islam, political Islam

JEL classification: B 54, Z 12, F 59

1 Introduction

In our research team we focus primarily on research of the Islamic factor in the context of contemporary international relations. Indeed, issues related to Islam are in the process of globalization becoming increasingly relevant in the European context. The influence of religion on the political and economic sphere is indisputable. Islam, as the leading monotheistic religion, which is at the same time the fastest growing religion in the world in recent decades, is gaining increasing attention of experts around the world. It is important to stress that not all aspects of Islam are properly presented in society. Positive, but also negative connotations related to Islam often lead to misinterpretation of facts and abuse for political purposes or propaganda aimed in favour or against Islam itself.

While completing one recent research of the Islamic factor in the contemporary milieu of the international relations, we focused on the aspect of political Islam. This topic

is also related to the present paper, in which we would like to explain the basic characteristics of Islamic feminism.

The main aim of our contribution is to clarify the definition framework of the presented term, which by its nature creates justified controversies. Several scholars consider the terms 'Islam' and 'feminism' to be contradictory and reject the existence of this scholarship. It is also important to set the term into the contemporary conditions of world politics and be able to answer why there is a need for such a feminist scholarship.

2 The new reality of the Islamic factor – causes and tendencies leading to the development of ideas of Islamic feminism

The urbanization process affects all latitudes and causes an unprecedented prevalence of the urban population over the rural population. As Černý suggests in his publication, this phenomenon leads to the erosion of the fragile balance between the two basic counterparts of Islamic religion: the various forms of rural and popular Islam and apolitical mystical Sufism in favour of ever-increasing urban orthodox fundamentalism and in the current notion of ever-increasing political Islam (Černý, 2012).

With the process of population fluctuation between rural and urban environment, not only the demographic structure of the population has changed, but also the socio-economic and cultural situation of society. In addition, urbanization has seen the decline of Sufism and traditional folk Islam in recent decades, while religious orthodoxy and elements of fundamentalism have become increasingly popular amongst the Muslim population.

Thus, in general, Islam, as one of major world religion, also ensures cultural transition and helps to cope with the changing situation of the displaced population. Religion meets the urgent social and psychological needs of a large mass of people. In an era of rapid urbanism, which creates new social and economic risks, outdated forms of religion cannot adequately compete with new institutionalized forms of religious life. Fundamentalist movements come up with new ideas and try to reinterpret the religious tradition (Sen Nag, 2017).

Urbanization enables the development of the modern phenomenon of Islamic feminism, which seeks to interpret Islam and to change the societal political discourse regarding the position of Muslim women in society. Women are actively involved in various Islamist movements to a similar extent as men. However, major movements (such as the Muslim Brotherhood, Hamas and Hezbollah) reject any social innovation (bida) and, in the case of gender relations, promote a version of Islamic law that gives women secondary status.

It is Islamic feminism that is more consistent in this respect, and in the pursuit of female emancipation, it mainly uses the interpretation of the Qur'an and especially the Sunnah (hadiths). This urban, educated part of the women's Islamist movement is advancing precisely because of Islam itself and its tradition. E.g. the last wife of the Prophet Muhammad Aish (among the Sunnis), as well as his daughter Fatima (among

the Shiites), are portrayed in many Hadiths as prototypes of emancipated and committed warriors, wise women, devout Muslims who play a major role in the political and public life of the Muslim community (Černý, 2012).

Critical readings of gender difference in Islam have mostly remained on the margins of normative Muslim literature where the normative view is that Islam corrected pre-Islamic gender bias with its arrival and is, therefore, necessarily a source of liberation for women. Equality is envisioned as a complementarity of male and female roles; men and women are created in a manner that suits them ideally to their divinely ordained social roles, adherence to which is necessary to a properly Muslim life. In Seedat's view, the status of women in Muslim society is considered progressive *vis-à-vis* other religious or social systems and Muslim women would be better served by the norms of Islam than the radical freedoms of the West, especially those suggested by feminism. This approach characteristically resists the convergence of Islam and feminism (Seedat, 2013).

Islamic feminism bases its arguments on the fact that the bad habit is in contradiction to Islam, which is much more effective in highly religious societies than in secular - Middle Eastern or Western - liberal feminists. They argue that the root cause of all the problems is to look for Islam itself, but they do not gain support in Muslim societies in the long term.

It should be noted that the development of feminism owes a great deal of literacy and access to education to women who have been allowed to study the Quran without the participation of mediators - clergymen, men, brothers. As a result, more and more women have a chance to look at the various directions of Islamism in high schools or universities, which are the epicentre of the whole Islamist movement.

The boom in urbanization was most evident in the way in which Muslim women were publicly covered. While in the countryside women lived and worked for e.g. on family farms and surrounded by a narrow social group, Muslim women in big cities tend to be more covered because of the more frequent contact with strangers (Černý, 2012). The way of covering Muslim women is understood as the main external sign of the moral qualities of man. For economic reasons, women are also forced to find a job, which is beyond the isolated family environment. But the causes of the massive covering of Muslim women are in fact more diverse. In this respect, a part of women tries to symbolically demonstrate their opposition to political or cultural attitudes, resistance to Western culture and politics. Another paradoxical phenomenon is the covering of adolescent girls in response to under-covered mothers trying to adapt to Western culture.

3 Important differences in the definition framework – is there any Islamic feminism at all?

The very notion of feminism provokes considerable controversy, not only with regard to specific feminist movements and their agenda, but also with the definition of feminism itself. Adding the word 'Islamic' to the term thus gives rise to many controversies,

what the term actually denotes and whether Islam and feminism are not contradictory terms.

According to Cambridge Dictionary (2019) we understand the term feminism for the purposes of our paper as the belief that women should be allowed the same rights, power, and opportunities as men and be treated in the same way, or the set of activities intended to achieve this state. Feminism affects all the continents and reflects the needs of women seeking the same position in social, cultural and political sphere, without exception regarding religious domain. In this perspective we consider the term Islamic feminism as a quest for gender equality, gender justice and sexual justice, which is the core of the feminism itself.

Over the last three decades there has appeared a new area of scholarship that occupies with Islamic sacred texts (the Quran and Sunnah) driven primarily by the question of gender justice and methodological reform. This scholarship consists of studies that critically revisit principal religious interpretations that are patriarchal and discriminatory against women, and aim to produce new knowledge that makes the case for gender equality and justice from within an Islamic paradigm. This new approach has been called amongst scholars *Islamic feminism* (Al-Sharmani, 2014). Omaira Abou-Bakr is among the first who conceptualized Islamic feminism (Abou- Bakr 2001). She has also researched and written about Muslim women's roles in the traditional religious sciences as well as women's mysticism in Islam and Christianity.

As Badran stated in her research study, the new feminism appeared at a moment of late post-coloniality and a time of deep disaffection over the inability of Middle Eastern nation-states to ensure democracy and foster broad economic prosperity. Islamic feminism surfaced earliest in parts of the Middle East where Islamism, or political Islam, had been longest in evidence - for example, in Egypt, where Islamist movements first emerged in the early 1970s and in Iran a decade after the installation of the Islamic Republic (Badran, 1999).

Ahmed and Mernissi in particular wrote about Muslim women and the history of Islam in a manner that no longer lauded Islam's progressive perspective on women, but implicated the patriarchal norms of early Islamic society and contemporary Islamic practice in a continuum of declining Muslim women's status. Ahmed's historical analysis identifies two distinct voices in Islam and two competing understandings of gender. The one is expressed in pragmatic social regulations i.e. the law and the other in an ethical vision, i.e. social morality. (Ahmed, 1993; Mernissi, 1991). By contrast, a second approach, found mainly in western academia, constructed Muslim women's critical gender analysis of Islam as Islamic feminism. Scholars such as Wadud rejected the label as did Asma Barlas who argued that patriarchy had historically provided the core of resistance to the divine truth but that divine truth is characteristically anti-patriarchal (Barlas, 2002). Much like Wadud, Ahmed and Mernissi, there were other scholars who adopted a feminist analysis, aligned it with critical readings on women in Islam, but did not classify their work as Islamic feminism (Seedat, 2013).

When speaking about feminism in religious connotations, it is important to note that there have been two major feminist paradigms referred to as (1) secular feminism and

(2) Islamic feminism. The foundational moment of women's secular feminism may be traced to the late nineteenth century while the emergence of Islamic feminism" became relevant in the late twentieth century. This category of feminism appeared mainly in Muslim-majority societies with plural religions and multiple ethnicities. The two *fin de siècle* feminisms surfaced as efforts to reform states and vibrant social, economic, and technological transformation were underway. Secular feminism draws on and is constituted by multiple discourses including secular nationalist, Islamic modernist, human rights, and democratic.

Islamic feminism is expressed in a single religiously grounded discourse taking the Quran as its central text (Badran, 2005). The emergence of Islamic feminism coincided with the spread of a new form of information technology when information and ideas circulated freely. Islamic feminism speaks 'in the name of' women who refuse to choose between the 'road to feminist emancipation' and their 'belonging' to Islam as a culture and a religion. In positioning themselves as Muslim women who are not *ipso facto* blind to and passive towards patriarchy, they aim to produce an alternative to secular feminism, which excludes any form of religious reference (Djelloul, 2018).

The criticism of feminism lies mainly in context where Islamic feminists are often reproached for having altered the 'discursive tradition' of Islam in order to speak about political and social rights (Asad, 1986). Islamic feminists are accused of questioning one of the conceptual foundations of democracy, namely the separation of spheres. Legitimate though this criticism may be, it nevertheless fails to take account of the need for Islamic feminists to question religious laws. For even if they are lucky enough to live under political regimes that already recognize their equal rights, their personal milieu is, at the very least, likely to be impregnated with patriarchal religious culture (Djelloul, 2018).

4 Conclusions

The current environment of multipolar international relations creates space for the development of various aspects of international politics. Their in-depth examination has become the subject of standard scientific research by experts around the world. The increasing role of Islam in world politics is one of the most prominent phenomena of contemporary international relations.

Our research team deal mostly with the Islamic factor of the world politics and economics. We try to focus on the prompt definition of the crucial terms connected with Islam in contemporary European arena. While studying the problematic of political Islam, we considered the issue of Islamic feminism as a very useful to mention and define.

Islamic feminism is gaining its popularity in the background of political Islam which more and more affects the contemporary society. Lots of fundamental movements emerged, without exception of movements created by women. We consider the term Islamic feminism as the scholarship that occupies with Islamic sacred texts driven primarily by the question of gender justice.

In this paper we focused also on issue that some scholars consider the terms 'Islam' and feminism' to be contradictory. Whether resisting the label feminist or resisting a convergence between Islam and feminism, the dynamic between Islam and feminism is a potentially significant space from which to theorise modern Muslim gendered ways of being, as Seedat suggests in her recent essay dealing with convergence of Islam and feminism (Seedat, 2013).

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COMPANY VALUATION (SELECTED THEORETICAL APPROACHES)

Peter Kušnir¹, Denis Matušovič²

¹²University of Economics in Bratislava
Faculty of National Economy
Department of Banking and International Finance
Dolnozemska cesta 1
Slovakia
¹pkusnir@intesoft.eu
²denis.matusovic@euba.sk

Abstract. Company valuation is an inseparable part of economic practice. Current professional theoretical approaches represent three basic models of company valuation. Each of them defines its basic signs using a distinct valuation technique. The practice within the valuation of, especially, bigger companies showed that the application of the only one model is insufficient. The article focuses on the summary of a wide range of theoretical approaches and models with the emphasis on a yield, property and option model. It outlines their positives and negatives. At the end of the article, we also present the most common models applied in the Slovak Republic.

Keywords: company, valuation

JEL classification: L 20

1 Introduction

Professional literature usually views the categorization of the company valuation approaches by the means of four basic groups. In case of yield methods the future income is directly counted on. It results from the ownership of company when taking in consideration the risk and costs of equity. The second market approach also carries the elements of the yield approach, since individual business transactions on stock market or individual decisions on company purchases generate a resulting value depending on the future yield. Therefore the yield approach is used indirectly. A difference is not only in a valuation technique, where the market approach is much easier and faster form to gain the view of the value of company based on the assumption that the market, or the number of participants on the market, should not be wrong in their opinion on the future expectations related to the future yield. In contrast, the third property approach as a separate category within the company valuation is a contradictory element in the professional literature. On the one hand, it is viewed as a part of the market and yield

approach and on the other hand, it is considered to be a separate category, since its value is based on the costs serving for its acquisition or creation. A relatively new approach within the company valuation is an approach based on option pricing. It deals with a specific form of companies. Their value results from the value of other assets and its future income is conditioned by the emergence of a particular event, too. From this point of view the valuation based on options represents a separate approach.

The practice of company valuation confirmed that the application of the only one of the above approaches is very rare, especially when considering big companies. Analysts more often confront the situation when it is necessary to use various approaches of valuation of separate segments in order to define the total value of company, e.g. in case of transnational conglomerates making business in several industries and various states. From this point of view we could also consider the presentation of the fifth approach of the company valuation which would be a combination of several above approaches.

1.1 Model and Data

Several scientific methods were applied within the preparation of the article. They were especially analysis and deduction. The analytical approach was mainly applied within the individual methods of the company valuation with the emphasis on the selected types of theoretical approaches. In the end, the comparison methods were used regarding a bigger number of the approaches and procedures applied in the company valuation.

2 Company Valuation using Yield Approach

The most common approach in the company valuation is the yield approach. It is based on the future expectations linked to the generation of economic benefits for the owner. The purpose of the investment of free financial sources of an investor is their future evaluation, which also applies when purchasing a company. The evaluation of financial sources includes the reward for the investor connected to the time limited ability to dispose of the sources, the expected inflation rate and the risk related to meeting the future expectations. The mentioned conditions based on the future expectations are common for any investment decisions and valuation. The current value of company is always equal to the future cash flow discounted at the costs of the opportunity on capital (Brealey and Myers, 1996).

The value of company is the function of three variables when considering the yield method. The flow of economic benefits, the growth potential of a company under valuation and a short-term and long-term risk related to obtaining economic benefits. The value of company is directly proportional to the amount of expected benefits as well as their expected growth. On the other hand, the value of company will decrease altogether with the growing risk connected to the expected future flow of economic benefits, since the increased risk requires a higher rate of recoverability (Hitchner, 2006). The impact of the company size on the rate of recoverability points out the fact, that the smaller the

company is, the higher non-systemic risk is (Fahey and Narayanan, 1986). The risk related to the activity of a company in a given industry or strategic group is influenced by the impacts, especially by the threat of competitors, bargaining power of suppliers, bargaining power of customers and rivalry among competitors (Porter, 1979). In relation to the definition of the capital costs, respectively the discounted, i.e. capital rate when valuating companies, the methods shown in the figure 1 are used.

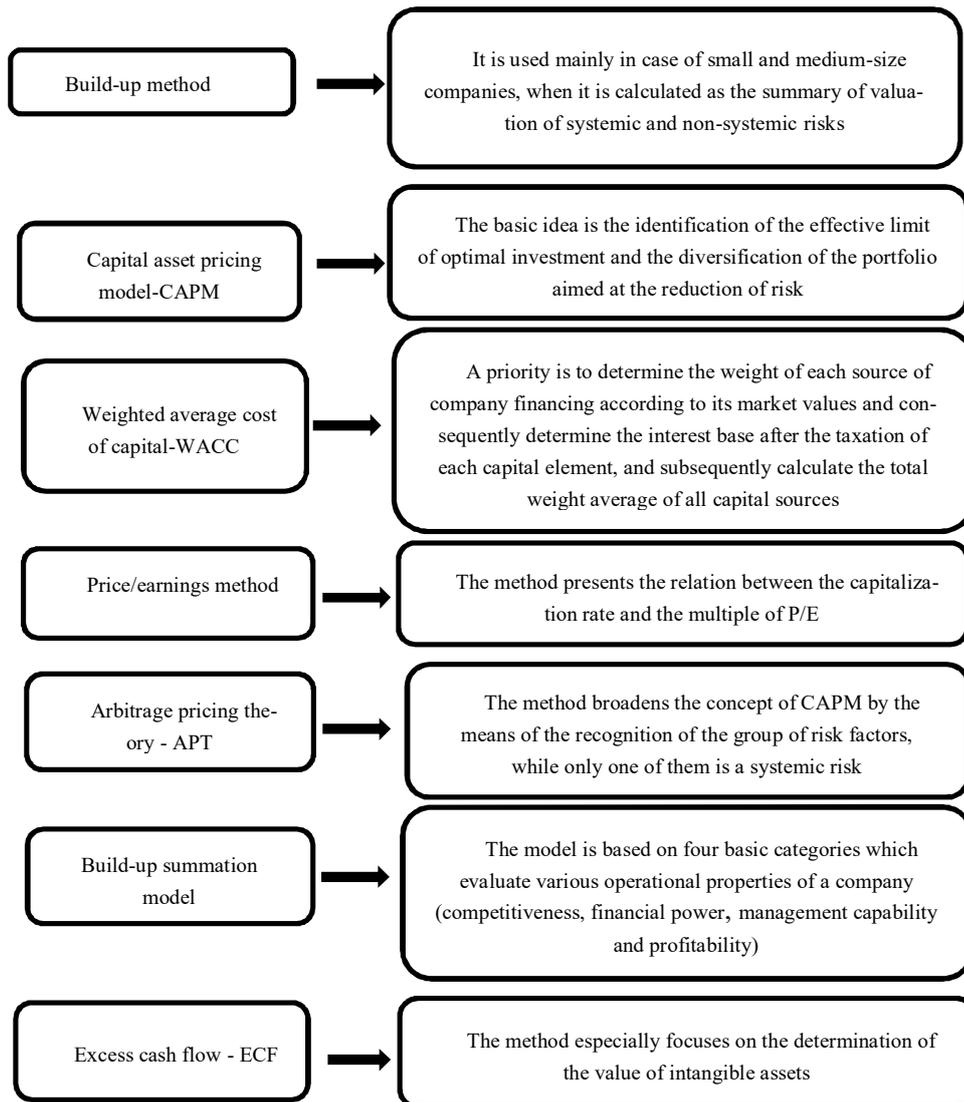


Fig. 1. Methods to assess the cost of capital. *Source: Own processing.*

When using the yield methods the value of company is directly or indirectly deduced from the current value of future cash flow often based on the historical financial data. Since the value of any investments is equal to the current value of future benefits coming from it, the correct determination of the flow of benefits is very important. However, when analyzing the last financial statements, it is necessary to eliminate all items not related to the future operating result.

Most of the generally used methods of valuation based on the yield approach lead to the valuation of all operational assets of a company, whether they are tangible or intangible. An open question within valuation is also the fact whether the valuation should be considered without tax impacts or with them. The right choice of tax rate might also be a problem. In case of tax costs, at least, this is very real use of cash flow, and therefore their involvement in valuation must be very careful. We can state that the value of company will decrease altogether with the increasing tax burden and vice versa, at the unchanged value of cash flow. Tax impacts on the valuation of company become disputable even in cases of various tax advantages of certain types of companies or investments, as well as various tax regimes. Therefore in company pricing we can apply several methods with the emphasis on cash flow.

2.1 Method of Discounted Cash Flow

The method of discounted cash flow (DCF) is based on an assumption that the value of any operational asset or investment is equal to the current value of its expected future flow of economic benefits. The reliability of actual receipt of future flow of economic benefits differs from asset to asset and also from company to company.

When using the basic DCF model for the valuation of company we consider the fact that the actual value of future cash flow as well as all repeating cash flows will come the last day of each estimated period. Generally when selecting a suitable time perspective it is always necessary to carefully consider payout company rules as well as their timing. Although the value of company based on cash flow which the company, not the owner directly, acquires is considered in the company pricing.

2.2 Capitalization of Cash Flow Method

Another method of valuation of the yield approach is capitalization of cash flow method (CCF). It is a shortened version of the method of discounted cash flow. However an assumption is that the future cash flow, growth rate and discounted rate are constant forever.

The higher constant growth in the future is assumed, the higher is the value of valued assets. It applies vice versa, too. The factor of the current value in denominator within the CCF method is called capitalization rate. It consists of the discounted rate and long-term sustainable growth rate. Since the CCF method is based on, respectively it is a shortened form of the DCF method, the same view and conditions in relation to the flow of economic benefits, risk level and growth impact, etc. apply, apart from the constant growth and risk.

2.3 Excess Cash Flow Method

Excess cash flow method (ECF) is a combination of the yield and property approach of company valuation. The CFC method can be prepared by the means of equity or invested capital and cash flow. Many analysts agree that the best representative of the flow of economic benefits is cash flow. However, there also exist other ones, such as net profit. In addition, the analyst must be familiar with the need of correct attribution of capitalization rate to a selected economic benefit. The method introduces the valuation of a majority share. Therefore when using it the modifications related to the majority as well as other normalization modifications must be done, which are related to the flow of economic benefits.

The amount of individual weighted averages of profitability on assets is equal to the weighted load on capital for the whole company. Goodwill and other intangible assets require higher rates of recoverability. If the value of required rate of recoverability varies around the weighted average on capital, the calculation was done correctly. If they differ significantly, the adequacy of the ECF method in terms of the determination of the value of company should be the subject of further investigation.

2.4 Dividend Discount Model

Following the mentioned DCF methods and a shortened version coming from it in the form of the CCF method, the Dividend Discount Method (DDM) is only another modification of a similar mathematical notation of the mentioned methods. The difference lies in the fact that the indicator of cash flow in form of the dividend paid out to the owner of assets is in numerator at the place of economic benefit. The current value in form of the expected cash flow is subsequently achieved from it.

The application of the DDM in practice is problematic, though. Apart from the fact that it is quite impossible to predict the height of dividend from the long-term point of view in real market conditions, the assumption of constant discount rate from the point of view of future is also quite improbable. However, this model cannot be always applied, since it is necessary that a valued company is stable enough and there is a reasonable assumption of constant development in dividends. From this point of view energy companies with a stable business environment are included in suitable companies.

This method cannot be applied in case of start-up companies, companies with unstable development of dividend payout, nor companies with low dividend payout. A restriction is also the dependence of the value on the amount of dividends and discount rate, while there are many other factors, which have the impact on the value of company in both directions. Last but not least, it has been already mentioned that it is impossible to use the DDM in cases when the annual dividend growth rate is higher than the discount rate.

2.5 Economic Value Added Method

The economic practice requires to find the indicator of profitability which would overcome shortcomings, such as the possibility of legal influence of the economic result,

not taking into account the time value of money, nor the risks of investors. On the other hand, it was necessary that this indicator shows the closest bond to the value of assets, enables to use the accounting data the most, includes risk, and enables the evaluation of efficiency as well as valuation of company. The indicator of economic value added (EVA) meets these attributes. It points out the fact that a company achieves economic value added in case that it covers not only its common costs, but also the capital costs including own capital.

Professor Mařík proved that, in relation to the traditional yield methods, especially the discount cash flow method, it applies that the same results will be achieved using the EVA method in case additional conditions are met, too (Mařík, 2011).

2.6 Multiple Methods

The nature of the methods of valuation by the means of multiples is that the value of a company (often small and not publicly trading company) can be determined by the reference to adequately comparable representative companies the value of which is known. In this case their values are known, because the companies being compared are publicly trading or they have been just sold and the conditions of this transaction were published. While the sources providing financial and other information about representative companies in a certain industry are beneficial for understanding industry standards as well as for the valuation of company, but only if the underlying values of company are available.

The multiples methods have their advantages and disadvantages like any other method. The advantages certainly include quite simply way of understanding. Companies with similar product, geographical or business risk or financial indicators should have similar value features. Another advantage is the fact that they are relatively easy to use. On the other hand, multiple methods have the disadvantages, too. They include the fact that there are not accurate representative companies. Another disadvantage is that most of important conditions remain hidden. In comparison to the other methods included in the yield approach where there is the defined assumption of a short-term growth together with the perpetuity growth, there is no unambiguous assumption regarding growth in case of multiples. Another disadvantage of multiple methods is their inflexibility and non-adaptability.

One of the most important and time demanding aspects of the application of the multiple method is the determination of a suitable set of potential representative companies. There are several ways of the identification of these companies. However, there is no a simple way suitable for all pricings. Since there is a big number of publicly trading companies which includes representative companies to be found, the analyst must be able to identify a way to quickly reduce the set of potential representative companies.

3 Property Approach to Company Valuation

International dictionary defines the property approach in valuation as a general method of the determination of indicated value of company, a business share or security using one or more methods based on the value of assets net of liabilities (4). In company pricing the property approach represents the value of all tangible and intangible assets and obligations of as company. This approach usually starts with accounting values from the balance sheet closest to the data of valuation. It revalues assets and obligations to the actual value or real market value.

At first sight it might seem that the property approach is simple, but the opposite is true. The application of this approach in practice brings many complicating factors which need to be dealt with before the satisfactory analysis is completed.

Companies carrying on businesses should be generally evaluated by profit they achieve, because investors generally price these companies this way. At least in theory, if a company based on its activity achieves higher profit than the actual profit from tangible and intangible assets, it proves that the market value of its assets exceeds their book value. It results that the company has also the value in intangible assets which are not registered anyway and if so, they are undervalued.

A decisive quantity in the determination of the value of company by the means of the property method is its degree of control. It is important from this point of view because the achieved value usually assumes the control over assets. Moreover, the property method usually provide an opinion on the value on a tradable basis.

Built-in gains are an old point of dispute between taxpayers and tax administrators. They are generated when the market value of entity's assets exceeds its tax base. When determining the value of company based on the net value of assets, no discount should be applied due to potential taxes on capital gains, which would be generated in case of liquidation of company, since there is no sign the potential future liquidation might happen. On the other hand, taxpayers state that under the common standards of application of objective market value, a buyer could gain a discount reflecting the tax on built-in gains.

4 Approach to Company Valuation based on Option Valuation

Black-Scholes model is used for the determination of option value which follow from an assumption that the value of a replicated portfolio based on the underlying assets and risk-free assets brings the same cash flow as the option and so their price should be the same. Black-Scholes model enables the valuation of any option with a relatively small number of entries.

The use of Black-Scholes model has its limitations, too. As we have already mentioned, it does not consider the possibility of earlier realisation of the option in comparison to the expiration date, nor the potential dividend payout from the underlying asset. Dividend payout usually reduces the value of assets right the day after the decisive day. Therefore there happens the reduction of the value of a purchasing option and on the other hand, the increase of the value of a sales option. From the short-term point of

view the dividend payout can be managed so that the current value of the dividend during the lifetime of option is deducted from the real value of the underlying asset in the model. However, from the long-term point of view it is better to use a modified Black-Scholes model provided that the dividend yield remains the same during the whole lifetime of the option.

However, the economic practice also has to cope with the valuation of the American type of options. They can be exercised any time during their lifetime. In this case we can again use the Black-Scholes model in the original structure. However, the result should be considered to be a limiting or conservative view on the real value of the option.

5 Approach to Company Valuation in Slovakia

In Slovakia, the value of property including company property or its part is determined in accordance to the Act on Experts, Interpreters and Translators (Act no. 382/2004 Coll. on Experts, Interpreters and Translators, 2004). Decree determining the general value of the property (International glossary of business valuation terms, 2008) was issued based on the Act. The decree specifies five valuation concepts an expert in the business economy can use to approach the determination of general value of company property or its part.

From the yield methods the Slovak legislation distinguishes the discount cash flow method also called business method and the multiple method which determines the value of the company by the means of a multiple resulting from the comparable transactions realized in the past in the given industry and which is represented by the comparative method. The property approach is represented by two methods, i.e. the property and liquidation one. In terms of the liquidation methods it also distinguishes whether the company under valuation terminates the business by liquidation or bankruptcy.

The last method the Slovak legislation distinguishes is the combined method, which determines the general value of company by the weighted average of the general value of company acquired by the property and business method (Decree determining the general value of the property no. 492, 2004). From the point of view of the classification of approaches to the determination of the company value the combined methods are usually not viewed as a separate approach, since they only combine the values achieved by various other methods.

6 Conclusions and policy implications

From the point of view of diversity of approaches to the company valuation we can identify the yield approach, the property approach and the approach based on the option valuation, while several methods can be identified within each of them. When comparing the yield and market model of company pricing we can draw a conclusion that the method of company valuation by the means of a multiple of the results of selected comparable companies from the given industry and the method of company valuation by the means of a multiple resulting from the comparable transactions realized in the past

in the given industry should not form a separate category of the approach to valuation in terms of the market approach, but they rather be a part of the yield approach. We can also state that the property approach should have a separate category from the point of view of the categorization of the basic approaches to the company valuation.

When calculating the value the yield model only includes the built-in assumptions based on future expectations, where the value of the owned share is equal to the sum of the actual values of expected future benefits coming from the ownership of this share. It follows that the result of company valuation using a relevant set of comparable companies and transactions with suitably derived multiples on the selected indicators is a range of values which provide a very good view of the actual market value of the company in combination to the other methods of the yield approach.

From the analysis of the theoretical approaches to the company valuation it follows that the yield and property models are applicable on companies operating on the market for longer time achieving more stable level of profit.

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PREDICTION OF THE FAILURE OF THE ENTERPRISE THROUGH RATING MODELS CREATED IN SLOVAK MARKET CONDITIONS

Andrea Lukačková

University of Economics in Bratislava
Faculty of Business Management, Department of Business Finance
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
andrea.lukackova@euba.sk

Abstract. The growing number of risky businesses and the turbulently economic environment at home and abroad create a constant need to use and develop creditworthiness evaluation by more accurate risk assessment model. This rating can be called a rating model or scoring model.

The rating model is a form of predictable creditworthy or bankruptcy model. A large number of such models bring foreign resources. Models developed in other historical contexts and economic conditions have very limited use in the case of Slovakia. The solution is to create Slovak models that would respect the economic conditions in Slovakia. The principle of rating models created by banks is also applicable to the construction of creditworthy or bankruptcy models for forecasting the financial situation of businesses. The development of such models is hampered by the impossibility of a clear distinction between - troubled and trouble-free businesses due to insufficient functionality of the Act on Bankruptcy and Restructuring. Knowing business failure indicators represent valuable information for scientists and practitioners as well.

Keywords: creditworthiness, rating model, enterprise performance evaluation

JEL classification: G32, G39

1 Introduction

The method of rating models design has a very important impact on the identification of their ability to predict corporate failure. In banking practice, mathematical-statistical methods are often used, which, for example, exclude subjectivity and, more precisely, evaluate relevant data on potential clients, the debtors, in comparison with scoring methods. The expansion of these models based on statistical processing has allowed the development of prediction models abroad.

We can state that in Slovakia already, more compact methods of assessing the client's creditworthiness are already using sophisticated rating models.

“In the process of evaluating a client as a potential debtor, banks are increasingly using formalized procedures related to rating models, which are based on selected indicators to classify the enterprise into a risky group. Rating is a comprehensive system for assessing all parameters of the enterprise in order to assess its future ability to fully and timely meet its obligations and with a definite probability.” (Hurtošová,2009)

“There are several types of rating models to estimate the probability of debtor's default. In the conditions of the Slovak Republic, models based on data from financial statements find their application. These models are constructed based on the selection and weighting of several financial indicators that distinguish well between a sample of good and bad enterprises - troubled and trouble-free businesses”. (Hurtošová,2009)

Currently, traditional client credit assessments, which rely on the subjective judgment of a credit analyst, are no longer used, but rating models are increasingly being promoted, reducing the extra work of individual client assessments and the ability to handle more credit cases. The amount of rating models based on a variety of methods ranges from the simplest based on scoring methods to sophisticated models based on more exacting statistical analysis.

In recent decades, statistical methods have become an instrument of objective assessment of indicators in an enterprise's creditworthy model.

2 Methods used in developing the rating model

The use of the right method in developing rating models depends mainly on the processing of the data used in the business's creditworthy model. The quality of the rating model also depends on the choice of the appropriate method in developing the rating model. The rapidly evolving economic environment increasingly requires knowledge of statistical and econometric techniques. Methods can be divided into:

- heuristic (e.g. questionnaire, expert systems),
- statistical (e.g. discriminant analysis, regression models, neuron network)
- causal (e.g. Option pricing model) - apply the knowledge directly from theory when the hypotheses are not subject to statistical testing,
- hybrid. (Hurtošová,2009)

Better results in assessing the likelihood of debtor failure are shown by the use of statistical methods over heuristic methods, of course, in the case of a sufficient data set for statistical processing. In banking practice, statistical methods are often used to build rating models. This method does not apply to all segments. As a rule, data on failures of states and governments are not available in an appropriate amount for model development.

“The choice of the appropriate method, as well as its correct application, is an important part of the development of the rating model. In order to ensure acceptance of

the model by users, it is essential to include experts' experience in credit risk assessment as well as in the process of model development by statistical methods.” (Hurtošová,2009)

In practice, however, these models are not used separately, but a combination of standard methods, the hybrid forms have been founded, e.g.:

- horizontal connection of models - for example, when quantitative data is processed by statistical methods and qualitative information is evaluated using heuristic methods,
- vertical connection of models - this approach evaluates the quantitative and qualitative characteristics of creditworthiness at the same time using statistical models. This approach aims at a proposed classification that can be modified by the credit analyst's intervention.

The essence for each statistical analysis is analysis of the statistical population using basic characteristics (e.g. quantiles). Several methods can be used to assess the discriminant ability of individual indicators as Median test or Wilcoxon signed-rank test that do not require a normal distribution of the data set. Consequently, indicators with good ability to discriminate can serve as input to the logistic regression itself with output in the form of a function with several indicators whose combination creates the best model to predict future financial situation of the enterprise.

3 Rating

“Rating is a standard international instrument of measurement for assessing the creditworthiness of the enterprises. The rating of the enterprise is characterized by its ability to meet its obligations. The rating actually determines the degree of risk caused by debtor’s default.” (Hurtošová,2009)

Therefore, there is a constant need to design bank’s own rating model, which is be considered as form to predict future client’s solvency.

Rating models are a credit analysis tool for assessing the potential debtor’s creditworthiness, the use of which is enhanced by the implementation of new capital adequacy requirements for banks. (Mihalovič, 2018) The success of the model is the result of its quality design. A prerequisite for model design is the correct definition of segments as well as the selection of the method by which the model will develop. The process of developing the rating model itself consists of:

- collection and sorting of data on the relevant set of enterprises,
- using the chosen method is developed rating function able to distinguish between solvent and insolvent enterprises,
- assign likelihood of default to individual rating risk class
- the proposed rating model is a subject to subsequent validation to verify its accuracy. (Zalai et al., 2016)

The essence of the rating model is based on the substitution of the decision-making process by an experienced analyst, taking into account all potential risk characteristics of the rated entity. In the development phase, this concept results in the creation of a comprehensive rating model that incorporates characteristics from a maximum of independent information sources. The aim of this concept is both to ensure good predictive ability of the model and to ensure resistance to changes over time. This process combines statistical methods with the analyst's experience to build a stable model with strong predictive ability, containing variables from diverse sources of information that identify the client's risk profile. The final rating includes a group of statistically determined characteristics that have good predictive ability in distinguishing solvent and insolvent future clients.

4 Slovak rating model to predict future debtor's failure

Complications in the application of foreign rating models to Slovak enterprise arise mainly from the following reasons:

- *“the diversity of accounting systems, the structure and content of the financial statements, which makes it difficult to fill the model indicators with the relevant financial statement data;*
- *differences in the level of some financial indicators, which are determined by "practices" in the national economy (e.g. the acceptable level of debt of US businesses is around 50%, while in many European countries it is up to 70-75%, etc.);*
- *the using of only the most well-known foreign models, irrespective of the size of enterprises, organizational and legal form and especially the field of activity, etc.”* (Šnircová, 1997)

Therefore, Slovak authors have developed our own rating models and among the best-known models developed in Slovakia and which we will focus on:

- Hurtošová's model,
- Binkert's model,
- Chrastinová's model (“CH-index”),
- Gurčík's model (G-index),
- Delina-Packová's model
- Gulka's model.

4.1 Hurtošová's model

The Hurtošová's model is based on financial statements using statistical methods that call for special requirements on the input data set. The rating model can be considered as a prediction model, but its task must be to estimate the likelihood of default of the debtor.

Analysis of the predictive ability of each indicator was performed using the median test and the Wilcoxon signed-rank test.

Logistic regression method was used to develop the rating function, namely the Stepwise selection procedure. The development of the rating model examined the dependence between whether the enterprise is in default or not and the values of its financial indicators. Binary encoding was used in the database. The default business was designated as 1 and the non-default business as 0. The probability that the business would become insolvent was designed. The model was developed using a set of data containing 85 indicators for all enterprises in the sample.

Table 1. Financial indicators selected by final model

Indicator	Quantification
UK27	inventory turnover I.
UK48	production consumption + costs incurred to procure the goods sold/sales
UK55	depreciation/costs from economic activities
UK57	interest expense/financial expenses
UK63	short-term financial accounts /assets
UK67	self-financing IV.

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions. In Podniková ekonomika a manažment, Vol. 1, pp. 75-85. ISSN 1336-5878.*

The model should be able to determine the probability of default for the year ahead.

Applying the logistic regression method with the Stepwise selection procedure at a 5% significance level of the coefficients of the input and dwell variables in the UK27, UK55, UK57 and UK67 model. The result was at a significance level of $\alpha = 0.01$ a statistically significant model with the following 4 indicators, statistically significant at a significance level of $\alpha = 0.05$ in the form of a rating function:

$$\text{logit}(\beta) = \ln(p/(1-p)) = -1,6889 + 0,00337 * \text{UK27} - 4,4075 * \text{UK55} + 1,4058 * \text{UK57} - 0,0165 * \text{UK67}, \quad (1)$$

or

in exponential form as

$$p/(1-p) = e^{-1,6889+0,00337*UK27-4,4075*UK55+1,4058*UK57-0,0165*UK67} \quad (2)$$

$$\beta = 1/(1 + e^{-(-1,6889 + 0,00337 UK27 - 4,4075*UK55+1,4058*UK57-0,0165*UK67)}) \quad (3)$$

is the estimated conditional probability of a business being „insolvent“.

This model also has its disadvantages:

- the inclusion of enterprises with different activities, the indicators selected in the model can then only reflect to some extent the riskiness of an activity,
- the fact that a default is considered to be a default of over 60 days (instead of the standard 90 days). A delay of 60 days does not necessarily mean that the company has real repayment problems and the bank will ultimately incur a loss. The inclusion of such cases could have distorted the resolution of the indicators, with a consequence on the final model.
- the ratio of „good“ and „bad“ enterprises in the sample was not the same as the ratio in the bank's portfolio. (Hurtošová,2009)

4.2 Binkert's model

In designing the model, the author used data on companies from the German and Slovak environment with the legal form of enterprises - joint stock company from various fields (production, services and trade). From the German environment, the author selected 1,350 joint stock companies from the original set of 13,000 companies with a turnover of more than DEM 1 million per year. Subsequently, he randomly selected a sample of 80 prosperous (solvent) and 80 non-prosperous (insolvent) companies.

From the Slovak environment, the author chose 1550 joint stock companies from the original set of enterprises 2,500 with an annual turnover of more than SKK 1 million. Similarly, this number has been reduced in the same way as 80 prosperous and 80 prosperous businesses.

The source of business information was the financial statements, 3 consecutive years in each country. This was the period 1991-1997 for German enterprises and 1994-1997 for Slovak enterprises.

Initially, the author used 72 indicators relating to the assets, financial and sales situation of enterprises, using a series of factor analysis and other methods to gradually reduce the number of indicators and to use linear multivariate discrimination analysis for processing, using SPSS (Superior Performance Software System). The output consisted of discriminatory functions taking into account the entire analysis period (3 years before the status of non-prosperous or insolvent).

The discriminatory function for Slovak enterprises has the following form:

$$D^{1to3}_S = 0,180 * U^1_{1+0,147 * U^2_{40} + 0,237 * U^2_{49} + 0,377 * U^2_{63} + 0,514 * U^3_{13} + 0,505 * U^3_{29} + 0,271 * U^3_{30} + 0,207 * U^2_9 \quad (4)$$

Table 7. Financial indicators selected by final model

Indicator	Quantification
U^1_1	current assets/total short-term debt of analysed year 1
U^2_{40}	basic capital/noncurrent assets of analysed year 2
U^2_{49}	trading income/sales of analysed year 2
U^2_{63}	total sales/added value of analysed year 2
U^3_{13}	total assets of current year/total assets of previous year
U^3_{29}	basic capital of current year/basic capital of previous year
U^3_{30}	debt of current year/debt of previous year
U^2_9	trading income/long-term capital of analysed year

Source: Vlkolinský, P. 2013. Review of rating models in selected countries (Part 5). In *Finančný manažér: periodikum Slovenskej asociácie podnikových finančníkov*. Bratislava: Slovenská asociácia podnikových finančníkov, Vol. 13, no. 3, pp. 26-35. ISSN 1335-5813.

The indicators U11, U144, U261 reflect the financial situation. Indicators U13, U136 reflect assets situation and indicators U28, U263 and U349 the situation in profit or loss. The exponent expresses the year of the analysed year (1st, 2nd, and 3rd year).

A bankrupt company is characterized by impending symptoms. First, it has a problem with the liquid assets, then there are difficulties that are reflected in the economic result due to lack of profitability. And, of course, before a bankruptcy, an enterprise will of course result in its inability to meet its obligations. (Vlkolinský, 2013)

4.3 Chrastinová 's model

Chrastinová's model ("CH-index") - a model based on multivariate discrimination analysis. When creating the model, it focused on the agricultural sector and the resulting equation has the following form:

$$CH = 0,37x_1 + 0,25x_2 + 0,21x_3 - 0,1x_4 - 0,07x_5 \quad (5)$$

The following table gives an overview of the resulting five variables entering the evaluation equation:

Table 3. Variables for CH-index

Variable	Quantification
x_1	EAT/capital
x_2	EAT/sales
x_3	cash flow/debt
x_4	(debt/sales) *360
x_5	debt/liabilities

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions*. In *Podniková ekonomika a manažment*, Vol. 1, pp. 75-85. ISSN 1336-5878.

Based on the results of the CH index, the enterprise is classified into one of three categories according to the following criteria:

Table 4 Centroids for CH-index

Centroid	Category
$CH \geq 2,5$	solvency
$2,5 < CH < -5$	grey area
$CH \leq -5$	bankrupt

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions*. In *Podniková ekonomika a manažment*, Vol. 1, pp. 75-85. ISSN 1336-5878

4.4 Gurčík 's model

Gurčík's model (G-index) - the basis of the model was a multidimensional discrimination analysis. The resulting equation has the following form:

$$G = 3,412x_1 + 2,226x_2 + 3,227x_3 + 3,419x_4 - 2,063x_5 \quad (6)$$

The following table lists the resulting five variables entering the evaluation equation:

Table 5. Variables for G-index

Variable	Quantification
x ₁	retained profit/liabilities
x ₂	EBT/liabilities
x ₃	EBT/sales
x ₄	cash flow/liabilities
x ₅	inventories/sales

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions. In Podniková ekonomika a manažment, Vol. 1, pp. 75-85. ISSN 1336-5878.*

Based on the G-index results, the company is classified into one of three categories according to the following criteria:

Table 6. Centroids for G-index

Centroid	Category
$G \geq 1,8$	solvency
$-0,6 < G < 1,8$	grey area
$G \leq -0,6$	bankrupt

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions. In Podniková ekonomika a manažment, Vol. 1, pp. 75-85. ISSN 1336-5878.*

4.5 Delina-Packová 's model

Delina-Pack's model - the model was created using regression analysis and is based on more familiar models (Altman, IN 05). The resulting equation has the following form:

$$P = 2,86 - 0,0001278x_1 + 0,04851x_2 + 0,2136x_3 - 0,000071x_4 + 0,0001068x_5 - 0,0006116x_6 \quad (3)$$

The following table shows the resulting six variables entering the evaluation equation:

Table 7. Variables for P' model

Variable	Quantification
x ₁	(financial assets - short debt)/(operating costs - depreciation)
x ₂	retained profit/total capital
x ₃	EBIT/total capital
x ₄	basic capital/total debt
x ₅	cash flow/debt
x ₆	EBT/total sales

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions. In Podniková ekonomika a manažment, Vol. 1, pp. 75-85. ISSN 1336-5878.*

Based on the results of the model, the business is classified into one of two categories according to the following criteria:

Table 8. Centroids for P' model

Centroid	Category
$P' < 2,856$	solvency
$P' > 2,856$	bankrupt

4.6 Gulka 's model

Gulka's model - a model based on logistic regression, containing 7 indicators and the ability to predict a company's bankruptcy a year in advance. The resulting equation has the form:

$$G = 0,02016 - 0,6131x_1 - 0,0068x_2 - 0,0293x_3 - 0,0011x_4 + 0,0240x_5 + 0,03176x_6 - 1,0663x_7 \quad (7)$$

Subsequently, the resulting G value must be substituted into the probability formula. The following table shows the resulting 7 variables entering the evaluation equation:

Table 9. Variables for G model

Variable	Quantification
x_1	financial accounts/short liabilities
x_2	(sales of goods + production)/working capital
x_3	financial accounts/assets
x_4	basic capital/assets
x_5	(bank loans + other short term liabilities)/assets
x_6	(social insurance liabilities + tax liabilities)/assets
x_7	EBITDA/assets

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions*. In *Podniková ekonomika a manažment*, Vol. 1, pp. 75-85. ISSN 1336-5878.

Based on the results of the G model, the company is classified into one of two categories according to the following criteria:

Table 10. Centroids for G model

Centroid	Category
$p < 0,5$	solvency
$p > 0,5$	bankrupt

Source: Podhorská, I. 2018. *Prediction Models: Predictive ability in Slovak conditions*. In *Podniková ekonomika a manažment*, Vol. 1, pp. 75-85. ISSN 1336-5878

The rating models bring about a decrease in the volume of costs and overall losses and thus improve the financial performance of the credit institution. Many other models have been found in the literature search, for example the model of Mr. Peter Vlkolinský, who used the logistic regression method and many others to create the rating model.

5 Discussion

In our opinion, there is no importance to compare the accuracy of models developed in the last decades of the last century in countries with developed market economies with the accuracy of models developed in the Slovak Republic, as the models were developed in different financial, legislative and information environments.

Banks in the Slovak Republic currently use rating models developed by the parent companies of these commercial banks abroad, which are, to a certain extent, adapted to local specifics, which of course has its disadvantages.

Currently, there is an effort by banking entities operating on the Slovak market to develop their own rating models from their own client data databases using mathematical-statistical methods that have been used successfully in developing rating models abroad over the past decades. In addition to the existence of different methods of developing rating models, their development is also aided by the development of computer technology.

6 Conclusion

For these reasons, there is a continuing need to reflect on current conditions and seek to construct new rating models that will be able to comprehensively address emerging issues in a timely manner to avoid a business failure situation. On the basis of mapping of already created available models tested on a sample of Slovak selected companies it is possible to find out their possible deficiencies. Their elimination can contribute to the construction of new rating models, which will more reliably assess the credit risk of the company and thus protect the investor from its possible failure.

Acknowledgement

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UNEQUAL SPATIAL DISTRIBUTION OF DOCTORS IN SLOVAKIA¹

Peter Mandžák

University of Economics in Bratislava
Department of Economic Policy
Dolnozemská 1
Bratislava
Slovakia
peter.mandzak@euba.sk

Abstract. The main aim of this paper is to examine determinants of spatial distribution of doctors in developed countries. With continuing economic development around the world, there is increase of healthcare expenditure and demand for medical services, because health can be considered as a luxury good – the wealthier the country, the higher healthcare expenditure. There is wide range of literature on distribution of doctors - papers on determinants of location, supply-induced demand, estimating maldistribution, analyzing trend (change in time) but also evaluation of policies to influence distribution. This paper contains short overview of this literature.

In this paper, we also present basic description of data on General practitioners in Slovakia. Compared to V3 and EU28, there is shortage of general practitioners in Slovakia. Graphical analysis suggest that they are relatively uniformly distributed across counties, there can be disparity across municipalities. Therefore, further research is needed.

Keywords: healthcare, doctor density, health economics.

JEL classification: I 11, I 14, I 18

1 Introduction

Although uneven regional distribution can be the case for most professions, this phenomenon raises especially serious equity problems in the case of physicians, as it entails unequal access to health care (Bolduc, Fortin, Fournier, 1996).

In Slovakia, shortage of general practitioners is already documented (ÚHP, 2018). Therefore, it is especially important to study possible geographical inequalities in Slovakia. While there is wide range of literature on this phenomenon abroad, in Slovakia it is still unexplored area. This paper aims to give an overview of current literature on

¹ This paper is a part of an ongoing research project I-19-108-00 „Vstup na trh a konkurencia v zdravotníckom sektore na Slovensku“

this topic, and to provide arguments, why further research in this area is relevant and needed for Slovakia.

This paper is structured as follows. Second chapter provides theoretical background to doctor's market. Demand for, and supply of doctors and wage-setting is described, together with theory on supply induced demand. Third chapter contains literature overview on maldistribution of doctors and determinants of their location choices. The fourth chapter presents analytical introduction into disparities at Slovak doctors' market.

2 Theoretical background

2.1 Demand and supply of doctors

Number of doctors at given market, or density (number of doctors per population) is affected by demand for and supply of doctors. Blumenthal (2004) claims that demand for doctors is affected by the level of health insurance coverage, the proportion of gross domestic product spent on health or method of physician remuneration. Demand could be also affected by population characteristics, for example by mortality and morbidity. The supply of physicians is likely to vary because of differences in, among other things, the availability of physician education and training, and terms and conditions of service. Shortages and surpluses of physicians can occur if wages or fees are set at a level which does not match supply with demand. Additionally, shortages and surpluses can arise due to lags in responses to changes in demand or supply (Simoens and Hurst, 2006).

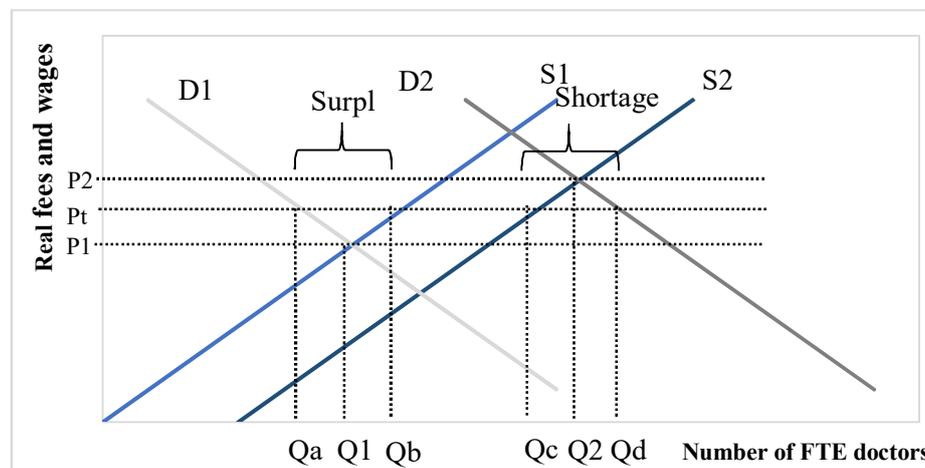


Fig. 1. Equilibrium at doctors' market. *Source: Authors compilation based on Simoens and Hurst (2006)*

Figure 1 shows a standard demand and supply model, where the demand for physicians declines with the real wage and the supply increases. Two countries (or for our case it could be municipalities) 1 and 2 can have different demand and supply schedules for

physicians, such as D1 and D2, and S1 and S2, respectively. Equilibrium between demand and supply would be attained in each country if fees and wages were set at P1 and P2, resulting in levels of physician employment at Q1 and at Q2, respectively. However, if, real fees and wages in both countries had been set for many years at an intermediate wage, P_t , country 1 is likely to have developed a surplus of physicians equal to $Q_b - Q_a$, and country 2 is likely to have developed a shortage equal to $Q_d - Q_c$. (Simoens and Hurst, 2006).

2.2 Induced demand

In standard economic theory, demand curves are stable. In some cases, they can be shifted by advertising. However, shifting demand is costly. According to the Physician induced demand (PID) hypothesis (also known as supply-induced demand), information between physicians and patients is so asymmetric that a physician can shift out the demand curve for his or her services. This shifting involves recommending a service such as a revisit or a surgical procedure whether or not the recommended care is of potential benefit to the patient. The only reason a consumer (patient) would accept this situation is asymmetric information between doctors and their patients (Sloan, 2012).

Induced demand is especially important for analysis of competition in the health care industry. Since doctors are able to induce demand for their services, they can enter a market with already sufficient number of doctors. This can lead to lower density of doctors in rural areas, because doctors usually prefer to live in a city. If doctors can generate demand for their services, they possess far more market power than is usually attributed to the monopolist, whose price-setting ability is constrained by a fixed demand curve. There are however ambiguous conclusions on existence of induced demand in literature so far.

Feldman and Sloan (1988) concluded, that there is little evidence to support the notion of supplier-induced demand or the contention that physicians generate demand to avoid the impact on their incomes of government price controls. However, Rice and Labelle (1989) in their paper criticized this conclusion. They argued, that the evidence on supplier-induced demand and physician responses to price controls does not support the conclusions drawn by Feldman and Sloan.

Labelle et al. (1994) have argued that more attention should be paid to the consequences of PID. If additional health services result in improved health status or better access to health care, then PID may be beneficial to society irrespective of physicians' motives for generating more services.

Carlsen and Grytten (2000) tried to throw a light at ongoing controversy about existence induced demand. Their results suggest that policy-makers can compute the socially optimal density of physicians without knowledge about whether supply-induced demand exists, if one accepts the controversial assumption that consumer satisfaction is a valid proxy for patient utility.

3 Literature review

3.1 Geographic (mal)distribution of doctors

Isabel and Paula (2010) analyzed the inequality in geographic distribution of physicians and its evolution in Portugal. They also estimated the determinants of physician density, and assessed the importance of competitive and agglomerative forces in location decisions. They measured inequality in spatial distribution using Gini indices, coefficients of variation, and physician-to-population ratios. The authors concluded, that geographic disparities in physician density are still high and appear due to income inequality. The impact of the growing number of physicians, and therefore potential increased competition, on geographic distribution during the period studied was small.

In 1990s, much government policy effort in Ontario (Canada) has been targeted toward the perceived “maldistribution” of resources between geographic regions. Authors of this paper applies the Gini index of resource concentration methodology to gauge the maldistribution of physician resources in Ontario during the 1990s. Novel feature of this study is, that it also proposes an approach for quantifying physician shortages through a physician shortage intensity index. The results reveal that numerous government policies and programs aimed at the geographic maldistribution of doctors were unsuccessful (Kralj, 2001).

The Gini coefficient was also used by Horec, Pesis-Katz and Mukamel (2004), to measure variations in distribution of physicians, but also hospital-beds (at the county level) during three decades. No association was found between equality in hospital-beds’ distribution and rates of hospital-beds per capita. However, physician distribution has become less equitable, while hospital-beds’ equity has increased.

The geographical distribution of general practitioners (GPs) was a persistent policy concern also in England and Wales since 1974. Results suggest, that maldistribution of GPs as measured by the Gini coefficient and Atkinson index increased from the mid-1980s to 2003, but the decile ratio showed little change over the entire 1974–2003 period. Unrestricted GP principals and equivalents were more equitably distributed than other types of GP. The 20 % increase in the number of unrestricted GPs between 1985 and 2003 did not lead to a more equal distribution (Hann and Gravelle, 2004).

Given wide popularity of Gini index for evaluation of geographic maldistribution of health practitioners, Brown (1994) analyzed how Gini-style indices should be optimally used. The analysis establishes that Gini-style indices can be used, only if the ordering of geographic areas required to give Gini-coefficient values internal technical coherence also has meaning in terms of the conceptual predictions of the modelling. In practice, the analysis establishes that one particular geographic distribution of health practitioners is empirically dominant, and that is the distribution which involves the lowest practitioner/population ratio in rural areas, and the highest ratio in large urban areas, with the ratio for small urban areas in between.

International comparative evidence on the factors driving inequalities in the use of GP and specialist services in 12 EU member states was provided by Doorslaer, Koolman and Jones (2003). Authors found little or no evidence of income-related inequity in the probability of a GP visit. There is even evidence of a somewhat pro-poor distribution. By contrast, substantial pro-rich inequity emerges in virtually every country with respect to the probability of contacting a medical specialist. Despite their lower needs for such care, wealthier and higher educated individuals appear to be much more likely to see a specialist.

Instead of analyzing maldistribution, Bolduc, Fortin and Fournier (1996) assessed the effect of various incentive measures introduced in Quebec (Canada) to influence the geographical distribution of physicians across 18 regions. Their dataset covers sub-periods before and after the introduction of these measures. Incentive policies are captured through price and income effects. Results provide evidence that these measures had a significant effect on location choices.

3.2 Determinants of doctor's location decision

Another interesting paper, which shifted from ongoing debate about maldistribution of physicians, focused on relationship between physician supply at regional level and demographic (population size, age structure, fertility and migration) and geographic determinants. Using regional data for Germany, authors examined econometrically the determinants of regional physician supply. Results suggest negative relationship to both the population share 60+ and the population share 20- in rural areas. While both population shares tend to have a less negative impact in urban areas, a pronounced positive effect arises only for the share 20 in regions with agglomeration character (Kuhn and Ochsen, 2009).

Newhouse (1990) claims, that doctors in general prefer location in cities. There can be several reasons why. One of the motives could be higher life-quality in greater city. Literature suggest that physicians maximize overall utility, not only profit. It can include quality of life in specific area, culture, sport or recreational facilities etc. Several studies conclude, that greater cities in fact attracts more physicians, but subsequent increase in total number of physicians will lead to diffusion into smaller cities (Newhouse et al., 1982a; Newhouse et al., 1982b; Rosenthal et al., 2005; Brown, 1993).

4 Physician market in Slovakia

Slovakia has problem with shortage and age structure of general practitioners. In Slovakia, there is 2,5 thousand inhabitants per one general practitioners, which is above V3 average (almost 2,4 thousand). The number is two times higher than EU28 average, which is under 1 thousand inhabitants per GP. Due to this shortage of GPs it is much more important to study equality in geographical location, to secure accessibility of healthcare for everyone. Ministry of finance also pointed out unfavorable age structure. Over 40 % of GPs are older than 60 years (ÚHP, 2018). Therefore, this shortage will

be even more serious problem in the future. We plot number of inhabitants per General practitioner in 2016 in Figure 2.

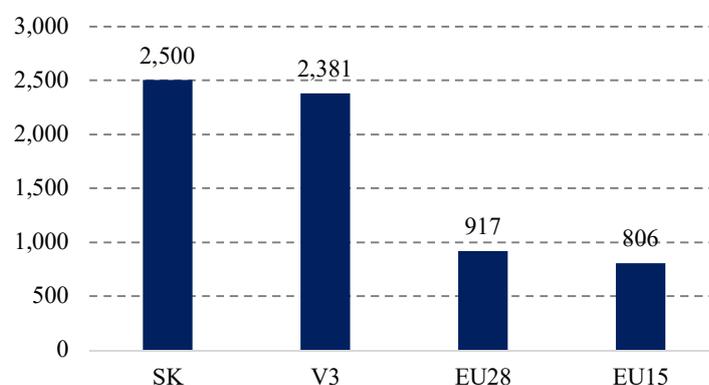


Fig. 2. Number of inhabitants per doctor, 2016. *Source: OECD database*

There are almost 2,2 thousand general practitioners in Slovakia. Given 2,9 thousand municipalities, there is less than one GP (0,75) per municipality on average. However, in only 551 municipalities are GPs located. It means, that over 80 % (almost 2,4 thousand) municipalities are without GPs.

Table 1. Descriptive statistics of Slovakia

Indicator	2017
Number of GPs	2 189
Number of municipalities	2 928
Number of GPs per municipality	0,75
Number of inhabitants per GP	2 483
Number of elderlies per GP	372
Number of municipalities with GP	551
Number of municipalities without GP	2 377

Source: authors calculation based on data provided by Ministry of Health of the Slovak Republic

We show geographical distribution of general practitioners at county level in the figure 3. Based on this graphical representation of data, there is relatively uniform distribution of GPs. The darker the blue, the higher density of GPs in given area. We can see the darkest blue in the regions of Bratislava and Košice. On the other hand, the white area can be identified around Košice.

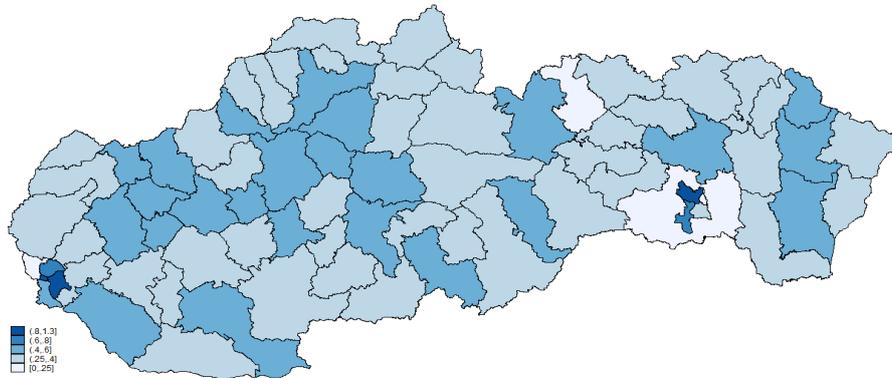


Fig. 3. Number of general practitioners per 1000 inhabitants at county level in Slovakia, 2017
Source: Authors compilation based on provided by Ministry of Health of the Slovak Republic

Although distribution of GPs in counties are relatively equal, higher inequalities occur between municipalities. The reason can be, that GPs prefer to be located in bigger cities, or county centres. Further analysis should therefore focus on geographical inequalities between municipalities. Analysis should also focus on determinants of GPs decision about location. Due to shortage of GPs it is especially important to prevent from geographical disparities. However, spatial distribution of physicians is influenced by minimum network of healthcare providers.

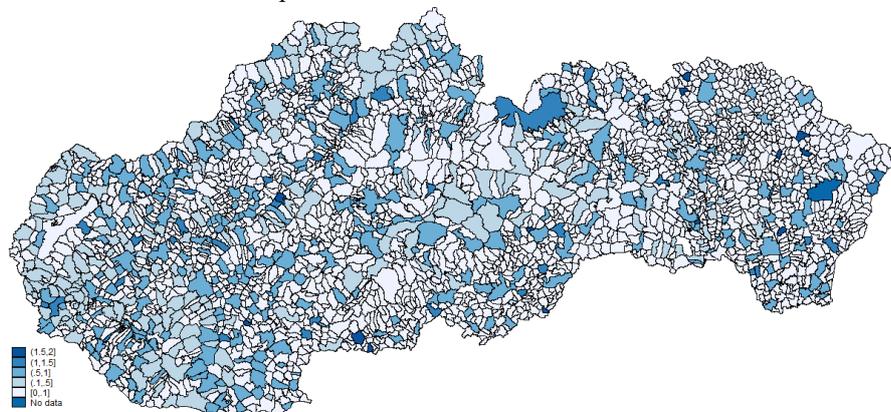


Fig. 4. Number of general practitioners per 1000 inhabitants at municipality level, 2017. Source: Authors compilation based on provided by Ministry of Health of the Slovak Republic

5 Minimum network of health care providers in Slovakia

Almost all GPs provide health care services in their private medical practices. All providers need to compete for contracts with health insurance companies based on quality criteria and prices. However, to guarantee accessibility of providers, a minimum network requirement is set by the government to influence capacity planning. This network

is based on calculations of the minimum number of physicians' posts in outpatient care and a minimum number of hospital beds for each of the eight self-governing regions. Minimum capacities are calculated per capita, but they do not consider the specific health care needs of the population and the effective use of resources (Smatana et al., 2016).

Minimum network is calculated by multiplication of normative by share of insured inhabitants of given insurance company per total number of inhabitants of given county. Minimum network of General practitioners in Slovak counties in 2018 is shown in table 2. Health insurance companies had to contract at least 1 733 GPs in 2018.

Table 2. Minimum network of GPs in Slovakia, 2018

County	Minimum GPs
Bratislava	205
Trnava	182
Trenčín	197
Nitra	233
Žilina	219
Banská Bystrica	213
Prešov	243
Košice	242
Slovakia	1733

Source: Government resolution 59/2019 Z. z.

6 Conclusions

The aim of this paper was to present literature overview on the determinants of doctor's location decisions. Although maldistribution can occur (and often occurs) in most profession, it is especially important problem in physician market, due to accessibility of proper healthcare. Shortages and surpluses of physicians can occur if wages or fees are set at a level which does not match supply with demand.

Slovakia suffers from shortage and unfavorable age structure of general practitioners. In Slovakia, there is 2,5 thousand inhabitants per one general practitioners, while EU28 average is under 1 thousand. Moreover, over 40 % of them are older than 60. Due to this challenges, it is especially important ensure equity in geographic distribution of GPs.

One of the explanations of unequal distribution of doctors provides Physician induced demand (PID) hypothesis. Due to this hypothesis, doctor can induce demand for his services, and therefore stay at the market he would have to leave otherwise (or even enter this market). This is possible thanks to asymmetry of information between physicians and patients. Shifting involves recommending a service such as a revisit or a surgical procedure whether or not the recommended care is of potential benefit to the patient. However, literature is still ambiguous on this phenomenon.

Literature on distribution of physician suggest, that maldistribution is ongoing problem in most countries. Some studies also claim, that government interventions could be unsuccessful. However, several studies conclude, that greater cities in fact attracts more physicians, but subsequent increase in total number of physicians will lead to diffusion into smaller cities.

Our brief introduction into Slovak market of doctors suggests possible maldistribution of General practitioners. Unequal distribution is stronger at municipality level. Due to already known shortage of GPs in Slovakia, it is necessary to study this inequality. Further research should also focus on determinants of doctor's decisions about location.

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DOES SLOVAK ECONOMY PULL MIGRANTS TOWARD IT?

Katarína Mertanová

University of Economics in Bratislava
Faculty of National Economy, Department of Economics
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
katarina.mertanova@euba.sk

Abstract. The aim of this paper is to discuss how the phase of the business cycle affects the number of immigrants to Slovakia. We sort the home countries of the migrants into three categories – similar, richer and poorer and compare the numbers of migrants from these countries with the development of real GDP growth in Slovakia. Our results suggest that when considering Slovakia, business cycle doesn't play a big role in the case of migration from similar and richer countries. However, it plays at least a small role in the migration from poorer countries.

Keywords: migration, economic cycle, Slovakia.

JEL classification: F 22, E 32

1 Introduction

Migration is a big topic nowadays, both as a part of the answer to demographic change in Europe and as a phenomenon feared of by some locals. Economic theory identifies pull and push factors of migration. Push factors are those which motivate the migrant to leave his or her country, such as not enough jobs or war. Pull factors on the other hand determine the country in which the migrant will arrive. Those can be for example abundance of jobs or good pay.

Economic cycle seems to be both push and a pull factor. In this article we would therefore like to shed light on this question which can be important for governments when deciding on their migration policy. Phase of the economic cycle is something that they cannot fully control, that is why they have to take into consideration the effect it has on migration.

Previous research had suggested that immigrants are usually concentrated in sectors of the economy that are most susceptible to fluctuations in the business cycle (Papademetriou et al., 2009). The question however is, whether they are also pulled towards a certain economy because of the business cycle.

We choose to study the connection between economic cycle and migration on the example of Slovakia, because we wanted to be specific. It would be interesting to study this topic on bigger sets of data, which we would like to do as our next step.

2 Objectives, methodology and data

As we consider this paper as the first part of an answer to this question, we choose a relatively simple approach similar to W. J. Milne (1993). He analyses interregional migration in Canada mostly by graphically comparing real GDP growth and net migration. Besides comparing net migration and real GDP growth of Slovakia, we also wanted to look specifically at the country of origin of the migrants coming to Slovakia.

We wanted to see who does the business cycle influence the most: the emigrants, the immigrants from poorer countries, the immigrants from similar countries, the immigrants from richer countries or return migration?

Similarly, to W. J. Milne, we do it by comparing real GDP growth of Slovakia with number of migrants from rich, poor and similar countries. We choose the countries from which Slovakia has the most migrants.

We define rich countries as those with much higher GDP per capita than Slovakia. For this study we choose United Kingdom, Germany and Italy. Similar countries for our purposes are other members of V4 – Czechia, Hungary and Poland. Poorer countries are those with considerably lower GDP per capita than Slovakia. We choose Ukraine, Romania and Serbia for our sample.

The data about migration come from the Eurostat database; data about real GDP growth are from the International Monetary Fund (IMF). Unfortunately, Eurostat holds information about the country of birth of migrants coming to Slovakia just from 2011. Therefore, we looked at the data about citizenship of migrants coming to Slovakia. There are three more years with this information – Eurostat started collecting it in 2008. The newest data are from 2017 in both cases.

3 Results

In this section we show the relationship between Slovakia's real GDP growth and net migration and show the top countries which immigrants to Slovakia come from. Then we compare the number of immigrants from different groups of countries with the development of Slovak economy.

3.1 Relationship between Slovakia's real GDP growth and net migration

When we look at the comparison of Slovakia's net migration and GDP growth, we can see that the trend is quite similar, even though the correlation coefficient is just 0.3 which suggest only moderate correlation. Net migration decreased when the economy slowed down in 1994 – 1999. However, it continued to decrease until 2002, even after the economic growth recovered. On the graph below we can also see the effect of the

world economic crisis in 2007 – 2009. Even though the net migration growth decreased in 2007, it started to decrease just after two years in 2009.

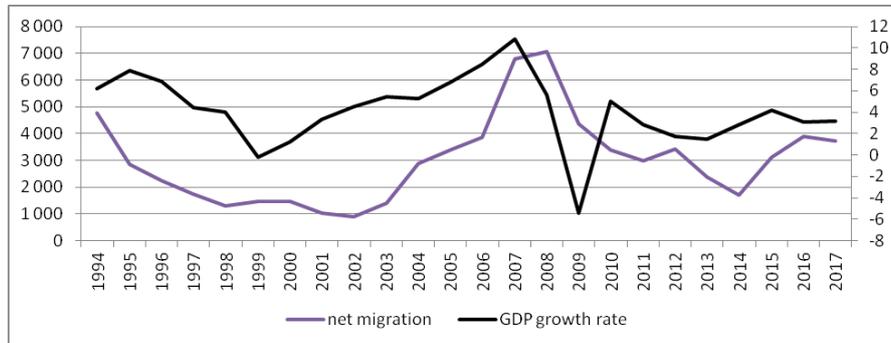


Fig. 1. Comparison of real GDP growth and net migration in Slovakia (1994 – 2017). *Source: Eurostat, IMF.*

This is in line with W. J. Milne's results. He concludes that as potential economic growth declines; the overall rate of migration falls. The net migration rate by province in his study was pro-cyclical - it moved with the national business cycle. K. Pandit (1997) also found that the effects of business cycle are more pronounced in international than interstate migration (as in Milne's findings). He studied interstate and international migration in USA. Similarly, A. C. Sasser (2010) found that phase of the business cycle is one of the conditions that play role in the magnitude of migration.

3.2 Distribution of migrants to Slovakia based on the country of birth

Despite the fear of some citizens, most migrants come to Slovakia from Europe, mostly from our neighboring countries. We can also see that return migration is a big part of the migration flow to Slovakia.

As shown by C. Dustman and Y. Weiss (2007) Experiences from older member countries of the EU suggest that return migration will grow as the quality of life in the country increases. According to the authors return migration increases when there a high preference for consumption in the home country, high purchasing power of the host country currency in the migrant's home country, or when the accumulation of human capital in the host country in improves productivity back home.

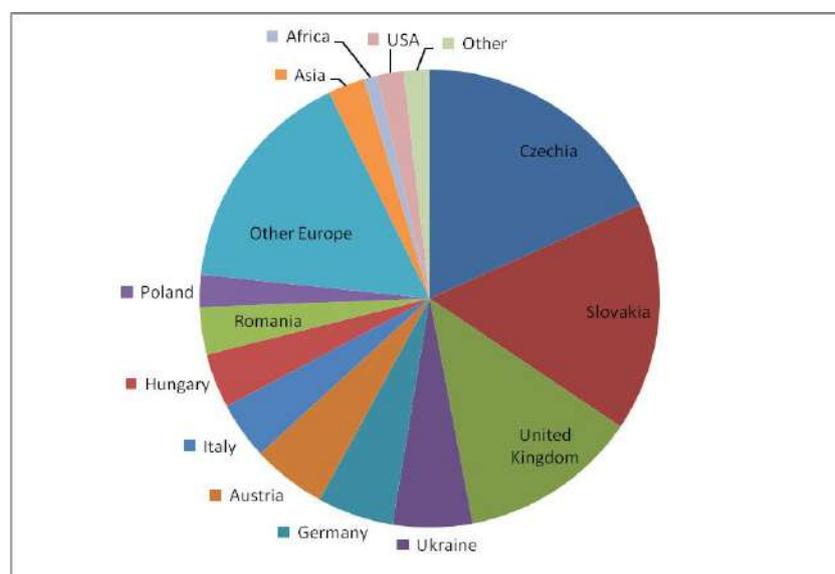


Fig. 2. Countries of birth of the migrants coming to Slovakia in 2017. Source: Eurostat

3.3 Relationship between Slovakia's real GDP growth and immigration from different groups of countries

In the following section we decided to work with three countries from each group that we defined in the second part of this paper – similar, richer and poorer. Similar for the purpose of this analysis will be Czechia, Poland and Romania – Slovakia's neighboring countries with similar backgrounds and developments.

United Kingdom, Germany and Italy are older members of the EU which are considered as the 'richer' countries in our analysis. Romania, Serbia and Ukraine are all countries with lower GDP per capita than Slovakia and will therefore for simplicity be considered 'poorer'. We predict that for these migrants the business cycle will play a biggest role in their decision to migrate.

Comparison of economic development in Slovakia and number of migrants from 'similar' and 'richer' countries

In the Figure 3 we can observe very different trend compared to Figure 1. Immigration from countries similar to Slovakia seem to be steadily decreasing since 2008, no matter the business cycle. In the case of Polish immigrants, there is an increase in 2013 aligned with the increase in real GDP growth of Slovakia. This however can be coincidence. Hungarian and Czech migration on the other hand increased slightly in 2014.

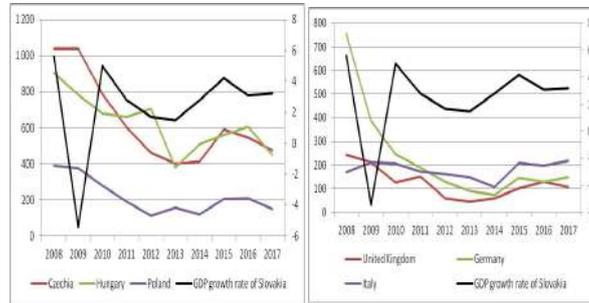


Fig 3. Comparison of Slovakia's real GDP growth and immigration from 'similar' countries – (Czechia, Hungary and Poland) and 'richer' countries (United Kingdom, Italy and Germany).

Source: Eurostat, IMF

Correlation coefficient shows weak negative correlation in the case of Czechia and Poland (-0,22 and -0,19 respectively) and no correlation for Hungary (-0,08). This suggests that people from similar countries come to Slovakia for reasons not connected with the business cycle.

We can also see similar pattern in the richer countries. Correlations are around zero.

Comparison of economic development in Slovakia and number of migrants from 'poorer' countries

As Figure 4 shows, there was a big decline of Romanians coming to Slovakia during the crises and also increase in the number of migrants in 2014, when the economy was also growing fast. In addition, all countries show an increase in migration to Slovakia in 2014 after the economy started to grow faster. Besides that, there are not many similarities in the trends.

Correlation coefficient shows weak correlation for Ukraine and Romania (0,26 and 0,28 respectively) and no correlation for Serbia. This can be caused also by the fact that many people coming from Serbia have Slovak citizenship and therefore are not part of the statistics. The Serbian numbers are also much lower – Serbia is not one of the top 10 countries out of which most migrants are coming to Slovakia. It was added to the analysis because we needed another 'poorer' country.

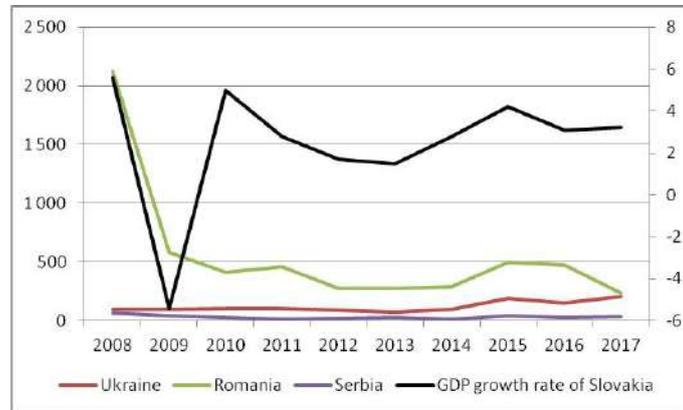


Fig. 12. Comparison of Slovakia’s real GDP growth and immigration form ‘poorer’ countries (Ukraine, Romania and Serbia). *Source: Eurostat, IMF*

Because we wanted to compare push and pull strength of business cycle, we also looked at the background of country. We choose Romania as the correlation with the Slovak business cycle was highest there. Form Figure 6 we can see that business cycle can also be a push factor. The correlation coefficient is 0.27, almost the same as with the business cycle of Slovakia. This is probably caused by the similarities in the economic development in both countries. However, there are some differences which we can compare with the development in migration from Romania to Slovakia.

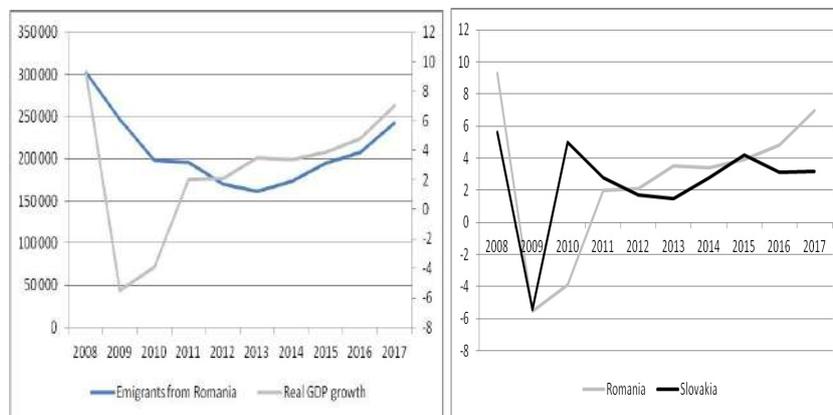


Fig. 5. Comparison of Romania’s real GDP growth and emmigration (2008 – 2017) and comparison of Romania’s and Slovakia’s real GDP growth. *Source: Eurostat, IMF*

The first difference is just after the recovery from the crises in 2010. In Romania the recovery was slower. As we can see in Figure 4, decline of migrants from Romania to

Slovakia continued at that time and rose only in 2011. This however doesn't support either explanation.

Another difference is in 2013 when Romania's economy grew more rapidly and Slovak economy growth declined. In this year the number of emigrants from Romania declined, which suggests a role of the business cycle as a push factor. The number of immigrants from Romania to Slovakia on the other hand stayed mostly the same which also supports the push effect hypothesis.

The last difference comes after 2015 – Romanian economy continued to grow fast while Slovak economy's growth slowed down. Number of Romanian emigrants continued to grow too, which doesn't support the assumption that economic cycle is a push factor – when the economy is growing, people should be motivated to stay in the country, not leave it.

On the other hand, the number of Romanians coming to Slovakia declined with the slowing economy of Slovakia. This suggests an anti-pull factor.

Our explanation of increasing number of emigrants from Romania is that there was a pull factor stronger than the anti-push factor caused by Romanian economic growth. Probably another country's growth was pulling Romanians away from home, it was just not Slovakia.

Comparison of economic development in Slovakia and number of returning migrants

We would assume that business cycle will play a great role in return migration. Our results however don't suggest so. The correlation between Slovakia's real GDP growth and number of Slovak citizens migrating to Slovakia from other countries is 0,18 – weak correlation.

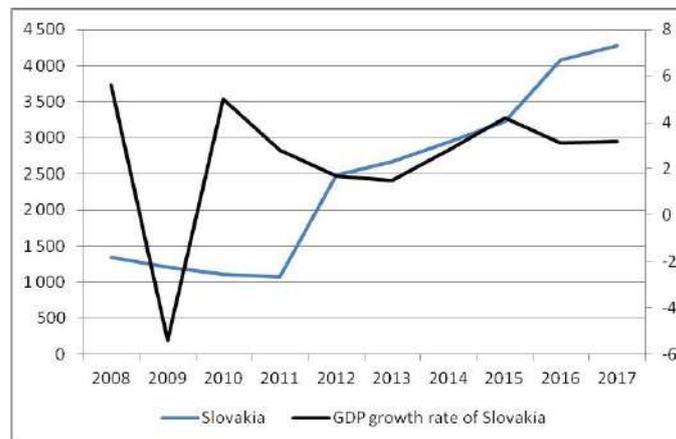


Fig. 6. Comparison of Slovakia's real GDP growth and return migration. *Source: Eurostat, IMF*

Part of the explanation can be that we used data about Slovak citizens. We therefore cannot say what number of migrants with Slovak citizenship is returning migrants and which are Slovak citizens born in other countries such as Serbia.

4 Conclusions

Our results suggest that when considering Slovakia, business cycle doesn't play a big role in the case of migration from similar and richer countries. However, it plays at least a small role in the migration from poorer countries. Our analysis doesn't fully answer the question set in the headline of the paper, but it offers some clues.

The numbers from Ukraine and Romania suggest that fast growing economy pulls migrants toward it and when it slows down, the number of migrants will also decrease.

A big problem with our results is the sample. This is partly caused by the availability of data and partly by our methodology choice. More rigorous research would be needed, for example taking into consideration the countries' sizes. It is also difficult to differentiate between push and pull factors when the situation in both countries was similar. As all countries were members of the EU or candidates for membership, their economies were interlinked.

Acknowledgement.

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EMERGING TYPES OF BUSINESS RISKS IN INSURANCE INDUSTRY

Darina Móžiová

¹ University of Economics in Bratislava
Faculty of Business Management
Department of Business Finance
Dolnozemská Cesta 1/b
852 35 Bratislava
Slovak Republic
moziova@gmail.com

Abstract. Property Insurance and business interruption is a traditional insurance coverage for several years. Risk engineering as a method had been invented to protect enterprise units against predictable risk. Its function is to discover business risks and estimate its volume. There are risks which gradually emerge due to increased overall consumption, digitalization, information technology and natural resources. Both enterprise units and insurance companies are forced to react properly. Natural resources that generate electricity are exhaustible in the long term and transition to renewable energy sources affect financial intensity, long-term return on investment and, to some extent, dependence on traditional sources. The new types of risks for business units need adequate qualitative and quantitative analysis.

Keywords: Financial risks, risk management, financial risk management.

JEL classification: G 22, G 28, G 32

1 Introduction

Global energetic problem can be understood as a problem of the future "functioning" of humankind with regard to natural resources. The existence of all living on Earth is based on energy consumption. Of course, energy production is related to the degree of human development. Naturally, man extracted energy in the past by the most primitive and accessible way. As humankind developed and grew energy consumption, methods of extracting energy have improved. (Musil, 2009)

Natural resources are considered as a key assumption in development of a national economy. However, we are observing that application of scientific and technological innovations lead to impact on a whole natural complex of economic development, especially developed economies, with negative influence. Of course, this fact cannot be seen absolutely. On the one hand, there are developed economies that do not have their

own capacity of natural resources, such as Japan, Republic of Korea, Singapore, in which the high economic growth has existed in recent decades. With the exception of 90's in Japan, where it had problems with its economy. On the other hand, the appropriate supply and diversity of natural resources give the same additional comparative advantage to those countries that are enriched with such resources. (Baláž, 2008)

1.1 Methodology

While working on a theoretical part of this article, there was a secondary research into available literature dealing with the subject matter. To achieve the set objectives, I identified current situation, procedures, guidelines and methods related with the issue. I refer to literature of domestic and foreign authors and data reported by individual companies. By gathering and sorting out information I tried to achieve a logical sequence and clarification of various topics. I achieved gathering required amount of information in order to elaborate main ideas of this paper.

2 Energy sources

World's economic growth has been historically describing four key types of energy sources: oil, natural gas, coal and nuclear energy. (Baláž, 2008) Minerals are exhaustible in the long term and it implies that mining will sooner or later reach its peak and then will gradually decrease. There are various studies analyzing whether the peak had already occurred. Graphically it is expressed by Hubbert curve, with a shape of bell. Anyhow, if the current consume type of functioning stays the same way, in the future, humankind will face mining peak of these resources:

- Crude oil
- Natural gas
- Coal
- Uranium
- Fertile soil
- Fishing all types of fish
- Environmental pollution

Basic geographical characteristic of a crude oil is its imbalanced localization. Two-thirds of the well-known crude oil reserves are located in the Middle East, while the largest exporter is Saudi Arabia (182.5 Bn USD). In the second place in the global export ranking is Russia (129 Bn USD) and in the third place is Iraq (91.7 Bn USD).

There are many projections about the peak oil. Some of them suggest stagnation of oil as of the year 2008. Since 20th century, the cost of oil extraction has steadily risen. In order to control costs, except direct and indirect cost there is a concept of Energy Returned On Energy Invested (EROEI) EROEI explains how many barrels of crude oil have been extracted to one barrel of consumed oil. While in the beginning of the oil industry this figure was around 50, at the moment with the good resources it is ranged between 10 and 20. (Stanek, 2017)

Mining and consumption forecasts have a central role in forecasting economic development. For each individual source there are detailed curves suggesting their peaks. (Stanek, 2017)

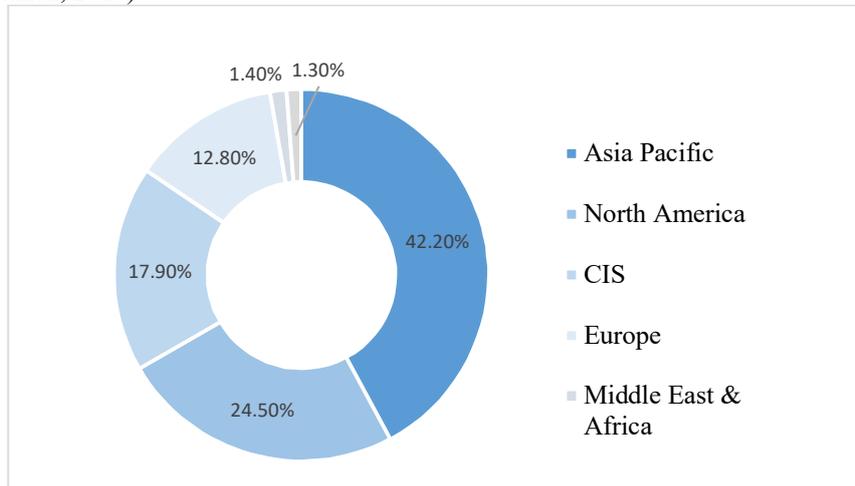


Fig. 1. Distribution of Coal reserves in 2018. *Source: BP Statistical Review of World Energy 2019*

As Stanek further states, the peak of coal is underway in these years and that in the future a large portion of the extraction will be in much lower quality, for example in the form of brown coal or liquid bitumen. This is linked to lower heat capacity, emission problems and a need to rebuilding coal power plants. Likewise, the extraction of conventional gas is in its peak. However, due to the large stocks of short-sea gas and deep-water gas, the global peak of gas mining will occur in the later future. According to Stanek, the peak of uranium was in 2006. Since then, the amount of uranium extracted is decreasing and its price grows. The construction of nuclear power plants takes a long time compared to the financial return, which shows that uranium cannot replace fossil fuels within the energy sources.

Coal has been for long a reliable source of energy, but it combines with high costs and externalities. Coal energy represents a lot of negative impacts of the environment and air pollution. Mentioned air pollution and global warming are two of the most serious environmental problems.

Decarbonization of the European Union's economies has become the core of the European Union's climate change and energy agenda. As with the overall long-term policy, European Union wants to contribute to decrease global warming by limiting to 2 degrees Celsius. European Union has set legal objectives for the year 2020 and the sub targets for the years 2030 and 2050. In the recent years, renewable energy became a topic in a forefront. It is especially wind energy, solar, hydropower, biomass and geothermal energy. (Musil,2009)

Renewable energy (excluding water) grew by 14,5% in 2018, slightly below historical 10-year average (which is 16 %). China has seen 45% global growth and in the last

10 years has 20-fold increased in consumption. Wind energy (142 TWh) has contributed to the growth of renewables more than solar energy (131 TWh). Wind energy has seen around 50% of renewable resources in recent years. (BP Statistical Review of World Energy, 2019)

The share of renewable energy production continues to grow. Further development of renewable energy sources decelerates a relatively high price of the energy thus obtained compared with the price of energy obtained from traditional sources.

The role of insurance in decarbonisation.

Insurance market may influence the behavior of entrepreneurs because the function of insurance is financial indemnification or to deflect unfavorable financial situation. For entrepreneurs it means either they accept the terms set by insurers or they will face financial losses that may lead to liquidation consequences. These terms set by insurers are for example:

- Developing sustainable development plans
- Eliminating the combustion of solid fuels
- Reduction of carbon dioxide emissions and transformation to a neutral level
- Renewable energy production (wind power, photovoltaic, solar power, hydro-power or geothermal)
- Changing the technological process with the help of environmentally friendly combustion (hydrogen, waste incineration, biomass)

At present, the trend is to decarbonize the industrial sector and non-profit organisations create a variety of campaigns to make decarbonization more visible, such as the "Un-friend coal" campaign.

Evolution of world energy consumption.

Every human activity requires some consumption of energy and recently energy demands increased with more intensity. Trend of energy consumption curve is in line with the curve of economic development. (Musil, 2009)

Average global energy consumption increased by 1.8% in 2018 to 76 GJ/per capita. Growth in the year 2018 was significantly higher than the historical average (0.3% pre-period 2007-2017). North America is the region with the highest consumption (240 GJ/per capita), followed by CIS (161 GJ/per capita) and the Middle East (149 GJ/per capita). Africa remains a region with low average consumption (15GJ/per capita). South & Central America and Europe were the other regions where average consumption in 2018 per capita was reduced. (BP Statistical Review of World Energy, 2019)

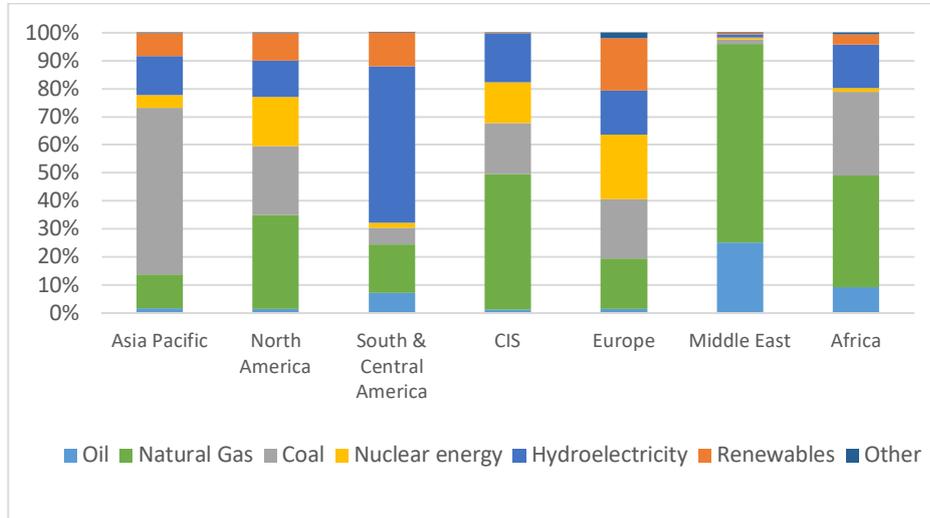


Fig. 2 Regional distribution of electricity by fuel type in 2018. *Source: BP Statistical Review of World Energy 2019*

Growth of consumption is often attributed to industrialization and digitization but also in weather conditions. In 2018, a high number of hot and cold days were recorded because of which in America, China and Russia experienced increased electricity consumption for the needs of balancing inside and outside temperatures.

The electric power industry provides the production and delivery of electric energy, often known as power, or electricity, in sufficient quantities to areas that need electricity through a grid connection. The grid distributes electrical energy to customers. Electric power is generated by central power stations or by distributed generation.

Quality of electric power is often a concern nowadays. The widespread use of electronic equipment, such as information technology equipment, power electronics such as adjustable speed drives, programmable logic controllers, energy-efficient lighting, led to a complete change of electric loads nature. These loads are simultaneously the major causers and the major victims of power quality problems. Due to their non-linearity, all these loads cause disturbances in the voltage waveform. Along with technology advance, the organization of the worldwide economy has evolved towards globalisation and the profit margins of many activities tend to decrease. The increased sensitivity of the vast majority of processes (industrial, services and even residential) to power quality problems turns the availability of electric power with quality a crucial factor for competitiveness in every activity sector. The most critical areas are the continuous process industry and the information technology services. When a disturbance occurs, huge financial losses may happen, with the consequent loss of productivity and competitiveness. Although many efforts have been taken by utilities, some consumers require a level of power quality higher than the level provided by modern electric networks. This implies that some measures must be taken in order to achieve higher levels of power quality. (Almeida, 2003)

The renewable energy sector stands out as needing innovative insurance solutions. Driven by rapid technological progress and policy incentives in many countries, the sector has grown rapidly and it will likely make up a large fraction of future infrastructure investments. This emerging sector is highly capital intensive and mostly funded by private or institutional investors. In addition to the significant property risk exposures of wind and solar farms, the latter are also exposed to operational vulnerabilities from weather risks. (Holzheu, 2017)

3 Insurance and non-physical damage business interruption

Business interruption insurance is a type of insurance that provides cover for loss of revenue due to an interruption or impairment in the economic performance of the insured business. In the event of a business interruption claim, the profit loss, as well as the unearned ongoing (fixed) costs during the so-called indemnity period of the insurance policy, are usually reimbursed. The indemnity period starts with the occurrence of a material damage (not the interruption of the insured's operations), the consequences of which lead to a business interruption in the insured company. In general, a business interruption may impact more than one company's business; it may affect a group of related companies that have losses because of their interdependency – e.g. branches of the same company. (Ronken, 2018) It is important to define in the insurance policy to which peril the business interruption refers. In most cases it is due to fire, natural catastrophes, engineering or electrical breakdown. (Janata, 2008) Whilst most businesses are to some extent dependent for their normal functioning upon some outside concern there is a great variety in the form and extent of this dependency and in the effects of turnover which would result from damage by fire or associated perils at another firm's premises. (Cloughton, 1999) Different covers for business interruption losses are available, including:

- **Gross Profit cover** – All costs are covered until the commercial restoration of normal business operations to the level immediately prior to the damage, including the ongoing loss of turnover even after technical restoration, but at the latest until the expiry of the agreed liability period.
- **Gross Earnings cover** – Costs are covered only until the technical readiness for operation has been restored; there is no contractually agreed liability period.
- **Increased Cost of Working insurance (ICOW)** – All costs are covered that do not accrue in the normal operation of the insured entity, but have to be paid in the event of an insured loss, in order to avoid a business interruption or to reduce its consequences; for example, rental costs for new premises, contractual penalties for non-performance of a contract or wages for necessary overtime. These costs will be reimbursed to the extent that they are economically justified, even if they do not have a detrimental effect during or after the indemnity period.
- **Loss of Rent insurance** – A subform of Loss of Earnings insurance, this insurance replaces one special type of loss of earnings, namely, loss of rent.

- **Public Utility insurance** – Public Utility insurance covers damages caused by loss of utility services; e.g. electricity, water, natural gas, refrigeration, telecommunications, waste disposal.
- **Interdependence insurance** – This insurance covers losses caused by interactions (e.g. property damage at one facility causes a business interruption at another facility of the same insured).
- **Contingent Business Interruption (CBI)** – CBI covers losses due to a Business Interruption at a main supplier.
- **Denial of Access** – This is insurance against loss of earnings due to access obstructions/regulatory restrictions in the event that an insured risk in the neighborhood causes property damage. (Ronken, 2018)

The number of causes for a business interruption loss is growing every year. They range from traditional risks such as fire, natural hazards or supply chain interruptions, to new triggers caused by ongoing digitization. While the latter typically does not cause damage to property, it can lead to high financial losses. (Ronken, 2018)

- Power outage (blackout)
- Supply Chain
- Cyber risk and cyber attacks
- Machinery Breakdown
- Withdrawal of regulatory approval or license to produce (ie, due to quality problems or safety issues)
- Closure of production facility by order of an authorized regulatory body
- Failure of Internet access; software errors and mistakes
- Political risks
- Terrorism affecting trade in a wide area
- Product recall
- Environmental contamination

There are various covers in the insurance market. Some of them are described in the publication of Meršmíd (2015) who differentiates covers in lines of business property, liability, engineering, motor and etc.

4 Discussion and risk exposure

Exposition to business interruption of non-material damage exists independently of the normal running operation of the business. For example, after a blast in the Chinese town Tianjin in 2015 there were several losses associated with Business Interruption because the port was closed by the local authorities or because the companies were unable to turn on the power supply. Such damage may be covered by insuring business interruption of the operation due to non-material damage. However, insurance of such risks is yet emerging, it is considered as difficult to define, monitor and estimate. These innovative insurance solutions require individual risk assessment and successful concepts can further be developed into the insurance products. The assessment approach should

take into account the amount of possible loss, parametric solutions and hybrid solutions, while addressing the probability of insurance events arisen from various triggers.

5 Conclusions and implications

The development of the society contributed to the expansion of knowledge, higher living standard and human development. The growth of consumption, innovation, digitisation and the development of information technologies have brought many new risks to business operators, affecting the environment. Natural resources are exhaustible and renewable sources are not clear solutions that can completely replace traditional sources. Higher demands on electricity consumption, investment in renewable energy, technology to balance fluctuations in electricity supply in larger cities, reduction of carbon dioxide emissions are further topics which many companies must face. Business Interruption is type of insurance that provides coverage of loss of income due to interruption business activities. New types of risks such as power outages or cyber-risks have a new room for innovating insurance products. The insurance sector has a significant position not only to compensate operational risks, but also through the creation of changes in enterprises such as decarbonisation.

Acknowledgement

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COMPARISON OF LABOR PRODUCTIVITY IN TOURISM AND THE OTHER SECTORS OF THE SLOVAK ECONOMY

Martina Naňáková

University of Economics in Bratislava
Faculty of Commerce, Department of Services and Tourism
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
martina.nanakova@euba.sk

Abstract. Evaluation of sectors of an economy has various options to be provided. The aim of this paper is to compare sectors of the Slovak economy based on labor productivity with tourism sector. Labor productivity is the value of an employee which contributes by to the creation of an output. In this research paper we consider the output as a gross value added which is created in the sectors of economy according to the classification NACE Revision 2. Furthermore, after the evaluation of the position of the tourism based on labor productivity in the Slovak economy, analysis within the tourism sector is provided. The results of this paper shows that particular tourism industries within the tourism sector reveal disproportions between individual labor productivities. Recommendations for the following development are stated at the final part of the paper.

Keywords: tourism, labor productivity, Slovak economy

JEL classification: E 24, J 24

1 Introduction

Slovak republic is a young country with a long forming history within the Central Europe. There has been a transformation from central planned economy to market economy with a remarkable change of gross domestic product and production. In early beginning of forming a state there was mining industry, followed by manufactures of agriculture production and lately in 20th century metallurgical and chemical industry production. From the beginning of 21st century, in Slovakia there is a major share of automobile industry within the economy of the Slovak Republic. However, Slovak Republic representatives recently support tourism sector which has been naturally formed from Slovak nature and its history. Tourism has a great potential for following period of time mostly for its growth in Europe and huge expansion of arrivals to Europe and travels within the Europe itself. These assumptions are supported by new releases from

UNWTO (2018): *“International tourist arrivals grew by a remarkable 7% in 2017 to reach a total of 1,322 million, according to the latest UNWTO World Tourism Barometer. This strong momentum is expected to continue in 2018 at a rate of 4%-5%.”* The text continues with a remarkable recognition of 8% growth for Europe in comparison with year 2016. In Slovakia, besides the incoming and outgoing tourism, domestic tourism has gained very important role in tourism development. In general, domestic tourism is the key driver of the tourism sector globally, accounting for 73% of total Travel & Tourism spending in 2017 (WTTC, 2018). In last 10 years, regarding to time series data – Domestic and outbound tourism of residents in the Slovak Republic (SOSR, 2018), Slovak citizens travel more every year. Tourism is one of the most fastest growing industries worldwide and therefore it is plausible to analyze impact of tourism sector to the Slovak economy.

2 Methodology

The aim of the paper is an evaluation of tourism sector within the Slovak economy based on numerical definition and comparison of the labor productivity in sectors of the Slovak economy. Furthermore, an analysis of internal impact of tourism industries within the tourism sector will be provided.

Tourism Satellite Account in the Slovak republic (TSA SR), the set of tables with economic indicators of tourism, is the core source for tourism data which are used in this research. TSA SR is a statistical data source for tourism data such as domestic, outbound and inbound expenditure of tourist, direct tourism consumption, gross value added, and employment in tourism industries, investment in tourism and other indicators related to direct affects of tourism. For the needs of this paper author used indicators such as gross domestic product, gross value added in tourism industries separately and as total value and also tourism employment data which are represented by indicator – number of full-time equivalent jobs in tourism industries by industries and status in employment (EMP).

For other sectors of the Slovak economy were used data from National Accounts published by Eurostat. As the first step, author used data which represents average growth rate and average share of gross domestic product for indicating the leading sectors of the Slovak economy and position of tourism sector within Slovak economy. Thereafter, the comparison of labor productivity within sectors of Slovak economy was provided. Based on results represented in graphic form author described the position of tourism in the Slovak economy. Each tourism industry in tourism sector does not have the same impact in creating gross value added of tourism sector (Michálková, 2014) and therefore labor productivity of tourism industries within the tourism sector itself was compared and analyzed.

Due to the data availability from the main source – Tourism Satellite Account in the Slovak republic (TSA SR) this research employs time series data from 2005 to 2016 for all variables.

2.1 Measuring labor productivity

Measuring and comparing labor productivity is the topic which was already explored and examined by many authors such as Carnicky et.al. (2016), Kotulic et.al. (2015), Martinovičová (2014), Sauian (2013), OECD (2001), Duarte & Restuccia (2010), Blanchard (2004), Rogers (1998), Pritchard (1990) and others. Productivity is an effectivity by which inputs are transformed into outputs. According to mentioned authors productivity is output value divided by input value. According to Kubičková et.al. (2016) the method of measuring productivity is not defined precisely in sector of services, which includes most of the industries within tourism sector. As text follows, Kubičková et.al. (2016) define productivity as the share of turnover per an employee. Carnicky et.al. (2016) states that labor productivity can be calculated as a ratio between gross domestic product (GDP) or gross value added (GVA), and total employment or the total number of hours worked. For our calculations, we will consider as output gross value added (GVA) and as input employment in defined sectors and industries based on data availability in partial tourism industries. Values of GDP in partial tourism industries are not available. According to Eurostat (2019) GVA is defined as output (at basic prices) minus intermediate consumption (at purchaser prices).

$$\text{Labor productivity} = \frac{\text{gross value added}}{\text{number of jobs FTE}} \quad (1)$$

Labor productivity is the value that each employed person creates per a unit of his or her input. GVA is accounted by national accounts as a production account. GVA values can be broken down by industry and sector.

Gross domestic product (GDP) at basic prices will be used as a key element to determine the wealth of the Slovak economy. For following figures, we will use acronym for tourism sector – Tourism, and other sectors of the Slovak economy are determined and used according to NACE Rev 2 codes as follows:

- A – Agriculture, forestry and fishing,
- B-E – Industry (except construction),
- C – Manufacturing,
- F – Construction,
- G-I – Wholesale and retail trade, transport, accommodation and food service activities,
- J – Information and communication,
- K – Financial and Insurance Activities,
- L – Real Estate Activities,
- M-N – Professional, scientific and technical activities; administrative and support service activities,
- O-Q – Public administration, defense, education, human health and social work activities,
- R-U – Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

3 Results

As the first step of the evaluation of tourism sector, it was compared average GDP growth rate and average share of GDP within Slovak economy sector in 2005-2016 and therefore defined the position of tourism within the Slovak economy.

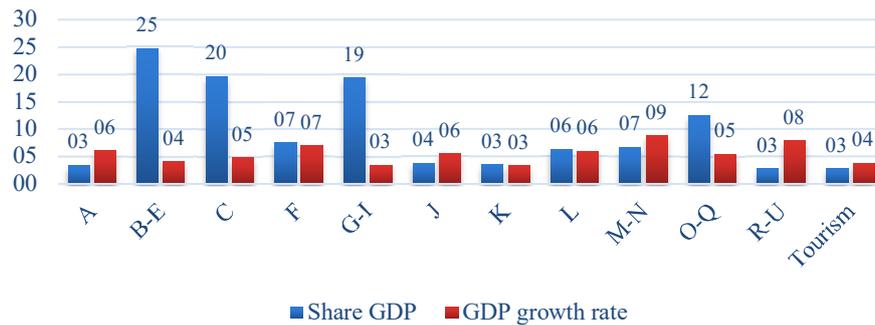


Fig. 1. Average share of gross domestic product of the Slovak economy and average growth rate of gross domestic product in 2005-2016. *Source: SOSR (2018), SOSR (2019), calculation-own processing*

Note: A – Agriculture, forestry and fishing, B-E – Industry (except construction), C – Manufacturing, F – Construction, G-I – Wholesale and retail trade, transport, accommodation and food service activities, J – Information and communication, K – Financial and Insurance Activities, L – Real Estate Activities, M-N – Professional, scientific and technical activities; administrative and support service activities, O-Q – Public administration, defense, education, human health and social work activities, R-U – Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

From the figure 1 it is observed that the leading sector of the Slovak economy is Industry (B-E except construction), followed by Manufacturing (C). Value of GDP in tourism sector is represented by value available from Tourism Satellite Accounts in the Slovak Republic. Tourism sector is a cross sectoral economic activity which includes values across almost all above mentioned NACE Rev.2 categories in the Figure 1, mostly from I, J, H, N, P and R. Gross value added of the tourism sector represents 2,8% share of GDP of the Slovak economy in 2016. The highest GDP share is 24,0% and it belongs to Industry (B-E). Regarding to average GDP growth rate for all sectors of the economy, the highest growth is recorded in sector M-N, followed by sector F and the lowest growth rate was recorded in sectors: K and G-I. Tourism reaches rather low values on researched parameters. Regarding to average share of GDP, tourism reached the lowest value from above mentioned sectors of Slovak economy. Out of 12 researched Slovak economy sectors, tourism sector took 12th place in the rank of average share of GDP and 10th place in average GDP growth rate.

In following step, labor productivity was calculated according to formula 1. From the labor productivity perspective, we can see in the figure 2 that tourism has achieved

the lowest values of labor productivity in monitored period of time. For better visualization author had to eliminate labor productivity of leading sector which is sector Real Estate Activities (L), due to the greatly high values of labor productivity than others in times series.

In years 2005-2008 labor productivity of tourism achieved higher values than many other sectors of the Slovak economy, besides that, it was slightly above the average labor productivity. After 2008, with exception of the year 2013, tourism reached the lowest labor productivity from all the sectors of the Slovak economy. From the year 2014 the gap between average labor productivity and tourism labor productivity has decreasing trend. It means that tourism sector is year to year less productive in comparison to the other sectors and average labor productivity.

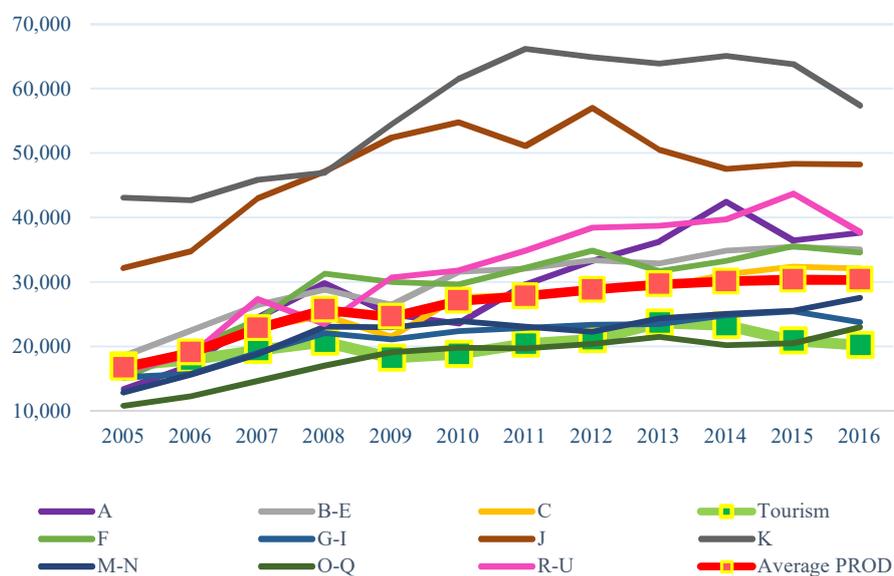


Fig. 13. Development of labor productivity in sectors of Slovak economy in 2005-2016. *Source: Eurostat (2019), SOSR (2019), calculation-own processing.*

Note: A – Agriculture, forestry and fishing, B-E – Industry (except construction), C – Manufacturing, F – Construction, G-I – Wholesale and retail trade, transport, accommodation and food service activities, J – Information and communication, K – Financial and Insurance Activities, L – Real Estate Activities, M-N – Professional, scientific and technical activities; administrative and support service activities, O-Q – Public administration, defense, education, human health and social work activities, R-U – Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

In following part of the paper, it is researched which tourism industries influence monitored decrease of labor productivity in tourism sector the most.

More detailed analysis of the data (figure 3) shows us increasing trend of tourism employment during all monitored years while GVA is decreasing from 2013 which

entails the decrease of labor productivity in tourism sector. A proposal for recovery, in a meaning of an increase of labor productivity in following years, has two options:

1. Increasing GVA along with the same or decreased value of tourism employment
2. Decreasing tourism employment with constant or increasing GVA

For further analyze of the tourism sector author divided tourism sector based on division of tourism industries from Tourism Satellite Accounts of the Slovak republic (SOSR 2018) into two main categories which will bring more detailed perspective about tourism sector:

3. Tourism characteristic industries: 1 – accommodation for visitors, 2 – food and beverage serving activities, 3 –6 passenger transport services, 7 – transport equipment rental, 8 – travel agencies and other reservation services activities, 9 – cultural activities, 10 – sports and recreational activities.
4. Tourism specific industries for Slovak Republic: 11a – retail trade of country-specific tourism characteristic goods, 11b – other country-specific tourism characteristic goods, 12a – insurance and other financial services, 12b – spa, health care, 12c – personal services.

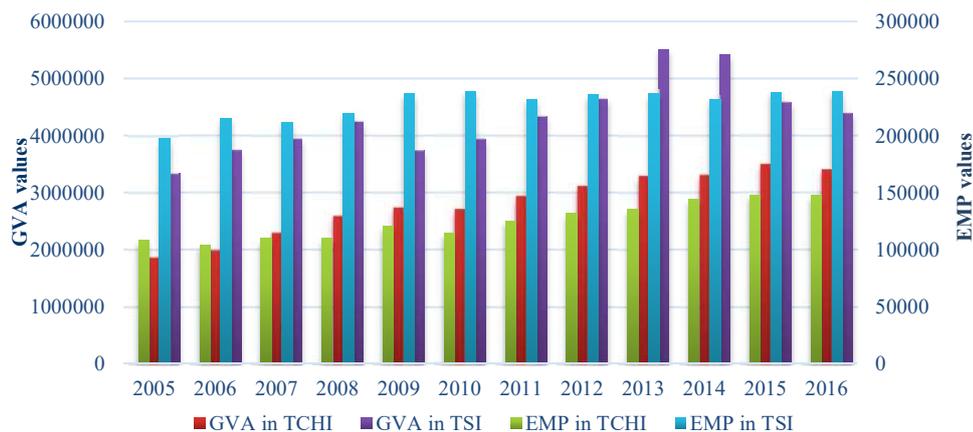


Fig. 3. Development of the GVA and tourism employment in tourism sector in 2005-2016.

Source: Eurostat (2019), calculation-own processing.

Note: GVA in TCHI=gross value added in tourism characteristic industries, GVA in TSI= gross value added in tourism specific industries, EMP in TCHI=employment in tourism characteristic industries, EMP in TSI= employment in tourism specific industries

As we can observe from the figure 3, high values of gross value added (GVA) is reached in tourism characteristic industries (TCHI) along with lower employment what concludes higher labor productivity in tourism characteristic industries. Tourism specific industries (TSI) reached lower gross value added and relatively high employment which cause lower labor productivity for tourism specific industries.

Therefore, when it comes to labor productivity of tourism sector we should look more precisely into the industries, mainly tourism specific industries, which cause the biggest changes within the labor productivity in tourism sector.

Table 1. Development of labor productivity in tourism industries in 2005-2016. Source: SOSR (2018), calculation-own processing

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Tourism sector	17 043	17 957	19 430	20 710	18 179	18 826	20 377	21 115	23 675	23 252	20 931	20 193
TCHI	17 314	19 058	20 907	23 483	22 775	23 687	23 506	23 681	24 357	22 999	23 687	23 108
1	15 946	17 071	15 820	16 218	17 717	16 460	17 020	17 992	17 513	17 002	18 523	20 705
2	13 319	13 199	11 140	12 887	9 582	10 624	9 962	8 954	10 435	9 920	7 774	9 002
3-6	12 558	14 031	16 406	17 589	21 418	19 427	19 038	20 424	19 224	14 807	18 023	20 444
7	61 380	65 803	69 037	89 637	109646	116753	171237	80 666	62 781	79 813	99 839	77 876
8	36 147	39 366	39 319	42 109	35 099	29 787	34 473	52 097	44 653	32 332	40 362	32 549
9	8 279	9 641	8 660	14 018	13 629	14 715	14 400	18 670	20 942	18 737	18 067	24 109
10	39 389	48 105	68 453	72 706	80 692	85 374	87 541	87 614	95 096	90 960	96 829	78 247
TSI	15 090	15 668	16 834	17 226	14 203	14 849	16 893	17 594	20 808	21 037	17 251	16 364
11a	39 416	36 531	30 274	37 074	27 895	27 869	32 711	20 718	31 926	39 286	26 682	26 046
11b	16 243	17 405	18 108	19 379	15 032	15 846	17 071	18 990	23 135	22 527	17 149	17 293
12a	46 835	31 618	46 068	33 252	34 849	25 504	55 490	46 742	50 617	57 704	88 644	63 334
12b	12 169	12 188	13 610	13 779	14 079	15 433	15 429	15 583	17 367	17 782	19 391	18 963
12c	8 333	8 505	10 135	9 934	15 959	19 061	23 698	19 163	15 356	18 991	18 530	14 239

Note: TCHI=tourism characteristic industries:1 – accommodation for visitors, 2 – food and beverage serving activities, 3 –6 passenger transport services, 7 – transport equipment rental, 8 – travel agencies and other reservation services activities, 9 – cultural activities, 10 – sports and recreational activities. TSI= tourism specific industries: 11a – retail trade of country-specific tourism characteristic goods, 11b – other country-specific tourism characteristic goods, 12a – insurance and other financial services, 12b – spa, health care, 12c – personal services.

From the Table 1 we can assume that industries with the lowest labor productivity are 1-accommodation for visitors, 2-food and beverage serving activities, 3-6-passenger transport services, 11a-retail trade of country specific tourism characteristic goods, 11b-other retail trade of products, 12b-spa and health treatment, 12c-personal service activities (table 1-coloured in blue).

In the following step, author evaluated the development of input values of labor productivity which are tourism employment and gross value added to make a conclusion about the nature of tourism industries within tourism sector and therefore author can propose solutions for recovery of further tourism sector development in case of increasing values of labor productivity.

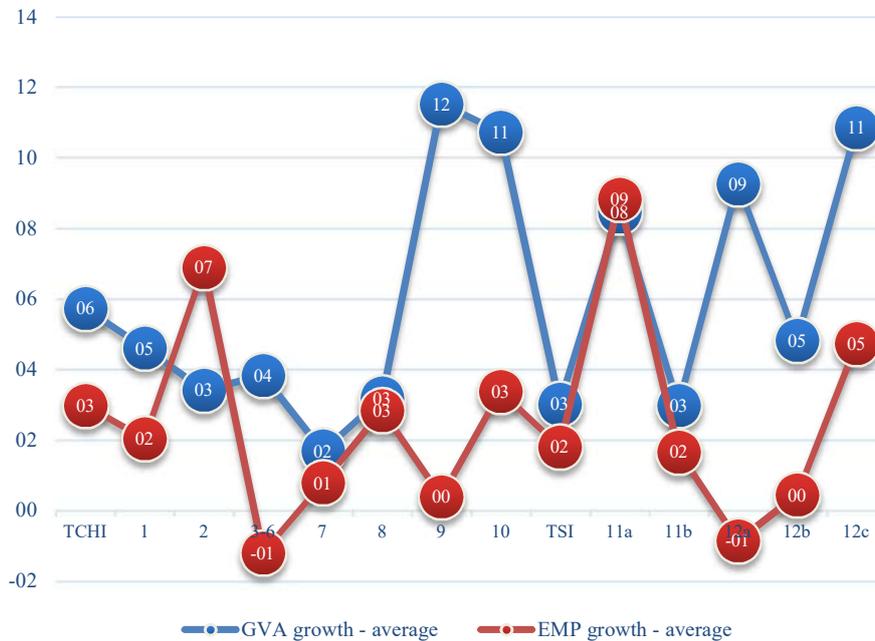


Fig. 4. GVA growth and tourism employment growth in tourism industries 1-12c. *Source: SOSR (2018), own processing*

Note: TCHI=tourism characteristic industries: 1 – accommodation for visitors, 2 – food and beverage serving activities, 3 –6 passenger transport services, 7 – transport equipment rental, 8 – travel agencies and other reservation services activities, 9 – cultural activities, 10 – sports and recreational activities. TSI=tourism specific industries: 11a – retail trade of country-specific tourism characteristic goods, 11b – other country-specific tourism characteristic goods, 12a – insurance and other financial services, 12b – spa, health care, 12c – personal services.

From the Figure 4 we can attain better picture of the situation when tourism employment accomplishes positive values, increasing, and GVA grows slower or even decreasing. The result is negative for a development of labor productivity, therefore, labor productivity growth rate is decreasing. The best example is demonstrated for the sector 2-food and beverage serving activities. Average growth of GVA is 3,4% and tourism employment grows faster, averagely by 6,9%. This disproportion causes yearly decrease of labor productivity of this industry. Moreover, we can observe the relative growth of 35% of GVA between years 2005-2016 and despite it, almost 100% growth in tourism employment which means that the tourism employment increased with greater growth rate than GVA, which is unpleasant for labor productivity variable. It may mean that a tourism industry sector related to food and beverage establishments needs to apply technological progress to make employment more effective. In 2016 an employee in the sector 2-food and beverage serving activities contributed to GVA by 9 002 EUR, annually in average in 2005-2016 by 10 566 EUR, what is twice less than

average of tourism sector and almost six times less than average labor productivity of the leading sector of the economy which is Industry (B-E).

Industries 1-accommodation for visitors and 3-6-passenger transport services and 11b-other retail trade of product indicate similar tendency. Labor productivity grows in observed time very slowly. Proportion between GVA and tourism employment growth is positive, however, the growth of tourism employment for industries 1- accommodation for visitors and 11b- other retail trade of product reaches positive values which are similar to values of GVA growth. This leads to very small annual changes within the labor productivity, and therefore, no development of labor productivity in this sector.

Spa and health treatment (12b) produces the lowest GVA of all tourism industries and employs yearly about 4500-5000 employees. There is not noticeable yearly change regarding to employment, however, the GVA growth in years 2005-2016 is represents by almost 60%. It can be also observed that the proportion between GVA growth and tourism employment growth is rather positive for the future progress.

Development of labor productivity in 12c – other personal service activities has increasing trend which is supported by positive proportion between GVA growth and tourism employment growth therefore we can assume that this industry will achieve positive development of labor productivity in following years.

The low productivity of tourism sector is mainly affected by industries 1 – accommodation for visitors, 2 – food and beverage serving activities and 3–6 passenger transport services. Based on results of this research it is recommended that these industries should increase GVA with an assumption that tourism employment will remain the same or decrease or make employment more effective. These industries are defined as human resources intensive and also those industries are the most important qualitative service industries which are core of satisfaction of customer's – tourist's primary needs. However, for future positive development of labor productivity there is desirable to apply technological progress within these industries to make an employment more effective.

However, greater challenge refers to tourism specific industries. Within the tourism specific industries one out of 5 tourism specific industries are characterized by negative development of labor productivity. A special example is industry 11a-retail trade of country-specific tourism characteristic goods, which disclosed the highest decrease of labor productivity within the monitored years.

4 Conclusions and policy implications

Regarding to the aim of the paper, an evaluation of tourism sector within the Slovak economy based on numerical definition and graphical comparison of the labor productivity in sectors of the Slovak economy was provided. Based on rather negative tendencies of tourism sector within the Slovak economy it was provided an internal comparison of labor productivity within the tourism industries. There were indicated the most problematic industries within tourism sector which influence the development of labor productivity in tourism.

Tourism sector is affected by development tendencies within all sectors in the Slovak economy, due to the fact that tourism sector is determined by a cross sectoral nature, therefore, there are noticeable significant variances within the tourism industries. All those industries are related to tendencies and regulation of ministries within the sector under which they are primarily regulated. Therefore, there is a great challenge for tourism sector to optimize its development. However, tourism sector will be examined in following years by expected increase of arrivals and therefore there is a potential for a labor productivity growth. This scenario it is possible to achieve if tourism employment remains at the same volume and gross value added grows which may be supported by technological progress in tourism industries.

For the future reaseach it is recommended to focus on primary reasons of a decrease of gross value added within an increased employment.

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ECONOMIC IMPACT OF HEALTH RESORT ENTERPRISES FOR THE HOST CITY: CASE STUDY FROM UKRAINE

Tetyana Nestorenko¹ and Olena Tokarenko² and Yuliia Ursakii³
and Viktoriia Budnyk⁴

¹ Berdyansk State Pedagogical University 4 Shmidt Street Berdyansk 71112 Ukraine

² Berdyansk State Pedagogical University 4 Shmidt Street Berdyansk 71112 Ukraine

³Chernivtsi Institute of Trade and Economics of Kyiv National University of Trade and Economics 32/82 Komarova Street Chernivtsi 58013 Ukraine

⁴State University of Infrastructure and Technologies 92 Kozatska Street Kyiv 03118 Ukraine

tetyana.nestorenko@gmail.com¹, lena1979-1@ukr.net²,
julja-ursakijj@ukr.net³, viktorija929292@gmail.com⁴

Abstract. The paper underlines the importance of economic impact analysis for the formation of institutional foundations of development of health-resort industry as well as for justify the strategic decisions on urban development.

Analysis of the results of a questionnaire survey of employees of two health resort establishments of Berdyansk confirms the hypothesis of the authors that the the induced economic impact of health resort's establishments on the economy of the host is on average more than direct – as a taxation level in the local budget.

Keywords: economic impact, health resort enterprise, local budget.

1 Introduction

Ukraine, as a state located in the center of Europe, with rich natural resources and original historical and cultural heritage, has all the prerequisites for sustainable economic development at the expense of tourism revenues. The tourism industry is only 1.5% of the country's GDP, while the global figure is 10%. The use of potential tourist opportunities in Ukraine is hampered by the effect of significant negative factors. At the same time, for some regions, cities and towns this is the leading factor in ensuring the realization of the socio-economic interests of the state and the citizens.

In Ukraine, the number of health resort enterprises decreased from 3,841 units in 1990 to 1641 units in 2017, which is more than double. In the last four years (2014-2017) analyzed, the volume of income of the enterprises of the health-improving complex has increased by 27.7%, while the number of accommodated persons has decreased by 5.2%; the number of employees decreased significantly – by 17.8% (table 1).

Table 1. The main indicators of functioning the enterprises of the health- resort complex of Ukraine for 2014-2017

Year/Indicator	Incomes of tourist services, euros	Average number of full-time employees, persons	Number of accommodated persons
2014	113 359 843	51 774	1 609 719
2015	105 283 243	45 070	1 482 668
2016	121 153 793	42 631	1 507 684
2017	144 808 907	42 578	1 526 013
Growth rate 2017 to 2014, %	27,7	-17,8	-5,2

Source: Authors calculations based on data extracted from Statistical Yearbook "Collective accommodation facilities in Ukraine in 2017"

Berdiansk is a city of regional significance. It is situated in the south of the Zaporizhzhia region, on the northern coast of the Azov Sea, in the centre of the Berdyansk region. Berdyansk is the sea, climatic and mud resort. The city was founded in 1827 at the place of fishing settlement, and later developed on the basis of a seaport in the Gulf of Berdyansk spit. The population of the city is 114 thousand people (as of 01.01.2018), the area is 82 km², the population density is 1,400 people / km². The distance to the regional centre is 200 km.

On January 11, 2005, the Verkhovna Rada of Ukraine adopted the Law of Ukraine "On the declaration of natural areas of the city of Berdyansk Zaporizhzhia region a resort of state importance."

The main therapeutic factors are mud and rump of estuaries, thalassotherapy.

The sanatorium and resort area of the city of Berdyansk was formed due to the use of therapeutic properties of the mud of lakes Great, Red and Small. The main natural recreational resources of the sanatorium and resort treatment are the following: various types of mineral waters, mud lakes, underground springs, estuaries and river beaches; the shallow warm Azov Sea and the sandy beaches of the Berdyansk Spit, the length of which is 23 km. The Spit is part of the Priazovsky National Park. Moderate-maritime climate, a large number of non-cloudy days create favourable conditions for treatment and rehabilitation.

During the holiday season of 2018 85 spas and health resorts, children's health and recreation establishments, including 6 sanatoria and 10 children's health and recreation facilities functioned in Berdyansk.

The services of spa and health resorts establishments are able to satisfy the needs of the population of Ukraine. Berdyansk Mud Hospitals are considered one of the best in the country. In sanatorium and spa establishments more than 200 modern methods of treatment are used.

Annually the city is visited by about 1.5 million tourists.

All of the listed above resources of the city, together with its unique historical and cultural heritage, create prerequisites for the successful functioning of the Berdyansk spa and health resort area and, accordingly, for increase in the city's budget revenues from enterprises in this sector. But this is hampered by a number of problems hampering the development of the urban health and tourism sector. In particular, it is an out-dated material and technical base of leisure and treatment, and a lack of quality and

interesting tourist products. The tourist resources of the city are used mainly during summer in a very limited time period.

In 2016, Ukrainians learned about the holiday in Berdyansk thanks to the national project "7 Wonders of Ukraine", and after the voting Berdyansk was recognized as one of the seven most attractive cities in the country.

According to the vision of Berdyansk up to 2027, which is proclaimed in its Strategy up to 2025, the first priority of its development is "resort with a high level of health (spa) services and family holidays".

With a view to these facts we suppose studying the economic impact of health resort for the host city is very actual.

The objective of this study is to give a credible assessment and measurement of the contribution of spas to the Berdyansk Municipal area.

2 Discusson of the problem

The share of tourist tax in the total revenues to the local budget of Berdyansk indicates the activity of health-resorts, spas, recreation facilities, other accommodation facilities that are the resort infrastructure of the city. In 2018 this indicator was 0,11% and increased compared to 2015 due to the revitalization of the tourist activity of the city.

Table 9. The dynamics of the ratio of tourist tax to total revenues to the budget of Berdyansk

Year	Tourist tax, euros	Total revenues to the local budget, euros	The share of tourist tax in the total revenues to the local budget, %
2015	15132,7	20 863 945,9	0,07
2016	22351,0	11 556 887,9	0,19
2017	32290,2	39 888 560,8	0,08
2018	42506,3	39 968 496,6	0,11

Source: Own calculation based on data on the implementation of the local budget of Berdyansk for 2015-2018 years.

The information on the general structure of revenues to the local budget by 2018 is shown in table 3.

Table 3. Structure of revenues of the local budget of Berdyansk for 2018

Incomes	%
Tax and collection on personal income	51,5
Income tax on communal enterprises	1,1
Excise tax on sales of excisable goods by business entities and excise tax (fuel)	9,8
Local taxes and fees	33,1
Part of the net profit (income) of communal unitary enterprises and their unions withdrawn to the budget	0,3
Fee for placing temporarily free budget funds	0,7

Income from rent for the use of integral property complexes and other property that is in municipal ownership	1,7
Fee for providing administrative services	1,2
State Duty	0,04
Other revenues	0,5

Source: Бердянська міська рада, 2019. Інформація про виконання міського бюджету за 2018 рік. [online] Available at the URL: <<https://bmr.gov.ua/index.php?id=119>>. [accessed 03.05.2019].

In 2018, the total number of employees involved in the sanatorium and resort sector is about 1000 people and has reached the highest level in the last 4 years. Although in comparison with 2013, it decreased by almost 1.5 times.

So-called economy-wide impact (or total economic impact) of an organization includes the direct, indirect and induced impacts, which are triggered by the initial spending of the organization.

In order to quantify the economic impact of spas on the local economy of a host city, an Economic Impact analysis was done.

Determining the economic impact of the firm is an important issue of the theory of organization, economic policy of the state, social responsibility of business.

It is possible to analyze direct economic impact, but this constitutes only a small portion of its total contribution, and, therefore, the study also captures the so-called indirect and induced impact. These stem from the related upward and downstream activities (including producers, suppliers, distributors, retailers and other services providers), which generate additional income, tax revenue and employment. These, in turn, induce further economic benefits throughout the economy. In the case of health resort enterprises of Berdyansk, it is important to capture the spending by staff which (at least partially) takes place in the local economy. This spending stimulates indirect and induced effects through the local economy.

Overall, the economic impact analysis (EIA) allows to measure the full economy-wide impact in terms of value added (i.e. gross domestic product, GDP), intermediate output (i.e. production), employment and remuneration. Importantly, as requested, the focus of the research is on the impact of health resort enterprises on the local economy. The analysis is thus restricted in the sense that it does not measure the economic benefits created outside of the region.

In our study we proposed questionnaire which contained 12 questions. It consisted of three parts. Questions of the first part were devoted to identifying the local profile of employees. Questions in the second part were focused on definition of incomes and expenditures profile of employees. Answers questions in the third part allowed to form the demographic profile of employees.

For staff, surveys were employed to determine the total expenditure and to estimate the proportion of the expenditure occurring within Berdyansk for both local residents as well as staff residing outside of the region.

3 Results and Discussion

The survey was conducted in April 2019 at Spa “Berdyansk” and specialized health-resort for children “Berdyanskiy”. The total number of distributed questionnaires is 120; returned - 100 questionnaires; correctly completed – 96 questionnaires. 4% of the collected questionnaires, were not taken into assessment of economic contribution due to incomplete answers.

The level of commitment to investigated health resort enterprises is 64%. This part of responders answered that if the Spa “Berdyansk” and specialized health-resort for children “Berdyanskiy” had not existed, they would have worked in another Ukrainian city (30%), or they would have gone to work to another country (25%) or they would not have worked at all of would have had retired (9%). Therefore, to study the impact of health resort for the economy host city, we will take into account the answers of only these 64% of health resort’s employees.

From a total amount of respondents 67% are female and 33% male. The largest part of respondents - 29% have age 30 or less years, 23% - 51-60 years. Marital status – 38% - single and 62% - married. All respondents work in a spa at the main place of work and full-time. 34% of respondents are managers of the higher and middle level; 22% - employees of the economic service and 44% - middle and junior medical staff.

In a table 4 it is shown the structure of expenditures in both enterprises. We calculated an average structure of expenditures per month in both spas (%). The most significant expenditures were identified: food (12.48%), utilities (12.35%), expenses for children (11.04%) and travelling (both to Ukraine and abroad) (27.22%) / The lowest levels of expenditures turned out to be the following: mobile communication services (0.55%), payment of debts (2.15%), health insurance, treatment and medicine (3,85%), saving (4.15%).

Table 10. Structure of Local Expenditures of employees of Spa “Berdyansk” and specialized health-resort for children “Berdyanskiy”

#	Expenditure	Spa “Berdyansk”	Specialized health-resort for children “Berdyanskiy”	Average structure of expenditures in both enterprises, %
1	Housing (rents)	35,8	34,0	6,09
2	Food	71,4	71,7	12,48
3	Clothing and shoes	49,7	46,9	8,42
4	Utilities	69,2	72,4	12,35
5	Transportation	19,9	16,3	3,16
6	Books and stationery	17,6	10,4	2,44
7	Traveling to Ukraine	81,6	81,0	14,18
8	Traveling abroad	34,0	115,6	13,04
9	Entertainment and sports	36,8	33,3	6,11
10	Expenses for children	58,6	68,0	11,04
11	Mobile communication services	3,0	3,3	0,55
12	Payment of debts	14,5	10,2	2,15
13	Health insurance, treatment and medicine	17,2	26,9	3,85
14	Saving	23,8	-	4,15

15	Other expenditures	-	-	-
16	Total average expenditures	267,1	256,8	-

Source: Own calculation based on questionnaires of Spa "Berdyansk" and specialized health-resort for children "Berdyanskiy" employees

According to the results of the conducted questionnaire 40% of the respondents spend up to 80% of their revenues on goods and services of the Berdyansk firms. So, we calculated, that average direct impact of employees of the investigated enterprises is 106.8 euros for Spa "Berdyansk" and 102.7 euros – for specialized health-resort for children "Berdyanskiy".

The total direct economic impact of health resort for the city of Berdyansk depends on number of employees and duration of high and low season. On the condition that structure of expenditures of employees is the same we get the following results. Direct economic impact of two enterprises employees is 209.5 euros per month or 421529.4 euros per year (considering seasonality). The distribution of the results obtained for all employed workers in the spa area of Berdyansk allows us to determine the approximate value of the economic contribution which will be 1258300 euros per year. This is 3.12% to the revenues of local budget of 2018 and it is 29 times more than tourist tax.

4 Conclusions

Data on the dynamics of the tourist tax show the revival of the tourist sphere of Berdyansk and the growth of its role in the formation of the local budget. The economic impact of the resort sector is estimated by such an indicator as the expenditures of workers of health resort enterprises as well. Calculated data allows to identify it as significant for the city's economy. Solution of problems of the development of the resort's sphere of the city, the realization of strategic goals and initiatives will contribute to the growth of this effect.

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MEASURING OF BANKING COMPETITION IN SELECTED EUROPEAN COUNTRIES

Adriana Novotná

Technical University of Košice
Faculty of Economics, Department of Banking and Investment
Němcovej 32
Košice, 040 01
Slovakia
adriana.novotna@tuke.sk

Abstract. Financial globalisation, digitalisation and the pressure of modern life affect the banking industry and force banks to cope with the fierce competition. The primary purpose of this paper is to investigate competition of banking sector in selected European countries through the Lerner index, the Herfindahl-Hirschman index and the concentration ratio. The data used in the analysis of this paper has been obtained from the global financial and macroeconomic data platform, Datastream, and consolidated banking data computed by European Central Bank, covering the period from 2010 to 2018. Based on results reached, we can observe that banking competition environment is relatively stable with a moderately concentrated market level

Keywords: competition, European banking sector, the Lerner index.

JEL classification: G 21, B 40.

1 Introduction

Financial globalisation determines modern trends in global linkages, and it is also crucial for the development of the global financial system. Effects of financial globalisation have become increasingly relevant, especially for the banking industry. Banks have to accumulate their resources of individuals and corporate entities through attractive products and services. It determines the fact that economic welfare, defined as the sum of consumer and producer welfare, depends on the soundness of the banking system. The implementation of Euro currency had an impact on bank competition in the European Union. Supply of cross-border services has increased and also allowed the entry for new competitors. Competition forces subjects on the market to prosper through innovations and quality of financial services over more inefficient subjects. Hempell (2002) states several reasons why is competition in the banking sector significant. For example, he argues that competition for the consumer of banking services leads to expansion of services and exclusion from the market low-quality products, meaning

that having a higher level of competition institutions do their best in order to provide their clients with the best quality services. The importance of measuring banking competition can also help to understand social welfare through several indicators.

The main objective of this study is to estimate the banking competition in the selected European countries with established insights from studies of banking competition. We compute the Lerner index as the main proxy for bank competition, and in addition to more accurate measures, we also consider concentration variable Herfindahl-Hirschman index (HHI) and the concentration ratio with the market share of the five largest banks in the industry (CR5). Firstly, we tried to consider Boone indicator from the World Bank database, consolidated data were however only available for a short period of time (until 2014). The structure of the paper is as follows. Section 2 reviews the literature. Section 3 describes the methodology. Sector 4 develops the results and describes data. Sector 5 concludes.

2 Literature review

In 1990, Keeley (1990) published a paper in which he describes how increased competition in the 1980s led to an increase in bank failure in the United States. He argues that various anticompetitive restrictions lead to a reduction in market power and reduced profits and franchise values of banks. Many other studies (Martinez-Miera & Repullo, 2010; Anginer, Demircuc-Kunt, & Zhu, 2014; etc.) have revealed that competition can either increase or decrease riskiness of banks depending on the current level of competition in the market. It is therefore important to focus on the degree of bank competition.

According to the several indicators found in literature and with respect to competition measuring literature mentioned below, is it possible to classify them into two major categories: traditional structural approach and non-structural approach. Former describes the level of competition in the banking sector and the structure of the banking market. This approach uses concentration indices under the structure conduct performance (SCP), originally advocated by Mason (1939) and Bain (1951) or efficient structure hypothesis presented by Peltzman (1977). The SCP paradigm negates that greater concentration causes less competitive bank conduct. It leads to greater market power and profitability of the bank, increased loan rates and decreased deposit rates, which decreases consumer welfare (Berger, Demircuc-Kunt, Levine, & Haubrich, 2004; Levy-Yeyati & Micco, 2004; etc.). The competition can be approximated by concentration ratios, for example, n -bank concentration ratio, and Herfindahl-Hirschman Index, since that market structure is related to competitive conduct. Latter, non-structural approach, suggest an alternative approach to competitive behaviour. The framework of this approach was developed by Baumol (1982) the Contestable Markets Theory. The models of this approach do not assess the competitive conduct of banks through the analysis of market structure, but rather recognise that banks behave differently depending on the market structure in which they operate (Chun & Kim, 2004). The non-structural approach analyses the degree of competition directly by observing behavior of banks in the market. It is represented by Bresnahan's market power, the Lerner index and the H-statistics provided by Panzar and Rosse.

Several authors have made efforts to examine the concept through various models using one or more indicators in their studies. Carbó Valverde, López Del Paso, & Rodríguez Fernández (2007) show the existence of important discrepancies when comparing the Herfindahl index and three indicators of competition, H-statistic, Boone indicator, Lerner index, in the banking sectors of the European Union in the period from 1995 to 2005. Řepková (2012) applies the Lerner index, the HHI and the concentration ratio to estimate the market power of banks in the Czech Republic. Weill (2013) measured the evolution of bank competition in all European countries during the 2000s with the Lerner index and the H-statistic. In the recent study by Kočíšová (2019) has been competition proxied by the Lerner index and market share to analyse the relationship between market power and stability in the banking area.

To examine the competition, we decide to use both a structural and non-structural measure of bank-level competition. The structural approach is measured by the HHI index and the concentration ratio methods. To measure the non-structural approach, we follow the Lerner index.

3 Methodology

Following the literature review, we measure the Lerner index for European banking sector during the period 2010-2018. We also examine Herfindahl-Hirschman index (HHI) and the concentration ratio values measured by the European Central Bank (ECB) to compare results as a robustness part of the study. In addition, it brings more accurate measures and discussion of banking competition.

3.1 Lerner index

Market power in the banking sector is measured in several studies mentioned above by the Lerner index. Formally, the ratio is defined as the difference between prices (P) and marginal costs (MC) divided by prices, for banks (i) in the year (t). Reached values are ranged from the lowest, 0, to the highest, 1. There is an absence of market power when the Lerner index is zero or negative. Higher value implying less competition and greater market power. In other words, the index decreases as the degree of competitiveness increases (Beck, 2008). The Lerner index is computed by Lerner (1934) as:

$$Lerner_{it} = \frac{P_{it} - MC_{it}}{P_{it}} \quad (1)$$

We follow Carbó, Humphrey, Maudos, & Molyneux (2009) and Weill (2013), etc., where P is the average price of bank production, proxied by total asset, as the ratio of total revenues to total assets. Value of total revenue is calculated as the sum of interest income, non-interest income and operating income. MC is estimated on the basis of production technology with three inputs and one aggregate output proxy, used in many previous studies (Berger et al., 2009; Řepková, 2012; Kočíšová, 2019). The translog function is estimated on the whole data of commercial banks (r , where $r=1, \dots, N \times T$)

during the whole analysed period using a panel regression model. The formula for trans-log cost function is expressed in the studies by Berger (2009) and Kočišová (2019):

$$\ln TC_r = \beta_0 + \beta_1 \ln TA_r + \frac{1}{2} \beta_2 (\ln TA_r)^2 + \sum_{i=1}^3 \gamma_k \ln W_{k,r} + \sum_{i=1}^3 \phi_k \ln TA_r \ln W_{k,r} + \sum_{k=1}^3 \sum_{j=1}^3 \rho_{k,j} \ln W_{k,r} \ln W_{j,r} + \varepsilon_r \quad (2)$$

Where TC_r denotes total costs, r is equal to the sum of interest expenses, personal expenses, and other operating expenses, TA_r is for total assets, r represents a proxy for the bank output, $W_{1,r}$, $W_{2,r}$ and $W_{3,r}$ represent prices of three inputs. $W_{1,r}$ is the price of borrowed funds (interest expenses to total assets), $W_{2,r}$ is the price of labour (personnel expenses to total assets), $W_{3,r}$ is the ratio of operating expenses to total assets. Marginal cost is calculated as:

$$MC_{i,t} = \frac{TC_{i,t}}{TA_{i,t}} \left[\beta_1 \ln TA_r + \frac{1}{2} \beta_2 \ln TA_{i,t} + \sum_{i=1}^3 \phi_k \ln W_{k,i,t} \right] \quad (3)$$

The Lerner index is then calculated as an averaged value of observed banks for each year and country. It is the only measure of competition in this study that is calculated at the bank level.

3.2 Concentration ratio

The n-bank concentration ratio measures the percentage of the market share of the specific number of leading banks in the banking sector. The concentration ratio is ranged from 0% to 100%, and a higher value indicated a stronger market share of the largest banks with higher concentration and lower competition between banks. If the indicator is close to 0, it indicates an infinite number of small banks with the same size in the banking sector. The ratio is formulated as:

$$CR_n = \sum_{i=1}^n s_i \quad (4)$$

Where CR_n is to the n leading banks and neglect small banks in the market. In our study, we use the five largest banks for concentration ratio, CR5, calculated as consolidated total assets of these banks to total assets of all the banks in the country.

3.3 Herfindahl-Hirschman index

The Herfindahl-Hirschman index is a statistical measure of the concentration of banking activities. It gives the sum of the squares of each institution's market share and measures all sizes of banks, including small banks, in the banking system. The index ranges from $1/n$ to 1. Bikker & Haaf (2002) argue that the lowest value is reached when the market is comprised of n equally-sized banks. The index is calculated:

$$HHI = \sum_{i=1}^n s_i^2 \quad (5)$$

The value of HHI can be measured in the range below 0.1, it shows a very low concentration. The HHI in the range from 0.1 to 0.18 shows a moderate concentration. The values above 0.18 show a very high concentration of the banking system. The HHI value equal to 1 defines monopoly.

4 . Data and empirical results

The study analyses European banking data and the final sample consists of a panel dataset for banks which are placed in countries of European Union. However, not all of them have their headquarters only in member countries. Covering the period from 2010 to 2018, the analysed sample consists of 1133 available observations in 23 European Union countries (except for Croatia, Latvia, Luxembourg, Romania, Slovenia). After additional cleaning of the data, Hungary, Lithuania and Portugal were represented with only a one banking subject over the reference period. We decided to eliminate these countries from the calculation.

The source of the data is Datastream database published by Thomson Reuters. These data were provided by Schumpeter School of Business and Economics at University in Wuppertal. Another source of the data is the Statistical Data Warehouse database computed by the European Central Bank. These data contain information on the aggregate consolidated concentration and HHI ratios of European Union banking sector. The ECB calculates the HHI and the CR5 for the European Union member countries regularly. We decided to analyse the level of competitiveness from the total assets point of view, as the data on HHI and CR on the level of credit and deposit are not available for all analysed countries. Data analysis was performed in MS Excel software.

Firstly, we estimate Eq. (2) and Eq. (3) and then calculate the Lerner index as in Eq. (1). As we have mentioned, the Lerner index determines market power in a specific sector and its higher value means lower competition. In a financial crisis, it is desirable to avoid the consolidation of anti-competitive market structures. The European Commission fostered the development of competitive markets also after the crisis. The period after the crisis from 2010 to 2012 reported a significantly decrease in value. Since 2012 there has been an increasing trend in the evolution of the Lerner index. The value has grown until reaching a maximum value in 2018. The value of the peak is 0.8725. We show the evolution of the Lerner index in Figure 1.

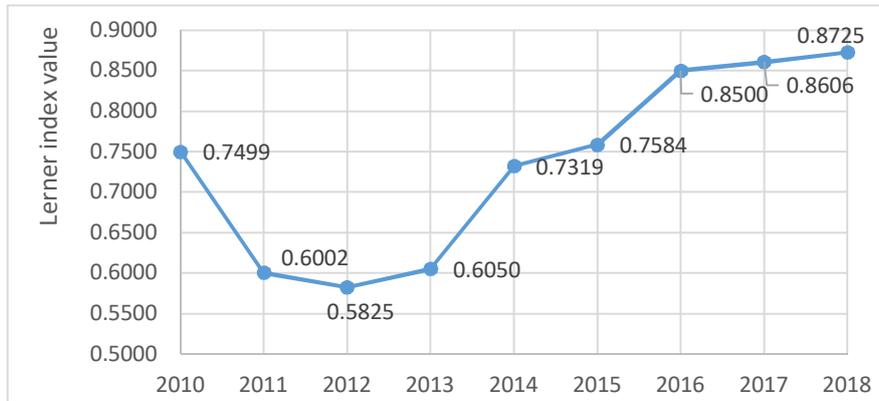


Fig. 1. Evolution of the Lerner index. *Source: Author's calculations*

Figure 1 presents the evolution of the Lerner index in 20 countries of the European Union. During the period 2010-2012, the average value of the Lerner index decreased, signalling a slight increase in competition. There is a gradual growth since 2012, and the trend indicates the increasing position of the largest bank subject in the market. The first three countries with the largest representation of observations are France, Italy and the United Kingdom. Two of the three largest representatives have their values close to 1, France (0.8866) and the UK (0.8705). France has historically been the most restrictive through nationalisation. Ireland is the least concentrated country in the analysed period with the highest level of competition with the value of 0.0989.

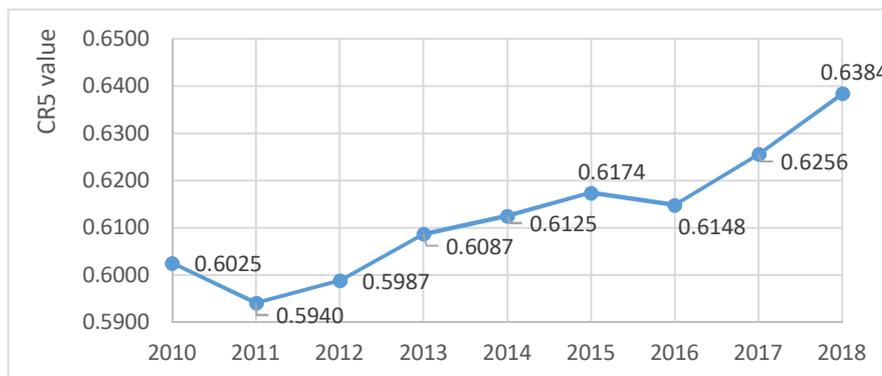


Fig. 2. Evolution of the CR5. *Source: Author's calculations*

Figure 2 reports the concentration ratio of the five largest banks placed in 20 European Union countries. CR5 defines the ratio of the total assets of the five largest banks to the total assets of all the banks in a given year. A higher value of the CR5 means increase of concentration.

During the reference period, we observe an increasing concentration of the five largest banks on the market. Those banks have strengthened their position. The increase in

the concentration in the banking system after 2012 was mainly the result of the exit of troubled banks from the system after the financial crisis. The value of the CR5 slight decreases in 2012 and 2016. The highest value of the CR5 is measured in 2018. The most concentrated country is Estonia (0.8999) and least concentrated is Austria (0.3635) in the analysed period.



Fig. 3 Evolution of the HHI *Source: Author's calculations*

In Figure 3, the evolution of the HHI based on total assets between 2010 and 2018 is presented. The HHI value less than 0.1 denotes a not concentrated market, from 0.1 to 0.18 a moderately concentrated market, and above 0.18 a highly concentrated market.

There was a decrease in values in 2012. The HHI has been relatively stable until 2015, but in 2016 there was a slight decrease. Then it started to increase again. It indicates a declining level of competitive environment; the largest banks have strengthened their market position. The values are in the whole period at a moderate concentration in the range from 0.1 to 0.18. The most concentrated country of the set of examined countries is Finland (0.3081), and the least concentrated is Austria (0.0282).

5 Conclusions

The study has investigated the different methodological approaches that have been taken to measure competition in banking. The critical variable is the measure of bank competition proxied by the Lerner index, but we also include traditional measures, the concentration ratio CR5 and the HHI to ensure robustness.

Since the European Commission monitors and investigates anti-competition to ensure business practices, it is positively associated with the competition level for European Union countries. Overall, these results indicate that the competition level in the European Union is relatively stable, even some values are quite high. It is recommended to pay close attention to that banking sector, which has its subjects concentrated over average values. To further research, we recommend to apply the Panzar and Rosse method.

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SWISS FRANC LENDING IN CENTRAL, EASTERN AND SOUTH EASTERN EUROPE¹

Lucia Orszaghova

University of Economics in Bratislava
Faculty of National Economy
Department of Economic Policy
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
e-mail: luckaorsza@gmail.com

Abstract. Swiss Franc household loans have been commonly used in many European countries in the pre-crisis period, exposing a large number of borrowers to foreign exchange risk. The objective of this article is to give an overview of the prevalence of CHF lending in the CESEE region, discuss main demand and supply drivers of CHF lending expansion, describe the materialisation of the foreign exchange risk in the post-crisis period as well as to explain some of measures taken by authorities in an attempt to address the associated systemic consequences.

Keywords: euroisation, Swiss Franc lending, currency mismatch, mortgages.

JEL classification: F34, F36, G15, G21

1 Root causes of lending in Swiss franc (CHF)

Lending in foreign currency to the private sector is not a new phenomenon. Given the proximity and trade relations, CHF-denominated or CHF-indexed loans (collectively referred to as "CHF loans") have always been present in the majority of European countries. They have accounted, however, for only a small fraction of total lending by banks. Moreover, they have been traditionally extended to the corporate sector, reflecting the presence of export-oriented companies as well as an overall degree of trade openness of the European economies.

There are nevertheless a number of European countries, where the CHF lending became extremely popular before the global financial crisis, with possible systemic consequences for financial stability. The issue was the most relevant in the Central, Eastern

¹ The article should not be reported as representing the views of University of Economics in Bratislava or any other institution the author has been associated with. The views expressed and mistakes made remain of the author.

and South-Eastern Europe (CESEE), in particular in Austria, Croatia, Hungary, Poland and Serbia. These lending practices were also very common in Iceland. The countries have in common that the CHF loans were heavily extended for mortgage purposes to households with limited hedging options. Moreover, the CHF lending constituted part of a wide phenomenon of excessive credit expansion and the real-estate bubble during the Great Moderation in the 2000s.

A variety of factors have been put forward in literature to explain the phenomenon of CHF household loans, both at the demand and the supply side.² One of the main reasons for their attractiveness appears to be the persistence of wide interest rate differential. The interest rate of CHF loans were far below of those in the local currencies during the most period, including the EUR. The CHF loans have become particularly attractive in the segment of long-term loans, such as mortgage loans, where the effect of interest rate differential on initial monthly repayment was larger. As a result, the CHF loans were considered as a cheaper alternative to loans denominated in domestic currencies. Furthermore, the lower CHF borrowing costs allowed also less viable (or lower-income) borrowers getting an access to a loan (or wealthier borrowers to tap a loan of a larger volume).

While the interest rate differential was the key driver, it was accompanied with numerous facilitating factors, such as high competition pressures in the housing loan markets. Furthermore, arguments related to the transition, economic convergence and EU integration processes of the CESEE countries (with the exception of Austria) were also put forward, such as the growing presence of foreign banks and related easy access to international (wholesale) funding as well as large capital inflows due to strong economic growth and convergence, coupled with undermined trust in the local currencies due to a history of high inflation during the transition process, including hyperinflation in some countries.³

In addition, the borrowers failed to understand the embedded foreign exchange risk. The exchange rate of the CHF vis-a-vis the EUR was relatively stable in the pre-crisis period, which contributed to the perception that it was quasi-fixed. In non-Euro Area (EA) countries, the expectations of further nominal appreciation of the domestic currency (in particular for countries with floating exchange rate regimes) as well as the expectations of a future adoption of the euro (in particular for tightly pegged exchange rates or for currency board arrangements) indirectly fueled the rapid expansion of the CHF lending.

It has to be noted that the CHF lending was not an exception and that EUR lending - or financial euroisation in more generally, has been a widespread phenomenon in the CESEE region in 2000s (with the exception of Austria). The major reference currency in the region has been (and continues to be) the EUR, on the back of economic and financial linkages with the euro area (EA) countries and the prospects of further political integration, including prospects of introducing the EUR as a legal tender. The drivers seem to be common for lending in the two currencies, however the importance and the overall volumes of the two currencies differ substantially across the CESEE region.

² See e.g. Yesin 2013 or Beer et al 2009.

³ see e.g. Orszaghova 2015

2 How big has been the CHF-problem?

Geographically, the specific case of extensive CHF lending to households in the run-up to the crisis could be associated with a limited number of European countries only. In absolute terms, the largest amount of CHF loans to non-financial sector originated in Austria (AT) and Germany, followed by Hungary (HU) and Poland (PL).⁴ While the share of CHF lending to non-financial sector in total lending to this sector in Germany was negligible (around 1% in 2007), given the size of the country, their share in other three countries was of systemic relevance (31% in HU, 17% in PL and 13% in AT in 2007).⁵ In relative terms, with respect to total lending to non-financial sector, the share of CHF loans in Iceland and Croatia (HR) as well as Serbia (RS) and Luxembourg were also nonnegligible (23% and 16% for the former two and 8% for the latter two in 2007). Moreover, there were three countries, namely AT, PL and HU, where the majority of foreign currency loans were extended in CHF (69% for AT and PL and 56% for HU in 2007), followed by Iceland (with 48% in 2007).

The distinctive feature of CHF-denominated loans in the pre-crisis period is that they were granted extensively to households (e.g. more than 70% of CHF domestic lending stocks in AT, RS, HU or HR in the period 2009-2014 was designated to households, as opposed to non-financial companies).⁶ This feature is in contrast to domestic lending in the EUR, where the non-financial companies take the lead, reflecting the high share of trade and investment credits for exporting and importing firms. The bulk of CHF-credit was offered to domestic households for housing purposes (mortgages), however mortgage-backed consumer loans were also popular.⁷ Moreover, CHF residential mortgage loans were typically extended in local currency, but indexed to CHF exchange rate, and subject to the CHF interest rate.⁸ In Germany and Luxembourg, on contrary, a substantial share of CHF-lending was extended to non-resident enterprises.

The practice of CHF loans to households started already in 1980s in Austria. It was first limited to Vorarlberg, a federal state bordering Switzerland where many Austrians commute to work in Switzerland. Since late 1990s, the phenomenon started to spread eastwards within the country and the CHF was increasingly used as the currency of denomination for private sector lending in Austria.⁹ While the share of foreign currency lending made up only 1% of total loans to households at the beginning of 1995, it had risen to more than 31% by mid-2006.¹⁰ As of 2004, Swiss franc loans have accounted for a lion's share (85%) of all foreign currency loans to Austrian nonbanks (and for over 90% in the case of households).

While EUR loans were already common in the CESEE region, the phenomenon of CHF household loans reached also these countries in the course of 2000s. The most

⁴ CHF 84, 60, 33 and 31 billion respectively (Brown et al 2009).

⁵ Calculations based on Brown et al 2009.

⁶ Krogstrup and Tille 2016.

⁷ For example in Romania, consumer loans represented almost 60% of all CHF-denominated loans to households, while mortgage loans stood at around 35% in 2014 (see NBR 2015).

⁸ Krogstrup and Tille 2016

⁹ Beer et al 2009.

¹⁰ Auer et al 2012.

prominent cases were Hungary and Poland in central Europe, however it was also present in Slovenia. Among the Western Balkan economies, the phenomenon was widespread in particular in Croatia, Serbia and Bosnia and Herzegovina. In Iceland, approximately 80% of foreign-currency loans made to households were denominated in the two currencies with the lowest interest rates, namely the CHF and Japanese yen and the currency mismatch fueled the housing boom.

3 CHF fluctuation during the crisis

Country's political and macroeconomical stability have made of the Swiss franc a currency to which international investors turn in times of crisis or geopolitical tensions. Its so-called safe heaven currency status dates back to the Cold War period. At the same time, the status combined with the small size of the local financial market poses a challenge for the Swiss economy, as the currency tends to move significantly against other currencies, despite the changes in economic fundamentals. More specifically, whenever a global crisis looms, investors flee to the perceived safety of the CHF and the currency tends to appreciate against currencies, which are considered as less safe alternatives.

Since the global financial crisis, currency fluctuations of the CHF have sent strong shock waves across the region. The CHF-loan holders suffered badly since 2008, when the value of the EUR and of other CESEE currencies relative to the CHF tumbled, on the back of investors' preference for seemingly secure currencies.¹¹ During the crisis, the CHF emerged as a safer alternative to other major currencies, including euro (EUR). The situation worsened further in 2010 with the onset of the euro area debt crisis, when the euro devalued against the CHF, taking the CESEE currencies down as well.

Some relief came on 6 September 2011, when the Swiss National Bank (SNB) introduced a cap against the euro (1.20 CHF per EUR) as a response to a massive overvaluation of the CHF. In the course of 2014, the floor had become increasingly difficult to keep, given the significant capital inflows into Switzerland and the quantitative easing initiated by the ECB. The next shock wave came in early-2015, following the sudden decision of the SNB of 15 January 2015 to discontinue the minimum exchange rate between CHF and EUR. The CHF almost instantly rocketed up against the CESEE currencies. Initially, currencies in affected countries depreciated by about 20% against the CHF, however they have regained some ground since then. As a result, the economic and financial stability impact of the removal of the cap was evaluated as small, according to the IMF (Lybek and Wiegand 2015).

With the EUR being considered as the reference currency of the CESEE region on the foreign exchange markets, the central banks have limited options for influencing the exchange rate with CHF. The exchange rate between the local currencies and CHF is set indirectly, as the result of the exchange rates of the local currency with euro and

¹¹ This also applies to Iceland, where the banking sector collapsed in 2008. As a result, the exchange rate of Icelandic króna against the CHF deteriorated during the last half of 2008, quickly making the CHF loans burdensome to hold.

EUR/CHF exchange rate. The developments in the EUR/CHF exchange rate depend on the foreign currency demand and supply for the euro area and Switzerland, with CESEE countries having no (or limited) influence on its quotation. While the exchange rate between EUR and local currencies has remained relatively stable, the depreciation of the local currency against the CHF was therefore to a large extent attributable to the appreciation of CHF versus the EUR (and other currencies) following the European sovereign debt crisis and upon the removal of the floor in 2015. The central banks had not possibility to intervene on the exchange rate with CHF, as the international arbitrage does not allow that only a single exchange rate is impacted, while keeping unchanged the exchange rates with other currencies. The local currency would thus have to appreciate against the EUR, with significant economic consequences, with strong erosion of external competitiveness and exports and risks of speculative attacks. Moreover, this would also lead to increase in domestic currency interest rates, making the local currency-denominated lending more expensive and increasing the costs for borrowers with outstanding loans denominated in the local currency. In other words, a low currency risk would come at the expense of higher interest rate risk. Moreover, such an intervention would lead to a change in the benchmark currency on the foreign exchange market, e.g. from EUR to CHF, contradicting thus the economic reality and the aspirations of many of the countries to euro adoption.

4 Policy responses

The number of CHF borrowers and the stock of CHF loans are both on the decline since new issuances of CHF household loans virtually stopped since 2008. The drop is also due to loan repayments, loan conversion into another currency or their sale. As such, the current problem of CHF loans could be seen as the legacy issue. Given their long-term nature, the outstanding volume in some countries, however, will continue to pose a challenge also in the coming years.

As the crisis has revealed, the CHF lending was associated with a variety of risks, including elevated credit and funding risks as well as impediments to monetary policy. Furthermore, it contributed to the fragility of banking systems through increased cross-border interconnectivity and the facilitation of credit and asset price booms. The significance of the risks and the consequences of their potential materialisation vary substantially across countries.

The problem of CHF-loans servicing could be seen as the legacy of the bad banking practice of FX-lending to unhedged borrowers before the financial crisis. This experience has led to a series of policy responses, both at the EU level and at the individual countries level. In September 2011, the European Systemic Risk Board (ESRB) issued Recommendation 2011/1 on lending in foreign currencies. It was based on three principles, namely enhancing borrowers' awareness of the risks inherent in foreign currency lending, improving banks' risk management and capital buffers and ensuring international cooperation with the aim of preventing regulatory arbitrage (envisaging reciprocity of supervisory measures with respect to residents of a specific country). Moreover,

Mortgage Credit Directive¹² was introduced in 2014, providing minimum harmonisation framework for mortgage lending in the EU. Its objective is to protect consumers by preventing irresponsible lending. It foresees, for example, an obligation to assess the creditworthiness of consumers with enhanced requirements if considering a foreign currency loan.

Given the different features of CHF household lending across Europe, individual countries have taken different measures (Box 1 provides some country-specific examples). The measures taken reflected the underlying situation and the severity of the problem, including the impact on the overall economic environment and financial stability. The majority of countries targeted the build-up of foreign loan portfolios by adjusting conditions on new loans¹³ targeting capital requirements or by tightening verifications of borrowers viability. Furthermore, with the materialisation of the risks, several countries banned (temporarily or permanently) CHF loans to households (in some cases, the ban was extended to any foreign currency).

Moreover, an increasing number of countries have proposed to covert CHF household loans into local currency loan or EUR-indexed loans. To various degrees, this was prompted by fears about the impact of private sector debt servicing difficulties on both the financial sector and the real economy. In line with the literature (Liu and Rosenberg 2013), this could be justified if the debt problem is systemic, leading to financial stability risks (e.g. due to sharp and widespread deterioration in banks' portfolio quality with no prospect of speedy resolution using the usual legal tools). Several conversion laws have had a retroactive effect, which was considered by the ECB as not in line with principles of Credit Mortgage Directive and undermining the principle of legal certainty. Moreover, the ECB has argued in favour of appropriate burden sharing, in order to avoid moral hazard.

¹² Directive 2014/17/EU of the European Parliament and of the Council of 4 February 2014 on credit agreements for consumers relating to residential immovable property, OJ L 60, 28.2.2014, p. 34–85.

¹³ For example, loan-to-value ratios or debt-to-income ratios were adapted.

Box 1: Regulatory measures used by individual countries

A series of measures were introduced in **Hungary** between 2010 and 2014, nearly eliminating any foreign currency household loans in the country. First, the provision of foreign exchange loans with mortgage collateral was temporarily banned. The authorities also introduced the possibility to service fx-denominated mortgages at a preferential exchange rate and the option of early pay-back of the loans under favorable terms, with loss fully borne by the banks (later partially assumed by the Hungarian state). In 2014, banks were required to reimburse borrowers for fees and surcharges. Later that year, the Hungarian Parliament adopted a law that obliged all banks to convert foreign-currency mortgage loans into forint loans.

In **Croatia**, the Croatian parliament enacted a special law in July 2011. It provided for an extension of repayment period as well as it froze the exchange rate for the CHF household loans for a year below the then-current market rate, however it was still higher than the prevailing rates when most loans were taken. In 2015, following the SNB decision, a new law was introduced, ordering banks to convert loans denominated in the CHF into euros at their own expenses. The conversion mechanism placed borrowers of CHF loans in the same position that they would have been in had their loans, from inception, been denominated in euros.

In **Serbia**, the central bank (SNB) banned any household lending in foreign currency other than the euro already in June 2011, which contributed to the reduction of CHF exposures. Furthermore, it issued recommendations on CHF-indexed housing loans in May 2013, which has foreseen a temporary reduction of loan instalments. They have been recalculated at the exchange rate valid on the day of loan extension adjusted by maximum 8% due to currency appreciation. The deferred instalment payment was to mature 3 years after the original maturity. Furthermore, following the SNB decision in early-2015, the Serbian central bank issued a decision on measures for preserving financial stability in the context of FX-indexed loans. The second part of the decision concerned exclusively CHF-indexed loans, where banks were required to offer to their borrowers four different modalities to terms of loan repayments.¹⁴ Only a few borrowers restructured their loans in line with the central bank decision, however. Following the Supreme court decision in early 2019, which declared currency clauses in CHF as null and void, the Serbian Government adopted a law on forced conversion of CHF loans into EUR loans. Furthermore, the law also envisages a haircut (write-off) of one part of the debt (38%), which will be covered approximately 60% to 40% by the banks and the Serbian state.¹⁵

Also in **Iceland**, the solution of 2010 included limited write-downs of mortgages to 110 percent of collateral value (on a case-by-case basis), interest rebate and subsidy as

¹⁴ First two options included a conversion of CHF-indexed loan into an EUR-indexed loan (using a more favourable exchange rate or with lowering the interest rate), while the other two options envisaged keeping the housing loan indexed to the CHF, however with more favourable conditions (by lowering the interest rate or by lowering the monthly instalment).

¹⁵ Law of the National Assembly of the Republic of Serbia of 25 April 2019 on Conversion of Housing Loans indexed in Swiss francs- CHF, Official Gazette of RS No. 31/2019.

well as conversion of fx-indexed loans to local currency. The scheme was however voluntary, but strongly encouraged by the Icelandic government.

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APPLICATION OF CIRCULAR ECONOMY PRINCIPLES IN V4 COUNTRIES

Hana Palušková

University of Economics in Bratislava
Faculty of Commerce, Department of International Trade
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
hana.paluskova@euba.sk

Abstract. The creation of the current ecological footprint, especially of developed economies, population explosion and enormous pollution of the environment are evidently created by human activity, which must be solved by a well-designed concept based on the principles of sustainability. The current linear concept of market economies has brought with it a number of negative consequences that currently increase the costs of their elimination. The circular economy model can be considered as an important model in the fight against excessive consumption, the creation of enormous amounts of waste and environmental pollution. It is a broad concept based on the reuse of waste, resp. based on unused products. Since circular economics is a comprehensive concept and its implementation is possible at all levels of the value chain, the principles of its application to individual economies can be monitored on the basis of several indicators. Therefore, in this paper, we compare the V4 countries in the generation of municipal waste, in its recycling rate of municipal waste, in the creation of investment and jobs related to the circular economy sectors, as well as the number of patents related to the elements of circularity.

Keywords: circular economy, international trade, waste generation, recycling rate of municipal waste.

JEL classification: F64, Q5

1 Introduction

“Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist.”

(Kenneth Boulding)

The gradual abolition of protectionist restrictions in international trade led in the second half of the 20th century to rapid growth in goods flows and the emergence of multinational corporations. Thanks to closer business ties, rapid technical progress and the increasing dependence between market economies, companies could reduce their

costs more easily and effectively. With the increasing liberalization, these entities were able to offer their goods almost all over the world at a relatively low price in the eyes of customers (Baláž, et al., 2015).

These as well as many other aspects have led to the growing production of goods, their more sophisticated and cheaper distribution, and consequently to the growth of customer consumption. Consumer life has generally been simplified because of these easily accessible goods and its consumption effect has grown rapidly.

In recent years, however, the general public has become aware of the negative effect of massive consumption. “Anytime, anywhere” products and services are beneficial in terms of time and availability, but their marketing-psychological effect causes them to consume excessively. Although for the companies themselves, higher sales of products in the context of numbers is positive, but it is necessary to realize both on the side of the customer and as an enterprise - the impacts that can be caused by their behavior of the society.

One of these negative externalities is excessive waste generation, which without a properly designed treatment system can negatively affect the environment both on land and in the seas and oceans. This unfavorable aspect can consequently create a hostile environment for life for decades to a hundred years, while increasing the cost of its elimination.

Through globalization i.e. the international interdependence and interconnectedness of markets, using the right business models and technological innovations can change the social system by eliminating excessive pollution of the planet and thus contributing to more sustainable production and consumption. One of the economic forms that contributes to a more acceptable and positive form of market economy in terms of waste generation is the circular economics model.

1.1 Methodology

The aim of the scientific paper is to point out the effect and the significance of the circular economy and its linkages with international trade, as well as the importance of its implementation on international markets by selected indicator comparison of chosen countries.

The following scientific methods were used in the paper: by a literature retrieval we searched and collected relevant information concerning the given issue. By applying abstraction, we selected the most admissible ones. Then through synthesis we have processed a comprehensive view of the researched issue of importance of circular economy. By the method of analysis, deduction and induction has been elaborated parts of the paper, in which we deal more closely with the linkage of implementing the circular economy concept into international trade flows. In the logical continuity we further evaluate and compare the elements of circularity, especially the indicators of municipal waste generation in the EU (28) and V4 countries. The paper also used graphical methods for clarifying the basic context and development trends of evaluated indicators in historical context.

2 Circular Economy Model

Market economies are now characterized by a linear market model, which is generally based on raw material extraction in its primary phase. Subsequently, their processing and production from which the final products are intended for sale and further for the consumption of customers. The last phase in the linear model is the generation of waste from discontinued, worn or discarded products (Incien¹, 2017).

Since the Industrial Revolution, this economic model has contributed to the expansion of the world economy. Technical and technological progress has contributed to the extraction of raw materials in the most efficient way. However, the direct or indirect impacts on the environment of this model has been until recently ignored. As the population grows year after year, demand for goods and services will grow - and thus the current economic concept can be considered unsustainable (UNCTAD, 2018).

The circular economy closes this imaginary line and its principle is the so-called "closed loop" - when the generated waste represents only another form of raw material, which can be otherwise appreciated in the economy. The result of this model is to mitigate the negative impact of man on the environment, stable and sustainable economic and social growth, and last but not least to increase the competitiveness of those who apply this model (Incien, 2017).

It is the circular economy that can represent an acceptable economic model for the future, because it closely optimizes the company's activities towards customers, but also to the producers themselves. According to the OECD (2018), it is important to ensure mutual support for international trade and the circular economy which should result in the most efficient use of natural resources. However, the first step is to establish appropriate legislation at national and international level to provide changes in the durability, quality and recyclability of products, optimize production processes using best available techniques and also limit the use of hazardous substances to facilitate product recycling after consumption (Incien 2018).

According to the OECD (2018) the current policy frameworks seek to change to the transition of the circular economy, but so far only at domestic level (Figure 1 - National Boundary). However, these activities have a strong interaction with the international trade value chain (Figure 1 - Trade flows).

¹ Incien = Institute of Circular Economy

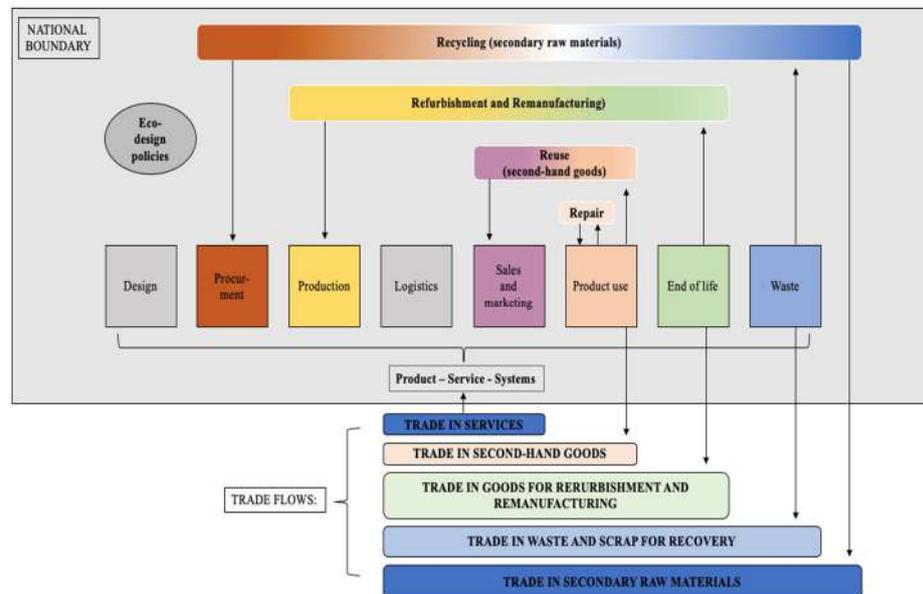


Fig. 1. Circular Economy and International Trade Correlation. *Source: Authors based on data extracted from OECD (2018): <https://www.oecd.org/environment/waste/policy-highlights-international-trade-and-the-transition-to-a-circular-economy.pdf>*

As can be seen in Figure 1, the circular economy means - in the basics of the value chain (in F.1 - product-service-systems), the return of products to circulation. This applies mainly to the last three stages: “product use”, “end of life” and “waste”. While a product in the waste phase would represent its end of use (or in some cases minimal processing), in the circular model this “waste” goes back to the second phase of the value chain, which is “procurement” and subsequent production. Through additional phases: 1. Repair 2. Reuse 3. Refurbishment and Remanufacturing and 4. Recycling, we conclude an imaginary linear concept and create a sustainable cycle.

The above-mentioned activities of the circular economy were situated within the national economy. However, as we have already mentioned, an effective transition to circularity requires the involvement of all actors throughout the value framework, which now transcends national boundaries. In connection with international trade, it is important to focus on the last three phases, namely:

- product use- while within the economy we can re-sell or repair the product at this stage → in international goods flows we can sell this product on **the second-hand goods market**.
- end of life- in this phase, we can return the product to production within its economy by rebuilding or modernizing it → in the field of international trade, we can sell this product on **the market with goods of refurbishment and remanufacturing**.
- waste- inside the economy, we are talking about the processing of waste into secondary raw materials for sale → in the international field we can sell this processed

waste on the secondary raw materials market or we can simply trade the waste itself to prevent the increase of waste in the home country and reuse in another one.

The circular economy is a framework that results in greater efficiency in the production process, improvement of value chain services, emphasis on quality rather than quantity, the use of modern technologies and lower waste generation, thereby reducing environmental damage and pollution, eliminating the costs that would most likely arise in the future and create an environment suitable for human life and health.

The importance of the circular economy to international trade is precisely in exploiting the comparative advantages of all actors in the international chain. Individual business entities can focus on those processes in which they have a competitive advantage in the form of high technology, know-how, etc. Based on Figure 1, it is evident that the circular economy is creating new opportunities both within the national economy and in international markets

2.1 Circular Economy Selected Indicators - Comparison in V4 countries

The circular economy is a complex system that requires the implementation of its elements in all business and non-business sectors. Whether countries are gradually implementing elements of circularity in their economies can therefore be expressed in several ways. The European Commission has set 10 criterias that form the framework for monitoring the implementation of the circular economy, some of which are subdivided into several sub-indicators.

The extent to which EU countries (28) implement the elements of circularity in their economy, focusing on comparing the V4 countries, we have selected 4 indicators:

1. generation of municipal waste per capita,
2. recycling rate of municipal waste,
3. private investments, jobs and gross value added related to circular economy and
4. patents related to recycling and secondary raw materials.

The average waste generation per capita in the EU (28) was 486 kg in 2017. The overall development of municipal waste generation in EU countries (28) since 2000 is shown in Figure 2.

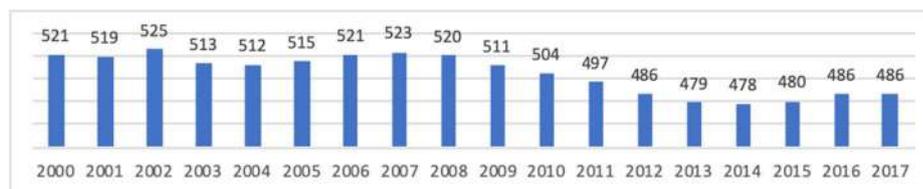


Fig. 2. Generation of Municipal Waste per capita in EU (28) countries 2000 – 2017 in kg/person. Source: Authors based on data extracted from Eurostat (2018a): https://ec.europa.eu/eurostat/igm/table.do?tab=table&init=1&language=en&pcode=cei_pc031&plugin=1

In 2017, Romania (272 kg / person) generated the least waste from EU (28) countries. And most municipal waste per person in 2017 was generated by Denmark (781 kg / person). As can be seen in Figure 2, since 2008 the generation of municipal waste has been decreasing in the European Union and since 2015 the amount of waste generation has been slightly increasing. Nevertheless, compared to the previous decade, we can speak of a slightly positive development in municipal waste generation.

In Figure 3 we compare the generation of municipal waste in V4 countries with the average generation of municipal waste of EU (28) countries in 2000, 2010 and 2015-2017

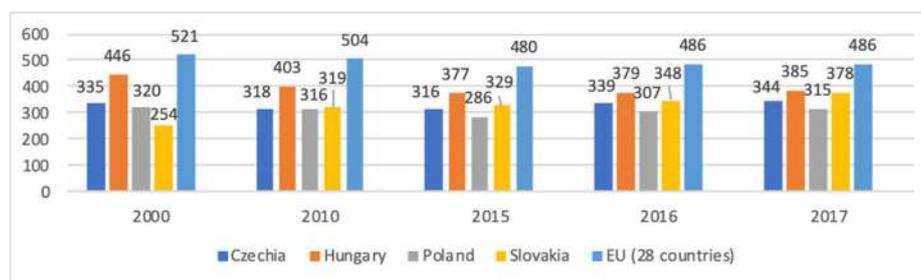


Fig. 3. Comparison of Municipal Waste Generation per capita in V4 countries (2000, 2010, 2015-2017) in kg/person. *Source: Authors based on data extracted from Eurostat (2018a): https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_pc031&plugin=1*

Since 2010 the order of V4 countries in the generation of municipal waste per person has not changed in the period under review. Hungary generated the most municipal waste per person. It is followed by Slovakia, the Czech Republic and Poland. A positive aspect is that all countries achieve a lower level of municipal waste generation than the EU (28) average. However, over the last three periods (2015-2017), municipal waste generation per capita has been increasing in all V4 countries.

The more effective waste treatment and appreciation of municipal waste is also possible thanks to recycling. In Figure 4 we show the development of the recycling rate of municipal waste in the EU (28) in 2000-2017.

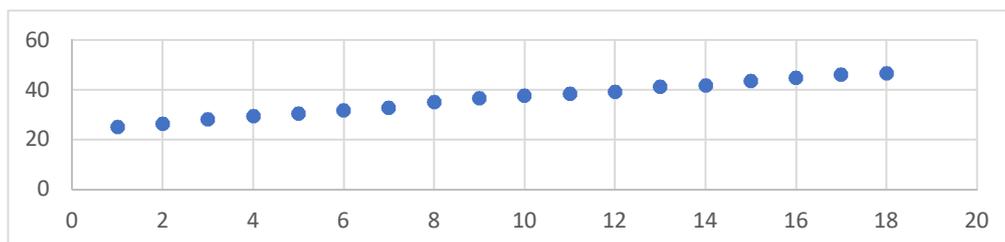


Fig. 4. Recycling Rate of Municipal Waste in EU (28) 2000 - 2017 in %. *Source: Authors based on data extracted from Eurostat (2018d): https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_wm011&plugin=1*

We can see that the whole EU (28) recycling rate has been slightly increasing. In 2000 the municipal waste recycling rate was 25.1 % compared to 46.4 % in 2017. In the next Figure 5 we compare the selected indicator of the V4 countries in 2000, 2010 and 2015-2017 period.

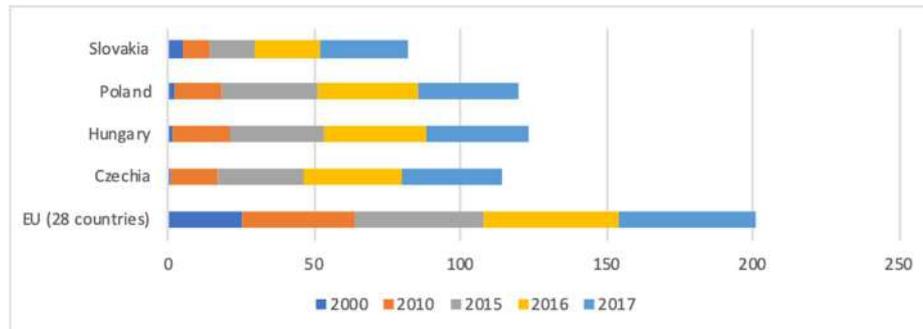


Fig. 5. Comparison of Recycling Rate of Municipal Waste in V4 countries (2000, 2010, 2015-2017) in %. *Source: Authors based on data extracted from Eurostat (2018d): https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_wm011&plugin=1*

As shown in Figure 5 the recycling rate of municipal waste is relatively the same in the reporting period in Poland, the Czech Republic and Hungary. In 2017 the highest recycling rates among the V4 countries were in Hungary: 35%, followed by the Czech Republic: 34.1% in 2017, Poland: 33.8% in 2017 and Slovakia: 29.8% in 2017. All V4 countries are below the EU average. We negatively evaluate the rate of recycling of municipal waste in the Slovak Republic, whose value did not exceed the level of 30% in any of the examined period. The European Union has set ambitious targets as part of its environmental waste management strategy. By 2025 it set the recycling rate for municipal waste at 55%, by 2030 at 60% and by 2035 the recyclability of municipal waste should be increased to 65% (Euroactiv, 2019). Which means that it is important for all V4 countries to take vigorous measures to combat waste generation and its effective recycling.

The third selected indicator is private investment, jobs and gross value-added sectors related to circular economy expressed in % of gross domestic product. Table 1 shows the comparison of this indicator in V4 countries in 2012-2016.

Table 1. Private Investments, Jobs and Gross Value Added related to Circular Economy Sectors in % of GDP. Source: Authors based on data extracted from Eurostat (2018c): https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=cei_cie010&language=en

country/year	2012	2013	2014	2015	2016
Poland	1,09	1,07	1,13	1,1	1,13
EU (28 countries)	0,98	0,98	1	0,98	0,98
Hungary	0,79	0,75	0,83	0,77	0,91
Slovakia	1,15	0,79	0,66	0,74	0,77
Czechia	---	---	---	---	---

The highest ranking in the selected indicator was achieved by Poland, which is also above the EU (28) average. In 2016 sectors of private investment, jobs and gross value-added sectors related to circular economy was 1,13 % of GDP in Poland. Following by Hungary (0,91 % of GDP in 2016), Slovakia (0,77 % of GDP in 2016) and the Czechia with no data in the monitored indicator. Since 2012 this indicator has hardly developed at all in the EU (28) and its value remains relatively constant. Nevertheless, the introduction of new directives and legislation in the field of circular economy can be expected to increase in the coming period.

The last of the monitored indicators is the number of patents related to recycling and secondary raw materials. In European Union this indicator has been increased since 2007 (228,67 of patents) to 2013 (360,41 of patents). In the last year examined its value declined to 338, 17 patents. Figure 6 shows the comparison of V4 countries in number of patents related to secondary raw materials and recycling in 2000 and 2010-2014.

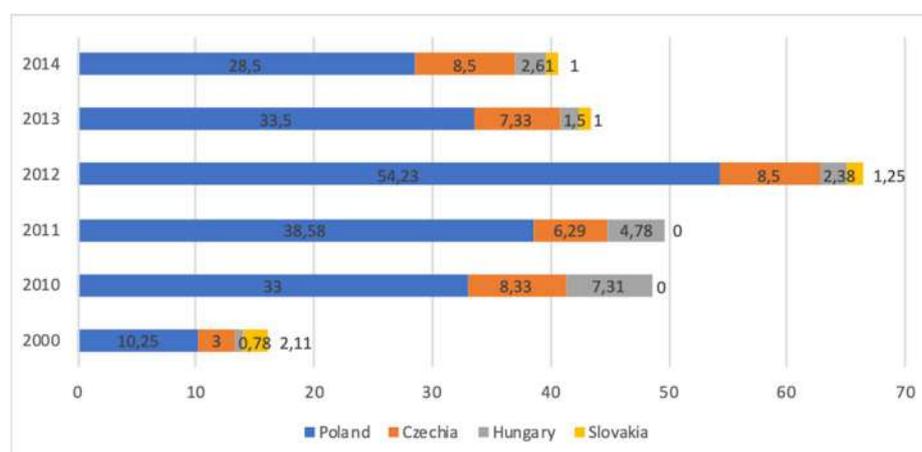


Fig. 6. Number of Patents related to Recycling and Secondary Raw Materials in V4 countries in 2000, 2010-2014. Source: Authors based on data extracted from Eurostat (2018b): https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_cie020&plugin=1

In the number of patents related to the principles of circularity, Poland again outperforms the V4 countries which far exceeds the remaining countries. It is followed by the Czech Republic, Hungary and the Slovak Republic even with zero values in 2010 and 2011.

3 Conclusion

The subtle way of life that has been characteristic of the Western world since the Industrial Revolution has increased consumption and thus the production of huge amounts of waste. The issue of waste is a generally discussed problem of a global nature. This negative phenomenon has been neglected until recently. However, significant environmental pollution, which directly affects the health and lives of people, also increases the costs for business to eliminate these negative phenomena. The business environment is faced with the challenges and principles of sustainability. Entrepreneurs should implement these aspects in their activities as soon as possible in order to remain competitive. In general, it is currently important for many to seek new solutions on a global platform. The transition to the circular economy can be an important milestone both within the national economy and across the global value framework. It is important that economic activities aim to provide a higher number of services before production, as well as concentrate on producing quality and durable streams that can be re-evaluated after the final phase.

In order for the circular economy to be properly implemented, it is important to adhere to its basic principles, which should be laid down by legislation. As economic activities are intertwined across a globalized world, it will be a major challenge to reconcile these elements, thus creating not only a national but also a global space for a circular economy.

The first step should be to set country targets and measure them gradually over the same indicators. The European Union has set ten such indicators, four of which we have examined and then compared among the V4 countries. Achieved positioning of V4 countries in these four monitored indicators shows Table 2.

Table 2. Achieved Positioning of V4 countries in Four Monitored Indicators. *Source: Authors based on data extracted from Eurostat (2018 a, b, c, d)*

indicator/country	SLOVAKIA	CZECHIA	POLAND	HUNGARY
Gen. of municipal waste per capita	2.	3.	1.	4.
Recycling rate of municipal waste	4.	2.	3.	1.
Private investments, jobs and GVA related to CE	3.	1.	2.
Patents rel.to recycling and sec. raw materials	4.	2.	1.	3.

As Table 2 shows the best achieving position of V4 countries in 4 examined indicators belongs to the Poland with three first places. This is followed by Hungary with one first place and the Czech Republic which has not recorded any data in the indicator of private investment and jobs related to the circular indicator principles. The last place belongs to the Slovak Republic which occupied the last two places.

However, the greatest challenge remains to reduce waste generation, which is the highest in Hungary. An important aspect is consequently to increase the recyclability rate, which enables the transition to circularity and which is very low in the Slovak Republic. Last but not least, business activity depends on the direction and flows of investment. The more investments are directed towards economic activities that are in line with circularity, the faster and easier it is to use the comparative advantages of individual entities to create services or new technologies that should result in a sustainable economic model.

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GLOBAL RENEWABLE RESOURCES MANAGEMENT A KEY ISSUE OF GLOBAL ECONOMICS AND SECURITY

Ing. Martin Patoprstý

University of Economics in Bratislava
Faculty of National Economy
Department of Public Administration and Regional Development
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
patoprsty.martin@gmail.com

Abstract. This paper deals with issue of increasing of using the renewable resources as the stabilizing tool in relation to the world economics and security. In this paper, there are identified and described basic critical issues of recent world economics and security. Moreover, there is a definition of wide seized security. After depicting of the basic problems of the world security there are deeper analyzed issue of oil deposits state and their diversification as a security problem as well as the problem of socio-economic development. This is followed by the security risk analysis related to the drink water world reserves. In further text there are characterized some scenarios of future security and socio-economic development related to the impact of possible lack of oil and water in world economics. This is followed by the characteristics of recent consumption of renewables within the primary energetic consumption, as well as by description of the stabilizing effects of increasing of using of renewables to the global security and socio-economic development. This leads to necessity of efficiency increasing of Global natural resources management aimed to Global renewables management within its frame.

Keywords: Renewable sources, Energetic dependency, Drink water reserves.

JEL classification: Q42

1 Introduction

The current development of the world is possible to characterize by increasing of the existence and influence of various kinds and types of crises. This fact seriously affects the process of achieving and keeping the world stability and security as the primary precondition for acceleration of the socio-economic development of the world or just only the selected states integration units or world regions.

Increasing number and diversity of crises which have significant influence to the socio-economic development of the world and its individual components is caused mainly by the growing number of risks and their multidimensional synergic destabilizing effects.

Considering the seriousness of the consequences of instability in various components of the security within the global economy frame, it can be concluded that there exist a real need for proactive approach to the managing imbalances in various different areas within the wider seized (state and global economy system) security frame. And this need affect any subject of international security and economic, as well as political relations.

Considering the facts mentioned above, it is possible to state, that recent turbulent reality within the frame of international relations creates the space for the development of using the crisis management principles and tools in relation to avoiding the future crises and solving of the existing ones

2 Key issues of the world economy and security

As the key factors destabilizing the socio-economic and security, as well as the political situation in the world can be considered the following issues:

- **The crisis of the global financial system** and particular crises in various world countries or integration units
- **The demographic implosion** and imbalance in demographic characteristics among the main world regions and countries.
- **Depletion of strategic natural resources and environmental degradation:**
 - Especially:
 - **depletion of accessible sources of drinking water,**
 - **depletion of the industrially useful minerals and materials,**
 - **depletion of oil and the other fossil fuels.**
- **Political, religious and military conflicts between the major actors in international relations**

In relation to this mentioned key issues of the global security, it is possible to underline the special importance of availability of strategic natural resources and demographic implosion as well as the necessity of improving the natural environment.

In this place, it is needed to explain our seizing of multidimensional security frame.

In our point of view the security of the state or level of integration unit or the other socio-economic system (e. g. global economy system) can be understood as state of system functioning within its internal and external environment, which results to the securing of system objective function fulfilment, as well as to the creating of preconditions for the long-term, sustainable development of this system (state or integration unit), considering future changes in the system environment.

Such a perception of security emphasis broad reference areas of security related to the ensuring the system objective function fulfilment, as well as to the creating of pre-conditions for the long-term sustainable development in changing condition within the internal and external environment.

Considering a mentioned facts, it is possible to notice a serious harmful effect of recent world economic crisis to the wider seized world security and stability. Breaking of the stability in international trade and financial relations resulted to the numerous partial state crises. In relation to the recent world economic crisis, it is possible to underline an absence of its systematic solution.

As the main areas of the key issues in the economic and financial world stability can be thought:

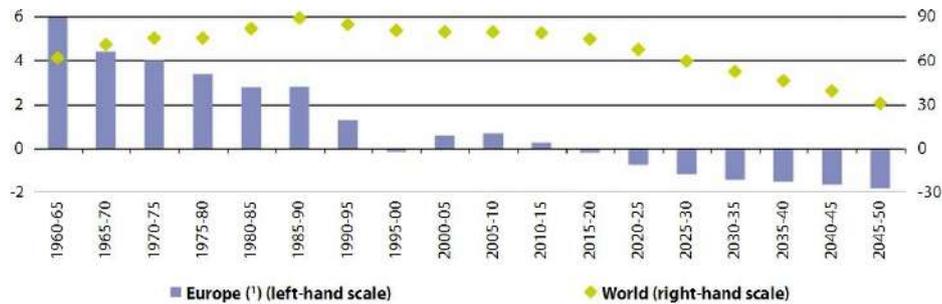
- **Ineffective balancing of the world economic system as a system generating of debts.**
- **Bad world HDP redistribution mechanisms which enforce increasing of disparities in socio-economic development among selected states and world regions.**
- **Not balanced amount of money in world economics in relation to the real world production.**
- **Self-destruction tendency of current world economic system based on economic growth supported by consumption of future possible prosperity.**

The solutions of the mentioned issues can be found in reducing of disparities in socio-economic development within the world countries and regions, transition of world economic system to the full-value money standards and anti-debt legislative.

The other important issue relevant to the world security level is problem of world demographic implosion and imbalances in demographic characteristics among the world regions.

In relation to the demographic implosion it is possible to confirm a real serious impact of disparities in demographic trends among the world regions or states to the world security. The main issues related with these factors are positive and negative multidimensional effects of the international migration processes to the world stability and also the problems with sustainability of the recent level of living conditions, e. g. due to the problems with sustainability of pension schemes in numerous countries, which are serious impacted by the demographic implosion. Differences in demographic trends together with disparities in socio- economic development and the environmental degradation among the countries or world regions are enforcing the volume of international migration. This can without effective global migration management lead to decreasing of global security level due to the possible number of social, economic, and military crises in involved countries and regions.

For supporting our view of demographic implosion and its future impact to the world security, as well as the impact of differences in demographic trends among the world regions, we can show next two figures. In the figure 1 there can be seen a demographic implosion of the world and also the Europe. In that figure there can be seen a really massive impact of ageing to the world population, but more to the European population. This can lead to increasing of economic inactive people and it can result to the need of migration from the other regions due to the sustainability of pension schemes and productivity of European economics.

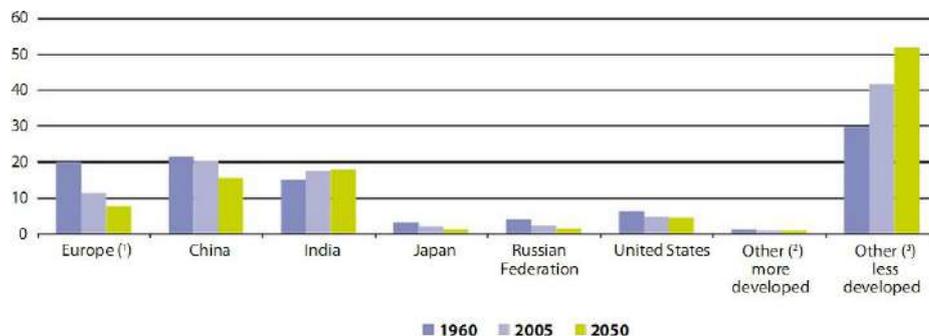


(¹) EU-27, Albania, Andorra, Belarus, Bosnia and Herzegovina, Croatia, Faeroe Islands, Iceland, Liechtenstein, the former Yugoslav Republic of Macedonia, Republic of Moldova, Montenegro, Norway, the Russian Federation, Serbia, Switzerland and the Ukraine.

Source: United Nations, Population Division of the Department of Economic and Social Affairs

Fig. 1. European and world average annual population change in 1960-2050, million. Source [1]

In the figure 2 there can be seen differences in demographic trends in selected world regions. This can also enforce the migration processes with their risks. We can see that except the volume of migration the other problems can be seen in cultural, and religious values compatibility among the migrants and major population. This can lead to numerous conflicts in various areas of state security.



(1) EU-27, Albania, Andorra, Belarus, Bosnia and Herzegovina, Croatia, Faeroe Islands, Iceland, Liechtenstein, the former Yugoslav Republic of Macedonia, Republic of Moldova, Montenegro, Norway, the Russian Federation, Serbia, Switzerland and the Ukraine.

(2) Excluding Europe, Japan and the United States.

(3) Excluding China, India and the Russian Federation.

Source: United Nations, Population Division of the Department of Economic and Social Affairs

Fig. 2. Average annual change of population in selected world region in 1960-2050, million.

According to our opinion as the most important issue related to the global stability in long term horizon can be thought the exhausting of strategic natural sources and degradation of the natural environment. As a key factor of future world instability can be thought to be the unequal allocation and accessibility of the strategic natural sources around the world, as well as final limitation of the strategic natural sources. Increasing needs and decreasing accessibility and disposable volume of the strategic raw resources has a potential to be a source of future multidimensional crises and will lead to the security destabilization within the world. This can be seen even in the past and today the most of all in the frame of international fighting about the oil exploiting control, as well as about the natural materials used in industrial production. It is possible to notice it e.g. in competing among the China, USA an EU to get access to the mining of raw materials in Africa. It is possible to see it also e. g. on the processes of African spring etc.

The most important in relation to the global development and global security is a disposability and access to the extend volume of oil and drink water.

Today's situation is not really good.

Depletion of world oil reserves, as well as drinking water, probably fundamentally affect the future development of the world economic system and by that way it will influence also the wider seized security across the world. Oil and other energy mediums e. g. electric power, natural gas, etc. can be seen as one of the most fundamental accelerator of socio-economic development of the world economics. Due to their wide range using across the national economics and global economics too.

In the next figure, it is possible to see the past and predicted developments in the world oil production as the most important industrial raw material and medium of energy. Based on the figure 3 and accepting the limited extent of oil reserves, as well as increasing mining costs related to necessity mine the oil from deeper mining deposits,

it is possible to expect sharp decrease in the amount of oil on the world market with all its negative consequences to the

economic and social aspects of development of the world economic system, as well as on the security stability of the world.

Less oil in the global economy will lead to an increase its price. This may cause secondary growth of all commodities' prices. Most of all due to the use of oil in production and transport processes. In the worst case it can be source of rapidly increasing number of starving people.

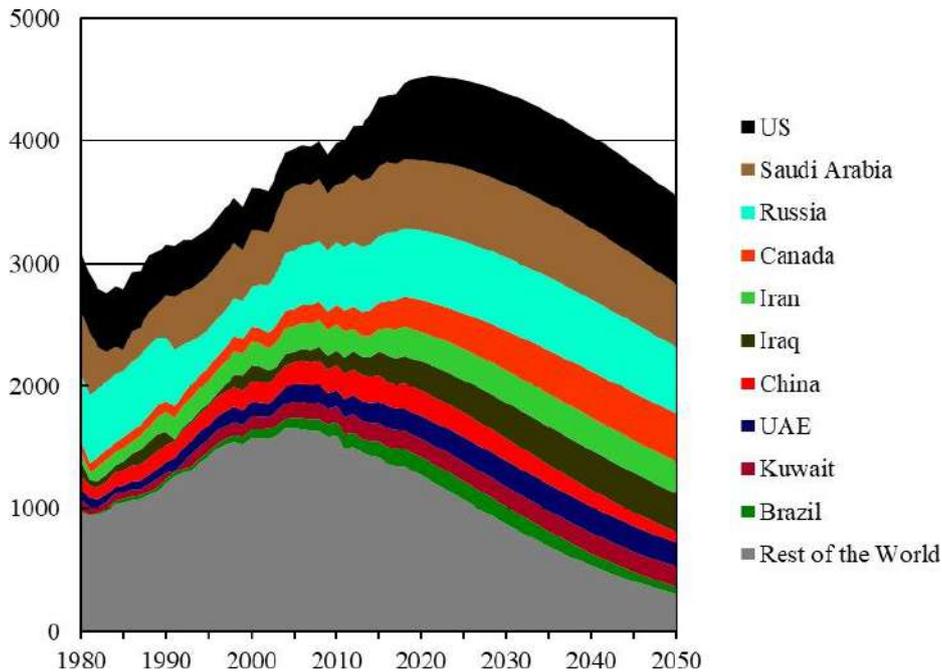


Fig. 3. World Historical and Projected oil production (Million, Metric Tons 1980 - 250).

Outlined prognoses may be source of worries about the future development of the world security. It can lead to the slowing down, respectively; to final stop of the globalization processes in the frame of world economic system. According to shown facts it is clear, more than ever, that it is and it will be very necessary to secure the food and energetic security of the global economics, integration units or world regions too.

In the next figure, it can be seen the diversity of oil deposit reserves. It can be important in relation to prognoses of future conflicts, due to the attempts to overrule these oil capacities.

This can be source of social economic, political and security imbalances that can impact the world development very seriously by the decreasing of the economic growth and security level in involved countries, as well as across the world at all.

Main oil reserves deposits in the world

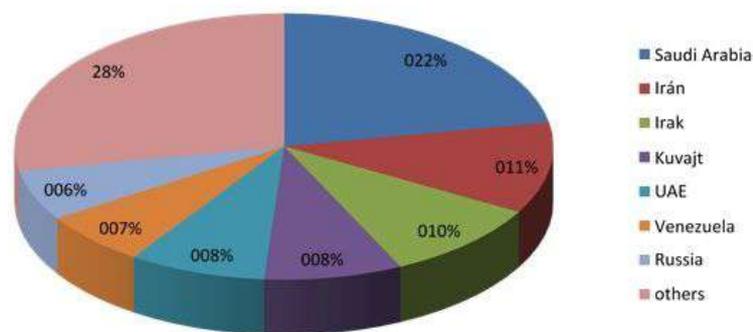


Fig. 4. Diversification of the main oil reserves in the world, % of total.

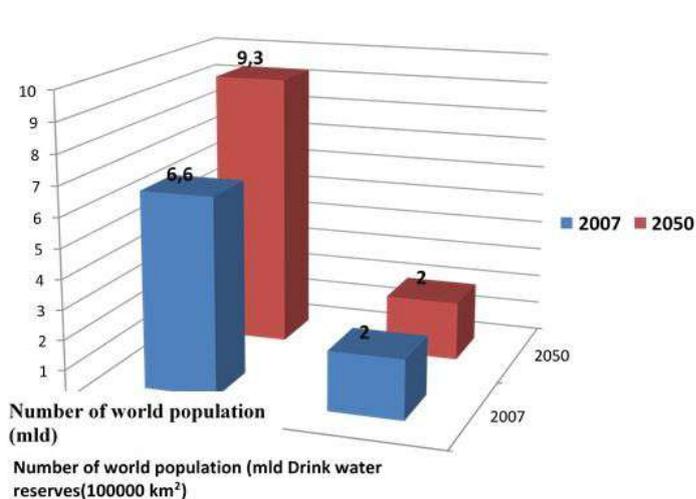


Fig. 5. World population change vs drink water world reserves change between 2007 and 2050.

The second strategic resource necessary for human survival and development is drinking water. Growing importance of drinking water as the strategic natural resource can be seen from figure 5 upwards. There is documented an increasing importance of drinking water, due to the limited amount of its resources as well as due to the increasing demands on its use, because of the increasing of world population.

It can be stated, that due to a strategic importance of drink water for human life, as well as due to its extend using in agriculture and food processing industry, future of lack of drink water and oil reserves reducing process implicate negative synergic effect to the world economic and security.

Like in case of oil there can be stated the crisis potential of lack of drinking water in relation to decreasing of world security due to the military economic and social conflicts, which will rise due to the fighting for the drink water reserves control. This potential is much more important if we consider the fundamental importance of water, especially drink water using in the wide range of agricultural and food processing processes. Together with lack of oil it can impact a world food, economic, social even military security of the world very hard.

3 Basic scenarios of future socio-economic and security development

Considering mentioned key problems of world security in its wider meaning it is possible to outline these basic scenarios of future world development:

Scenario of a completing of the globalizing processes: This one is based on the precondition that the global issues enforce and need the global solutions. This scenario operates with idea of global ruling and managing of the world as one space.

Scenario of a global cataclysm as a result of a global or local military nuclear conflict, which arise as a result of fighting for the oil, needed raw materials and drink water reserves among the selected states.

Scenario of serious impact mentioned issues to the global security, which will lead to the dividing the world into the more relatively separated regions.

In relation to the globalization processes there can be expected a three basic scenarios:

- **Completing the globalization,**
- **Semi-globalization scenario** with IT full globalization connected with world knowledge sharing, but without territorial globalization, because of difficulties with global food supplying and global transport means (due to the lack of water and oil as well due to the numerous social and military conflicts within the separated regions)
- **Stopping the globalization processes** impact of many crises due to the instability in world financial, trade, environmental, social, and political, as well as the security relations.

4 Global Renewable sources management as a stabilizing instrument of the world economics and security

Considering the key issues of world security mentioned in former chapters, we can state that just increasing of using renewable resources in world wide scale can seriously reduce a risk of negative crises due to the energetic dependency of the global economic system.

We can state that increasing of the using of renewable sources can reduce of number and impacts of military and economic conflicts due to the fighting for the oil and energetic mediums control. This can reduce a social conflicts and migration processes. They can reduce also the future food crises, so they can be thought to be a stabilizing instrument or factor of

global security. It is really needed to increase of efficiency of renewable sources using. This creates the space for scientific research development.

It can be also stated that recent situation in world economics and security leads to necessity of establishing and empowering the key role of natural resources global management as well as it causes a need of increasing of establishing efficiency global renewables management within it's frame.

Development of renewable sources using can reduce the dependency ratio of periphery economics on the states, which have a control over the international trade with oil and its exploitation.

It seems to be a quite long way to achieve this goal in world wide range, if we do not want to increase a number of nuclear power plants. But according to our opinion it is really necessary to enforce it.

Without changing the energetic mix of world economics, it is just question of a time when the huge problems in global society will arise.

In the next figure no. 6, there can be seen a development of the share of renewable sources on the primary consumption in selected world regions. We can see that the shares of renewables on the primary consumption are relatively stabile for a long period. There can be identified relatively small share of ones in Europe and North America despite the large extend of their economies. This is mainly caused by large number of nuclear and coal power plants in these regions. After nuclear accident in Fukushima There is a question of security and safety of the nuclear plants much more actual than ever. Despite the slow increasing share of renewables on the primary consumption in Europe and North America on primary energetic consumption, there exist a real need to improve using the renewables to be able in long term horizons turn of the nuclear power plants and also to be much less dependent on the oil. This really actual issue for EU, which is not able satisfy its demand for oil in long time horizons. This makes EU not secured from the economic and political and security pressure from the Russia and North America. This pressure can be documented by the list of the most intensive oil producers in world economics. According the ENERGO DATA Global energy statistical year book 2013 the five most extensive oil producers in the world are: Saudi Arabia, Russia, China, United States and Iran.[5].

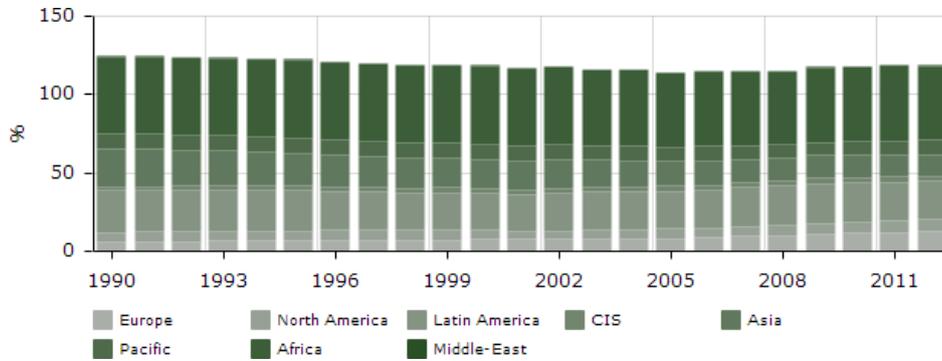


Fig. 6. Share of renewables in selected world regions on the primary energetic consumption, % of total.

Increasing importance and present potential of renewables on additional energetic capacity across the world regions is documented also in the next figure data. Figure 7 shows Renewables share in capacity additions by world region in stated policies and Sustainable Development scenarios in the period 2019-2040.

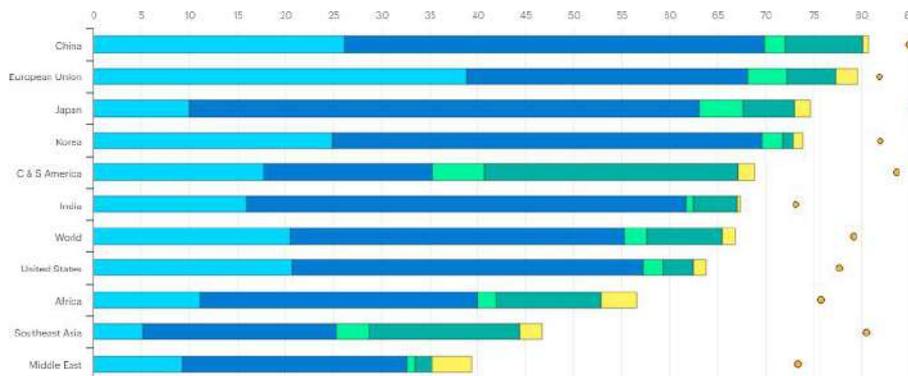


Fig. 7. Renewables share in capacity additions by region in the stated policies and Sustainable Development scenarios 2019 – 2040.

According to the figure 7 it can be agreed with this statement.”

“In the Stated Policies Scenario, nearly 8 500 GW of new power capacity is added globally by 2040, of which two-thirds is renewables. Renewables account for the majority of capacity additions in most regions. This includes about 80% of additions in the European Union and China, but they provide less than half of additions in Southeast Asia and the Middle East. Solar PV provides the largest share of renewable capacity additions in most regions, including China and India.” [6]

5 Conclusions

At the end we can conclude, that recent socio-economic and political situation, as well as a processes of exhausting of raw materials, oil reserves and drink water reserves in the world economics are the source of many various risks in relation to the global security. As was proved in former text, there exist a real strong need to establish an effective global strategic natural sources management. Problem is with absence of the global powerful and trustworthy institutions, which should be able to manage affective sustainable socio-economic development of the world in terms of ensuring the global stability and security.

It can be also stated that recent situation in world economics and security leads to necessity of establishing and empowering the key role of natural resources global management as well as it causes a need of increasing of establishing efficiency global renewables management within it's frame.

Global strategic natural resources management, the most of all management of oil production and consumption, as well as drink water using and renewing its deposits can be thought to be fundamental base for ensuring the global security in midterm horizon.

Finally, in relation to the outlined scenarios of future development of the world, we can state, that increasing of volume and efficiency of using the renewables can be particular and very successful solution of energetic dependency of global economics on the oil. Even it can be very efficient in stabilizing of world security due to the reducing the necessity of fighting for the oil deposits control as well as due to its impact to the equalizing of the precondition for the socioeconomic development across the world. This all will be possible only when majority of the world population will be accepting of a global strategy of socioeconomic development based on increasing of volume and efficiency of using the renewables in global economy. There are two preconditions of success of this process. For the first, increasing of supporting the scientific research in this area, and for the second decreasing of energetic intensity needs of recent global development.

Thanks to the renewables the human society can get extra time to find out or explore some much more effective and much less destructive energetic alternative to the nuclear energy and oil dependency within the global economics.

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VENTURE CAPITAL AS A SOURCE OF FINANCING FOR ENTERPRISES IN SLOVAKIA

Petra Polečová

University of Economics in Bratislava
Faculty of Business Management
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
petra.polecova@euba.sk

Abstract. The choice of financing is part of the strategic decisions of each company. Suitable and appropriate financing at each stage of the company's development will ensure that the company remains financially healthful. Decisions on where to raise finances will be a matter of considering entrepreneurial goals, the stage of company development and the reasons for financing. At present, entrepreneurs do not have to rely on their own funds or bank loans only, because Slovak market also offers a rich offer of alternative sources of financing. Although they are not so well known in our market and are used in small quantities, they enable companies to start their business with the help of investors who in addition to provide finance, have important experience and contacts that can help entrepreneurs lead and develop their company. One of these sources is a venture capital, which is particularly important for small and medium-sized companies with growth potential that are mostly at high risk and have low creditworthiness to obtain other sources. The aim of this paper is to provide insight into the use of venture capital in Slovakia also compared to other European countries and to outline the main reasons for its insufficient use.

Keywords: financing, alternative sources, venture capital.

JEL classification: G 11, G 24

1 Introduction

Every company, regardless of whether it is beginning or an existing one, needs to obtain the finances to expand and develop. Therefore, the most important decisions that the company realizes is the choice of source of financing. Finding fund for running service is demanding, whether they are initial funds, expansion capital, or money that the company can keep in difficult times. It is therefore always advisable to consider all its costs, advantages and disadvantages, before choosing the final source. The choice of suitable sources of financing depends on number of factors, most frequently from the development stage of the company. For this reason, a newer company will prefer

internal sources, whereas an established company will rather turn to a bank or investor. The company's financial need will also depend on the type and size of the company. At present, entrepreneurs have a wide range of financing their intentions. However, it is important to maintain a balance between financial sources to ensure sufficient liquidity for the company.

2 External sources of financing

External sources of financing are money generated from external sources of the company, which may come from private funds or from the financial market. In terms of time, we break them into long-term sources and short-term sources. Long-term financing of a company is usually required to acquire new equipment, research and development, increase cash flows or expand the company. Financing long-term needs is more demanding and far-reaching for a company than financing short-term operational needs. External sources enable to implement growth projects that the company could not finance itself and allow using internal sources for other purposes. On the other hand, there is a disadvantage of loss ownership in favor of the investor and also an increase in total costs through interest.

Keřkovský (2015) includes loans (long-term, medium-term, short-term), supplier loans, advances, liabilities to employees, liabilities to the state budget, bonds, bills of exchanges, subsidies, grants, factoring, forfaiting, leasing, project financing and last but not least, alternative sources of financing such as business angels, venture capital or business incubators between external sources of financing.

The most used foreign source of company financing in Slovakia is loan. The problem for many small companies is that they do not have to get regular bank loans because they have no experience, have credit problems or they are in a high-risk sector. So, there are also a large number of alternative non-bank lenders. However, not all creditors are affordable or have transparent conditions. They can charge extremely high interest rates and fees, and they do not have to adhere to the same rules for providing information to consumers as banks. When an enterprise reaches the specified growth stage, it is expected that company is probably on solid ground and can predict its revenue and cash flows. At this stage, an enterprise may request traditional loan products with the most attractive interest rates and terms offered by conventional banks.

2.1 Alternative foreign sources of financing

In addition to standard foreign sources, the financial market in Slovakia offers interesting alternative sources of financing, which are gradually gaining confidence of entrepreneurs. For this reason, begin to emerge also specialized institutions such as Slovak Venture Capital & Private Equity Association or Slovak Business Angels Network, which raise awareness about these funding opportunities. Alternative foreign sources are mostly those that are used on market in a smaller amount, because companies do not have enough information about them. Alternative sources include venture capital, private equity, business angels or mezzanine financing.

Venture capital

Access to financial sources is the most difficult when starting a business and its initial development. The reason is mainly high risk of failure of companies, lack of creditworthiness of credit guarantees. In particular, this reason concerns small and medium-sized enterprises, which are innovative and have growth prospects, but their activity requires high capital investment which also means high risk. Therefore, these companies use the possibility of venture capital financing.

Venture capital is an alternative or substitute form of access to finance as it involves equity finance or equity-linked investment in potentially high growth unquoted companies. It's access to finance for innovative companies to sustain their innovation, growth and survival. (Imarhiagbe et al., 2018).

Private equity and also venture capital represents an investment to the equity of companies. The aim of the investor is to obtain share in the enterprise. Venture capital is primarily focused on investing in start-ups such as seed capital or start-up capital. Private equity is rather used like expansion capital or acquisition capital. Therefore, venture capital is a subgroup of private equity.

Venture capital investors may be institutional investor such as banks or insurance companies or non-institutional investors such as various private individuals. The finances of these investors are collected by venture capital funds that invest them in small and medium-sized enterprises. Projects that funds decide to financially support must fulfil certain conditions such as the expected return of investment. As Kislíngrová et al. (2004) states venture capital can only be used where the project is potentially very profitable and its estimated return must be at least 30 %.

Venture capital is not permanent in the business, but after a certain period of time it is withdrawn either by redemption of the share or by the sale of the share to another company. In case of failure, the share may be sold at a lower price or the company may be liquidated and the assets sold.

The main objective of venture capital is to enable start-ups or prospective small and medium-sized enterprises to realize their idea and become well-functioning and prosperous enterprises (Freňáková, 2011).

Companies that use venture capital for financing have a high growth potential but also a high level of risk. For this reason, there is little likelihood of obtaining conventional bank loans, because projects begin to generate positive cash flows after approximately 3 years and represent a high financial risk for the bank. On the other side bank requires a guarantee and this can be deterrent for entrepreneurs.

We distinguish different types of venture capital from basic types, such as seed, start-up and development capital to rescue capital, acquisition capital or buyout. Individual types differ amongst themselves in particular the stage of development of the business in which they are used, the lengths and amount of the return on investment, as well as the level of risk. Irrespective of the risk capital division, the investor always invests directly in the company's equity for limited time and acquires ownership.

Gadiesh and MacArthur (2011) mention that the leader's most important task is to increase the value of its business. Most studies prove that the best private equity investors create an excellent return on their investment, usually in the range of three to five

years. The success of the company represents for the investor an appreciation of his investment. On the contrary, when company fails investor lose the funds deposited.

In addition to the financial benefits in the form of obtaining the necessary capital, venture capital also provides non-financial benefits for entrepreneurs. This includes, for example, long-term support from the investor, the use of his knowledge, skills, or contracts; thereby entrepreneur acquiring the management habits necessary to manage the company. In addition, there is a risk spreading between company and venture capital funds.

On the other hand, a number of disadvantages are associated with venture capital. Entrepreneurs are particularly afraid of a partial loss of control over a company because there is an increase in the number of owners. There may be leakage of sensitive information, and there are also no legislative standard governing venture capital financing. Last but not least, it is an alternative source that is not used in our conditions so much that in the other countries, and therefore some mistrust and reservations among entrepreneurs against this type of financing.

Use of venture capital in Slovakia

According to Invest Europe (formerly EVCA), venture capital financing in Slovakia is 0,006 % GDP, in the neighboring Czech Republic it is 0,014 %, in Ireland 0,042 % and in Finland 0,058 % of GDP (Sobeková Majková, Solík, 2016). Since venture capital started to develop in Slovakia in the 90 years, it is a way of financing that has a short history compared to bank loans. The very short history, the low awareness and the poor preparedness of the companies are the main reasons for the rare use of venture capital in Slovakia.

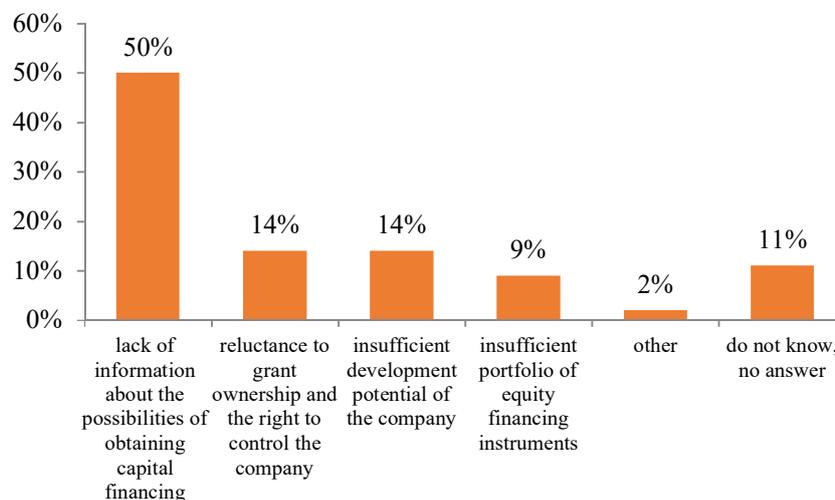


Fig. 1. Main reasons for under-exploitation of venture capital between entrepreneurs. *Source: own processing according to SLOVAK BUSINESS AGENCY. 2016. Využívanie externých foriem financovania MSP. [cited 08.07.2019]. Accessible from http://www.sbagency.sk/sites/default/files/analyza_financovania_msp-priloha2.pdf*

In 2015, the Slovak Business Agency conducted a survey of small and medium-sized companies with 1000 entrepreneurs focusing on the use of external financing. One of the studied areas was also the perception of venture capital as an alternative form of financing. As the chart shows, the biggest barrier to the use of venture capital is poor awareness of this ability to obtain finance for up to half of respondents. This is the reason most often cited by individuals and micro-enterprises, especially in the field of transport and construction. Additionally, entrepreneurs are afraid of lose control over the company, because investor with their equity participation could influence the strategic direction of the company, and also companies have lack of business development potential. Insufficient development potential is most felt by start-ups mainly in the field of agriculture. The reluctance to provide equity participation was in particular declared by medium-sized enterprises in the accommodation and catering sector. Insufficient portfolio of capital instruments was seen as a hindrance to 14 % of respondents, particularly for individuals and small companies in the catering, accommodation and industrial sector.

The Slovak Venture Capital and Private Equity Association – SLOVCA, is the organization that expanding and raising awareness of the possibility of the using venture capital in Slovakia. The association was formed in 1995 on the initiative of several companies. Every year SLOVCA organizes a conference aimed to bringing entrepreneurs information about the possibilities of alternative financing through private equity/venture capital. In addition to theoretical level, association presents the companies in which such funding has been successful. SLOVCA has also become a partner of the

Slovak Business Angels Network and so has expanded its activities to this type of investment. In present, the association has nine regular members – ARX Equity Partners, Enterprise Investors, CVI, Genesis Capital Ltd., Limerock Fund Manager, Neology Ventures, National Holding Fund, Innovation and Technology Fund and Slovak Growth Capital Fund.

Table 1. Type of investments by V4 country, 2016 – 2017 (in € thousands)

Stage focus	2017				2016			
	Czech Rep.	Hungary	Poland	Slovakia	Czech Rep.	Hungary	Poland	Slovakia
Seed	3,415	21,744	2,191	0	459	3,770	1,671	3,409
Start-up	150	6,790	22,549	1,991	4,060	32,568	17,717	6,801
Later stage venture	0	139	24,538	725	0	2,110	5,549	0
Total venture	3,565	28,673	49,278	2,716	4,518	38,448	24,937	10,210
Growth	7,614	72,831	140,632	1,500	4,860	58,430	145,012	2,750
Rescue/Turnaround	0	0	1,663	0	0	0	0	0
Replacement capital	0	0	0	0	0	0	8,401	0
Buyout	43,525	98,249	2,294,688	0	159,059	365	579,485	0
Total	54,704	199,753	2,486,260	4,216	168,437	97,243	757,835	12,960

Source: INVEST EUROPE. 2018. *Central and Eastern Europe Private Equity Statistics 2017*. [cited 04.07.2019]. Accessible from <<https://www.investeurope.eu/media/727455/Invest-Europe-CEE-Activity-Report-2017-05072018.pdf>>.

Based on the table, we can see that among V4 countries, Slovakia is the country that used least the venture capital. Venture capital has been used in both years in particular as start-up capital, seed capital or as development capital. Other forms of venture capital were not used at all, and as the only country among these four did not use management buyout. Even the ratio of total venture capital fell year on year. Poland, on the other hand, is one of the countries with the most active growth in the development capital and buyout not only between the V4 countries but among all the countries of Central and Eastern Europe. Other countries with a high ratio of individual investment include Romania, Latvia and Hungary.

Statistics Invest Europe (2018) further shows that Slovakia is at the end of the ranking of the share of risk capital in the country's GDP. While risk capital financing accounted for 0,006 % of GDP in 2016, it was only 0,005 % of GDP in 2017, so Slovakia placed in the penultimate spot in front of Serbia. The first three places were occupied by the United Kingdom (0,771 %), Latvia (0,649 %) and France (0,589 %).

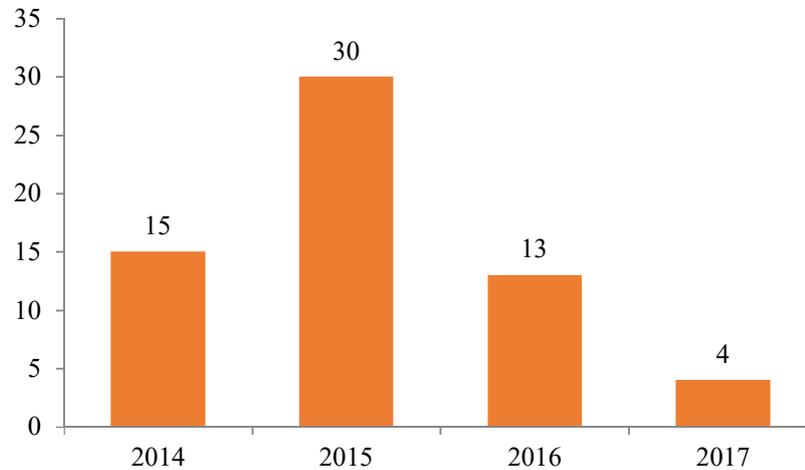


Fig. 2. Annual investment value in Slovakia 2014 – 2017 (in € million). *Source: own processing according to INVEST EUROPE. 2018. Central and Eastern Europe Private Equity Statistics 2017. [cited 04.07.2019]. Accessible from <<https://www.investeurope.eu/media/727455/Invest-Europe-CEE-Activity-Report-2017-05072018.pdf>>.*

The annual amount of investments in Slovakia also falls every year. The largest amount of 30 million was invested in 2015 and from this year investments dropped to 4 million in 2017. This only confirms Slovakia's previous position among the countries with least use of venture capital as an alternative source of financing.

Looking at the number of companies invested in each year, the best year was 2016, when investments were realized in 27 enterprises. Years 2014 (12 enterprises) and 2015 (22 enterprises) also showed an increasing trend. The worst development was also in the year 2017, when the number fell to just 4 enterprises (Invest Europe, 2018).

Compared to other Central and Eastern European countries, the activity of venture capital funds in Slovakia is still low. The reason is, in particular, a small market that does not create enough investment opportunities. For investors are more attractive larger foreign markets. In Slovakia, finances are deposited into funds mainly by private individuals and banks. The most attractive sectors for investors include health service, media and IT.

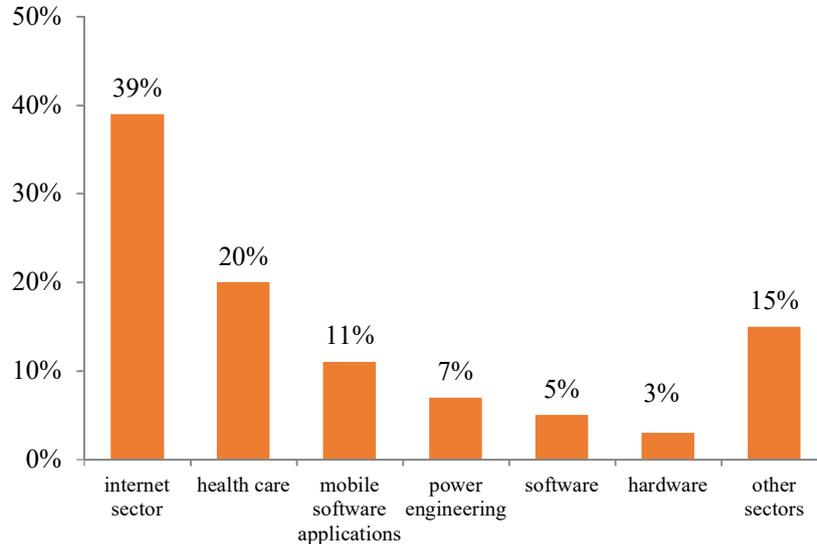


Fig. 3. Sectors in which the venture capital was invested. *Source: own processing according to SOBEKOVÁ MAJKOVÁ, M., SOLÍK, J. 2016. 39 rád, ako budovať svetovú firmu s investorom. Bratislava: Podnikajte.sk, 2016. p. 14. ISBN 978-80-972470-0-3.*

In Slovakia dominate internet sector in the area of venture capital. Successful Slovak companies that started with the investor include for example Etarget, Inc. which operates in the field of internet advertising. The company started with Genesis Capital investor and is currently one of the leading programmatic networks in Central and Eastern Europe. Another major sector is health care, which represents 20 % of total capital investment. From health care area is successful company medical center Medifera, Ltd., which was the first non-stat polyclinic institution in our territory. At the beginning of this company was the Slovak Development Fund. An attractive sector for investors is also information technology represented by software and hardware. Well-known and successful companies in this area are Profesia.sk (Slovak American Enterprise Fund), Zoznam, Ltd. (Benson Oak Capital) or Sygic, Inc. (Slovak Growth Capital Fund). Among the other sectors to which venture investments is directed we can include food industry (Kofola Československo, Inc. – Enterprise investors), media (Rádio Express – East Fund Management) or telecommunications (Slovanet, Inc. – Genesis Capital).

Venture capital funds in Slovakia are joined by the National Holding Fund. It currently contains three basic funds – Slovak Development Fund, Slovak Growth Capital Fund and Innovation and Technology Fund.

Table 2. Number and amount of realized investments per individual funds

Name of the fund	Realized investments in 2015		Realized investments in 2016		Realized investments since the fund establishment	
	Number	Amount (€)	Number	Amount (€)	Number	Amount (€)
Start-up Capital Fund	0	0	0	0	52	12 906
Regional Start-up Capital Fund	0	0	0	0	33	2 611 963
SISME Fund	0	0	0	0	8	1 204 830
Innovation and Technology Fund Inc.	3	935 000	8	772 925	18	2 707 925
Seed Capital Fund	1	400 000	0	0	49	13 289
Slovak Development Fund, Inc.	0	0	0	0	25	22 750
Slovak Growth Capital Fund, Inc.	1	3 000 000	0	0	15	33 153
Total	5	4 335 000	8	772 925	200	88 623

Source: own processing according to SLOVAK BUSINESS AGENCY. 2016. *Správa o stave malého a stredného podnikania v Slovenskej republike v roku 2016*. [cited 29.06.2019]. Accessible from <www.sbagency.sk/sites/default/files/pictures/sprava_o_stave_msp_v_sr_v_roku_2016.pdf>.

Based on the latest analysis of Slovak Business Agency, we can see that the National Holding Fund administered even seven funds in 2015 and 2016. In 2015, 3 of them were used in 5 investments in the total value of 4 335 000 €. In contrast, in 2016 only the Innovation and Technology Fund was used, through which 8 investment were made in the total value of only 772 925 €. This represents a year-on-year decrease of 82,17 %. On the other hand, the number of realized investments increased on 3, which represents an increase of 60 %. All investments were directed to the field of information technology.

The most used fund was Slovak Growth Capital Fund, based on the amount of total investments made since its establishment. This fund is used for financing at the growth stage of the company. In terms of the number of investments made since their establishment, the most used was Start-up Capital Fund. This fund was strictly committed to geographic jurisdiction on a defined territory.

Slovak Business Agency states in report *The situation of small and medium-sized businesses in Slovakia (2016)* that in 2015 the largest amount of finances 3 000 000 € went to companies as development capital. Into start-ups was invest 1 100 000 € and only 235 000 € was used as seed capital. In 2016, were made 7 investments in start-up companies in the total amount of 769 625 €. The rest 3 300 € was realized as seed capital.

3 Conclusions

Venture capital as an alternative source of financing is used in Slovakia in a much lesser extent than in other countries. The main reason is the lack of knowledge of entrepreneurs about a possibility of obtaining these types of finances. Organizations such as SLOVCA, which raise awareness of venture capital and try to spread information among the largest number of companies, operate in our territory. However, the problem is also on the supply side. There are few companies and funds that provide such a way of financing and dominate non-institutional investors. No less important factor is the certain conservatism of Slovak entrepreneurs against the entry of investors into their companies. There is overwhelming mistrust over investors, because companies afraid of expanding ownership to an investor. On the other hand, entrepreneurs forget about the amount of non-financial benefits, such as the knowledge or skills the investor can bring them. Venture capital is used in Slovakia only in basic forms such as start-up or development capital, particularly in the area of information technology and health care. The development of its use is very volatile. The volume of investments sometimes grows and the number of companies into which it was invested decreases or vice versa.

Venture capital is an important source of financing, especially for innovative small and medium-sized enterprises that have the potential, but are also high-risk and require high capital investment. Therefore, it is very important to continue to raise awareness of this type of investment and to present the business in which investors have been or are still operating and helped to create profitable and successful businesses.

Acknowledgement

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ANALYSIS OF TREASURY BENCHMARKED BONDS IN PRIMARY MARKET

Zuzana Rudášová

University of Economics in Bratislava
Faculty of Business Economics with seat in Košice
Tajovského 13
Košice, 041 30
Slovak Republic
zuzana.rudasova@student.euke.sk

Abstract. The aim of this paper is to analyse basic characteristics of treasury benchmarked bonds in primary market. This market was chosen because here the bonds are firstly introduced. For the purpose of the article the treasury benchmarked bonds are bonds, which use rate of U.S. Treasury securities as a benchmark. This paper analyse bonds in several ways. Firstly, we try to determine which countries issue these bonds. Second analysis determines how are these bonds distributed within various business categories based on the focus of their issuers. Then we investigate which sector issued higher volume of treasury benchmarked bonds. The end of our research focus on analysis of treasury benchmarked bonds based on ratings and spreads. The analyses realised in this paper should provide overview of treasury benchmarked bonds market based on their main parameters.

Keywords: bonds, rating of bonds, spread.

JEL classification: G12, G15, G24

1 Introduction

Bonds are one of the most widely used capital market instruments. A debt security or a bond represent debt-to-bond relationship between the owner known as the lender and the issuer of the bond known as debtor (Bajus, Galová, Kadarová 2011). The bonds are issued by governments or companies that are required to pay interest to investors on a regular basis and to repay the face value of the bond over bond's lifetime. (Lijuan Caoa, Lim Kian Guanb and Zhang Jingqing, 2005, Fabozzi, 2000). Default payment means that the company is unable to meet one of the payments (called missed pay or delayed pay) ((Lijuan Caoa, Lim Kian Guanb and Zhang Jingqing, 2005) Apart from stock exchange listings, bonds have their maturity, which makes them very hardly to compare in the same time. In order to improve the ability to compare yield in different conditions, bond market usually emit their bond using references or benchmarks to price the

securities. The underlying idea is that the “excess return of corporate bond over a similar risk-free bond (benchmark) compensates the holder for the cost of defaults.” (Hull, Predescu, White 2005). Use of benchmarks to define yield is applied in majority of issued bonds. The selection of benchmark depends on the issuer, who tend to agree with recommendation of underwriting bank. In the past, majority of issued bond in the bond markets use U.S. Treasuries as benchmark for their bonds. Before recent financial crisis, the U.S. treasury bonds were considered as risk-free investment. The detailed discussion describing pre-crisis use of U.S. treasuries as risk-free rate can be seen in Fleming (2000). Although, post-crisis use of such benchmark is in decline, it is still one of the mostly used benchmark in bond markets. This is the reason why we limit our research only to treasury benchmarked bonds.

Bonds, or debt securities, are an essential instrument of the capital market. The capital market is a mechanism where investors meet people who need these free funds to accomplish their objectives. Investors in this model represent the supply side and debtor the demand side. In bond market these investors become creditors and give up their current funds in favour of future profits, which they logically demand from the debtors. The return from the bond represent the retribution for current and future constraints (Rejnuš, 2014). There are several definitions of bonds. Chovancová et al. (2002) characterizes bonds as a credit relationship between the borrower (debtor) and the lender (investor, creditor) in form of financial security. According to Jindřichovská (2013) bonds can be characterized as a loan to the issuer from investors who bought the bonds after the issuance. Polouček et al. (2009) defines bonds as debt securities that express the debt relationship between the owner of the security and its issuer. While the owner of the security acts as a creditor, the issuer of the security is the debtor. The bonds can be classified into different groups based on their maturity, the issuance method and the type of the issuer. (Polouček et al., 2009) There are many differences between bonds and stock exchange shares or other financial instrument. For example, there is not official stock exchange for bonds. Apart from shares, most bonds have fixed maturity. In addition, bonds have usually pre-determined repayments and interests, while shares are entitled to dividends or participation in the liquidation balance. Unlike in some kind of shares, in bonds, the bond holder has no right to participate in the management or decision-making process of the issuer, i.e. he has no right to influence the operation of the debtor. (Chovancová et al., 2002). The bond is issued per par, which represents its current value. According to Rejnuš (2014) if interest rates of the bond on the primary market increase, the price of the bond on the secondary market decreases. (Rejnuš, 2014)

Baran (2003) states that the nominal or nominal value of a bond is stated directly in the bond text. The issue rate is the amount for which the issuer issues the bond. By issuing a bond, the issuer borrows funds from creditors, thereby committing itself to repay the borrowed amount after a specified period. The creditor's remuneration is a yield, in other words, a coupon whose size and maturity are determined by the issuer.

Each bond must meet certain requirements, otherwise it is invalid. Polouček et al. (2009) states that the bond must be clearly identified: indication that this security is a bond, the name of the issuer (name and address), the name of the holder (if it is a registered bond), maturity date of the bond, coupon amount, term of interest payment, the nominal value of the bond, the date of issue, the place of issue, the ISIN (12-digit code

that allows for better differentiation from other securities), the number and series of the bond, the issuer's representatives' signature. (Polouček et al., 2009)

2 Methodology

The bonds can be classified in several ways for example based on the type of issuer, type of coverage, volume of emission, maturity, etc. but for the purpose of this article we will mainly use sector classification proposed by Bloomberg Bond radar, which classify bond into five groups/ categories: 1. Agency bond, bonds of various international agencies and associations, 2. Financial bonds, financial sector bonds, 3. Corporate bonds, corporate bonds and commercial institutions bonds, 4. Country bonds, which represent bond issued by governments 5. Municipal bonds, bonds of municipalities and local territorial units.

The basis for the analysis was a sample of bonds obtained from the Bond Radar database, which contained bonds issued since 31.3. 2004 until 8.8.2016. For the purposes of this article, we only used bonds whose spread was quoted as “T” + basis points. The abbreviation “T” means that U.S. treasuries were used as the benchmark. The basis point represent how the interest rate of the bonds differs from interest rate of U.S. treasury (benchmark) with the same maturity. In this article we analyze bond market based on various parameters. Special attention is devoted to rating of the bond. Although, there are several credit rating agencies, Moody's and Standard & Poor's have the dominant positions among US credit rating agencies. These companies are much more active in bond ratings than others. (Baker, 2002). For purpose of this article, we will be use rating only from Moody's rating agency. It is because this agency has bigger market share. Moody's rating scale is based on letter and numbers. In order conduct statistical analysis, we transform rating into numerical values. The conversion table is presented in table 1.

Table 1. Rating scale from Moody's

Value	Moody's rating	Value	Moody's rating
1	Aaa	12	Ba2
2	Aa1	13	Ba3
3	Aa2	14	B1
4	Aa3	15	B2
5	A1	16	B3
6	A2	17	Caal
7	A3	18	Caa2
8	Baal	19	Caa3
9	Baa2	20	Ca
10	Baa3		
11	Bal	21	C

Source: Author's modification based on IMF (2010)

3 Bond issue by country

The first analysis was the classification of treasury benchmarked bonds based on the country of issuer. The motivation for this kind of research was to determine, whether the U.S. treasury is word widely accepted as appropriate benchmark for bonds and whether issuer for other countries this kind of benchmark to issue bonds. To answer this question, we decided to use pareto analysis which is presented in figure 1.

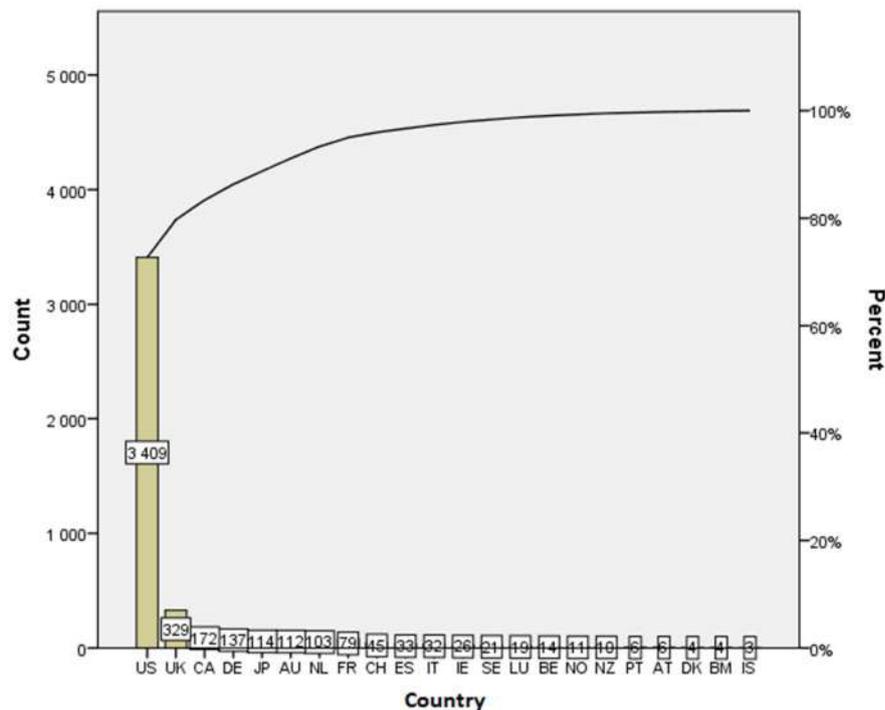


Fig. 1. Pareto analysis of number of bonds based on country of the issuer. *Source: Author.*

As was expected results presented in the figure 1 shows that most bonds were issued within the United States. Bonds issued in United State represent more than 70% of the treasury benchmarked bonds. In the second place is the United Kingdom, followed by Canada, Germany, Japan and Australia.

4 Groundings of the aircrafts and following consequences

The second analysis tries to determine which types of treasury benchmarked bonds are mostly emitted in the primary market. The type or category of the bond is determined by the issuers. The bond evaluation, measurement of risk differs based on the category of the bond. The results of this analysis are presented in Figure 2.

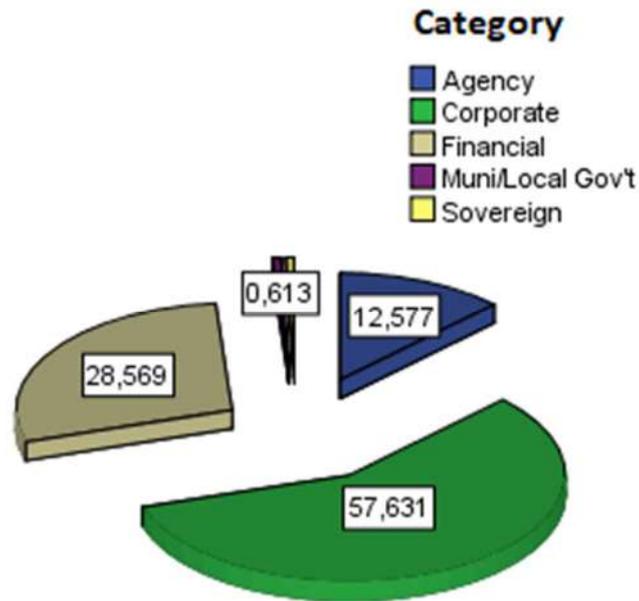


Fig. 2. Percentage of bonds by bond category. *Source: Author*

As can be seen from figure 2, the biggest share of treasury benchmarked bonds debt market (57,631 %) is represented by corporate bonds. Bonds from financial sector have the second largest share (28,569 %). Agency bonds represent third largest group of treasury benchmarked bonds (12,577 %).

Next analysis provides more detailed overview of issuers of treasury benchmarked bonds.

5 Case study of Smartwings Slovakia - consequences of aircraft groundings on charter market in Slovakia

Analysis conducted in this part of article are focus on characterization of issuers based on the sector that they are operating. Motivations for such analysis was to determine in which sectors most treasury benchmarked bonds are issued. Pareto analysis presented in figure 3 identifies the main sectors based on the volume of bonds from each sector. The group “other” consists of sectors which accounted for less than 1% of the sample under investigation.

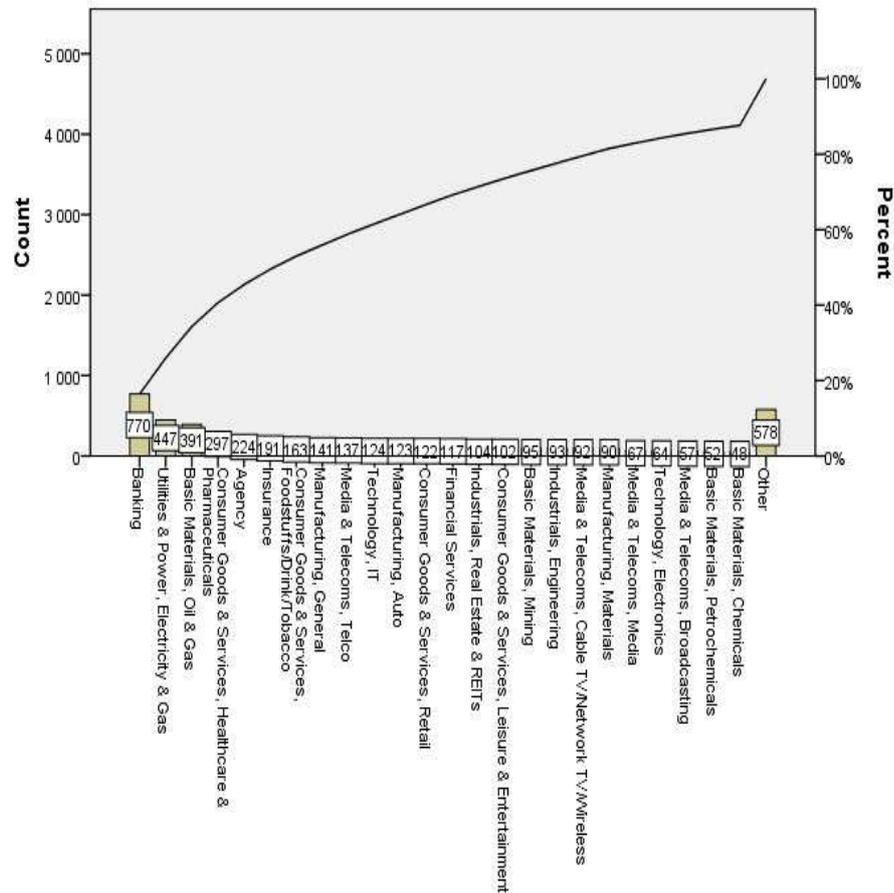


Fig. 3. Pareto analysis of bonds based on volume of bonds in sector. *Source: Author*

According to figure 3 issuers of treasury benchmarked bonds which operate in four sectors represent more than 40% of all volume emitted in primary market. The most bonds are issued by the banking sector, followed by the energy and services sectors. The oil and gas sector is the third sector. The health and pharmaceutical sector is the fourth biggest emitting sector.

6 Analysis of bond sector and rating

In the previous analyses, we have been focusing on different aspect of issuers of treasury benchmarked bonds. We analyzed them based on their type, their sector or their origin. In the further analyses, we will try to determine how the type of issuer influence main characteristics of treasury benchmarked bonds.

First, we try to investigate, how rating on the bonds as a measure of risk differ based on the type of issuer. Motivation for this kind of research was to compare riskiness of various issuers perceived by rating agencies. For this kind of analysis we used the box plot analysis that is presented in Figure 4.

The results of the box-plot analysis showed that there are significant differences in perception of riskiness of various type of issues. From the figure 4 can be seen that bonds issued by agencies have almost always lowest rating AAA, therefore they represent lower risk.

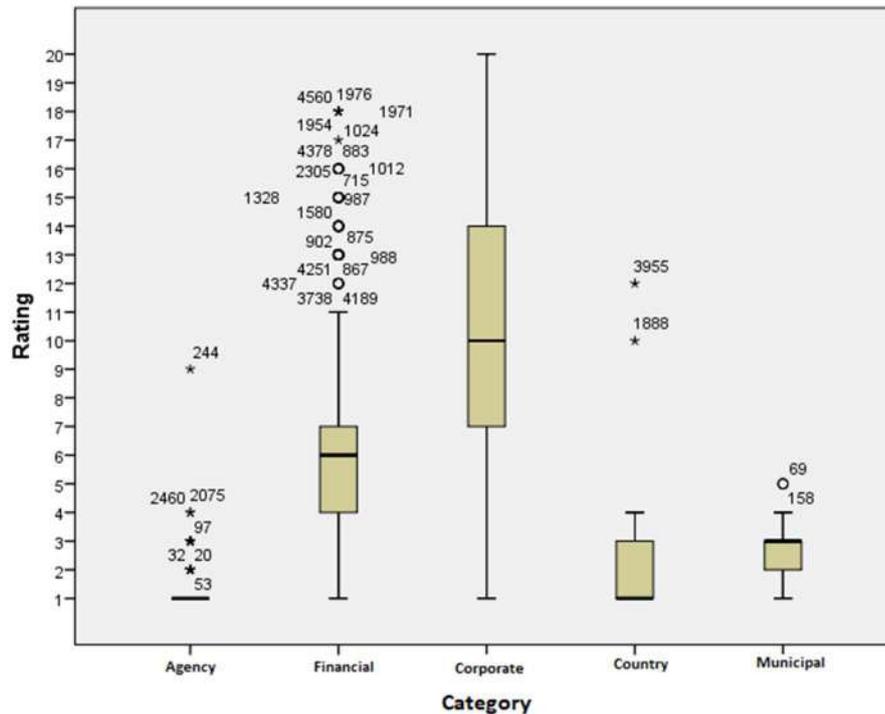


Fig. 4. The riskiness of bonds depending on category. *Source: Author*

The second place in terms of riskiness is represented by country or sovereign bonds. The position of the median in value 1 within the box-plot says that 50% of all country bonds have the best rating AAA and the size of the interquartile range indicates that 75% of all country bonds have at least an Aa2 rating or higher. Municipal bonds are on the other hand riskier, because the position of median in value 3 indicates that half of the bonds surveyed have either the Aa2 or Aa3 worst rating as well, with the interquartile range showing that only 25% of the bonds are better than Aa1. The results of the box-plot clearly show that corporate bonds are rated worst in terms of riskiness. Turning to the interquartile range, we can say that only 25% of corporate bonds achieve the first 7 best credit ratings. Another 50% reaches ratings from A3 to B1. The remaining 25% contain a rating worse than B1. Financial bonds are less risky than corporate bonds. The interquartile spread says that half of these bonds are rated between Aa3 and A3.

7 Spread of bonds by category

After we analyzed differences in rating based on the type of issuer, our attention switch to analysis of spread. The higher rating is usually connected to higher spread. Motivation for this kind of research was to determine whether distribution of spread and its variability is similar to distribution and spread of ratings based on various type of issuers. We also used Box-plot analysis to analyze the spread/ yield of bonds based on bond category. We can see that figure 5 is optically similar to the figure 4.

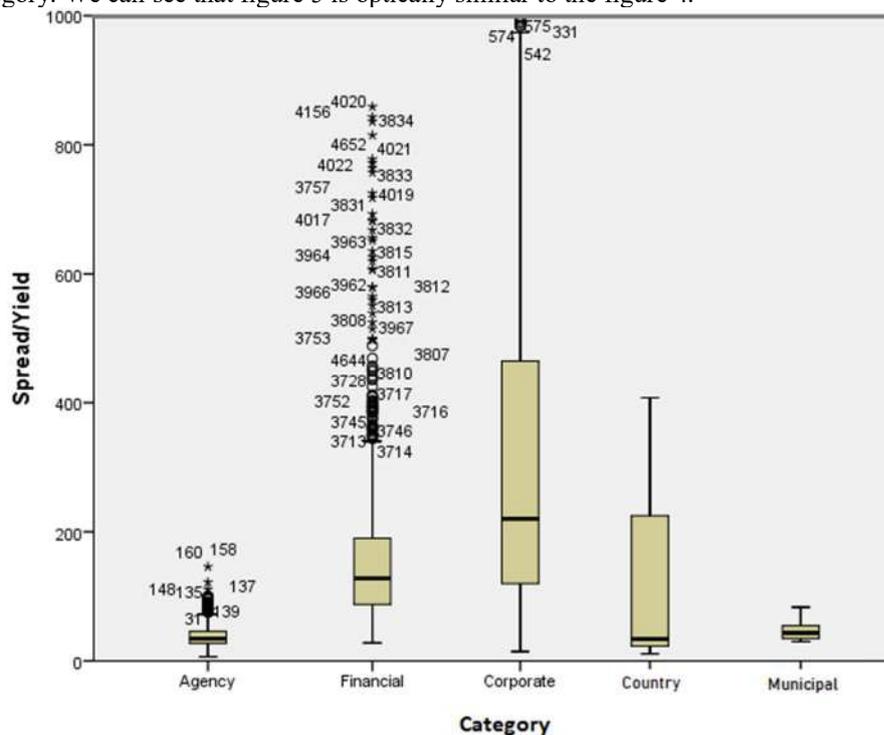


Fig. 5. The spread of bonds depending on category of bonds. *Source: Author*

As was mentioned before, figure 5 is very similar to the previous one especially in term of agency rating. The variability of spread of agency bonds is very low. In term of sovereign or country bonds, it can be seen that variability of spread is quite high. On the other hand, the median value suggest that these kind of bonds are second lowest profitable bonds, which is align with the findings of previous analysis. The highest variability in terms of rating was detected in corporation bonds and financial bonds. As we can see in the previous figure, corporate bonds have a wide range of rating grades (contain also non-investment grade of rating i.g high riskiness) but they have the highest spread/ yield.

8 Analysis of the impact of selected bond attributes on bond yield

The last part of the research focus on determination of relationship between basic parameters of treasury benchmarked bonds. The motivation for this research was to determine how various basic parameters of bonds influence each other. The basic attributes that were selected for analysis are:

- Issue volume (in millions): variable representing the size of the issue
- Maturity: a variable that represents the maturity of a bond
- Rating: variable: representing the degree of risk
- Spread/Yield

Since all these characteristics are categorical, non-parametric statistics had to be used in order to measure level of association. On the other hand, the bond yield, which in this case acts as an explained variable, reaches a number of different values. Therefore, the Spearman correlation coefficient was used to analyze the relationships between the above variables. The results of the analyzes are presented in Table 2.

Table 2. The impact of selected bond attributes on bond performance

Spearman's rho		Volume in millions	Maturity	Rating	Spread/ Yield
Volume in millions	Correlation Coefficient	1,000	-,089**	-,402**	-,323**
	Sig. (2-tailed)	.	,000	,000	,000
	N	4689	4689	4689	4689
Maturity	Correlation Coefficient	-,089**	1,000	,151**	,237**
	Sig. (2-tailed)	,000	.	,000	,000
	N	4689	4689	4689	4689
Rating	Correlation Coefficient	-,402**	,151**	1,000	,842**
	Sig. (2-tailed)	,000	,000	.	,000
	N	4689	4689	4689	4689
Spread/Yield	Correlation Coefficient	-,323**	,237**	,842**	1,000
	Sig. (2-tailed)	,000	,000	,000	.
	N	4689	4689	4689	4689

Source: Author

The results of the analyzes show that all Spearman correlation coefficient values can be considered statistically significant at the significance level $\alpha = 5\%$, as the values of the Sig (2-tailed) parameter for all coefficients was less than 0.05. However, the values of the coefficients themselves differ, which means that the different variables affect the yield of the bonds differently. The lowest correlation rate can be observed for maturity. A value of 0.237 says that we cannot speak of a strong relationship between maturity and profitability. The link between the volume of issue and profitability is somewhat stronger. A negative sign of the coefficient indicates that this is an inverse proportion,

which mean that with increasing volume, the bond yield declines and vice versa. Since the value of the coefficient itself is

-0.323, there is no strong correlation between the variables. This brings us to the last of the variables analyzed, namely the rating. The value of the coefficient of 0.842 clearly shows the strong influence between rating and return, e.g. with increasing rating (risk), the bond yield itself increases.

9 Conclusions

The research carried out in this paper dealt mainly with the analysis of the bonds, whose return was quoted based on US government bonds as the reference interest rate. Aim of this paper was to describe this type of bond market. Our attention was focused mainly on primary market, and on the issuer of the bond.

We analyzed this specific kind on bond market based on the country of the origin of the bond respectively issuers. The results showed that treasury benchmarked bonds are mainly emitted in United States and United Kingdom. This lead to the question whether the treasury benchmark is still worldwide considered as proper benchmark. Regarding the sectoral breakdown of individual bond issuers, it can be argued that the most profitable sectors remain the traditional sectors, such as the oil and gas, banking, energy and pharmaceutical industries. On the other hand, our analysis showed that industries focused on the production of consumer leisure and entertainment products start to compete with them.

In term of various type of issuers, the analysis showed that the bond market in question consists mainly of corporate bonds. These bonds represent 85% of the examined sample. This means that corporate bonds are a major part of the securities market. In second place are bonds of issuers from the financial sector, whose share is 14%. Other types of issuers issue less 1% of treasury benchmarked bonds.

Our analysis also showed great difference in term of ratings and spread based on the type of issuer. As far as rating is concerned, the risk analysis showed that corporate bonds are the riskiest, only 25% of corporate bonds have rating rate A3 and better rated, and 55% of bonds have rating scale from A3 to B1. The least risky are agency bonds, which are almost all marked with the best rating. Within the financial sector, we can say that 75% of bonds are rated A3 and better. In term of relationship between basic parameters of bonds. The conducted tests confirm strong positive relationship only between rating and yield. Mild negative relationship was confirmed for volume and spread.

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MARKETING EMOTIONS IN THE RESTAURANT BUSINESS

Savvtska Natalia Leonidivna¹ and Chukurna Olena Pavlivna² and Mykhailova Mariia³

¹ Kharkiv State University of Good Technology and Trade, Kharkiv, Ukraine Doctor of Economic Sciences, Professor of the Department of Marketing and Commercial Activities Kharkiv, Ukraine

² PhD Economics sciences, Associate Professor of the Department of Marketing Odessa National Polytechnic University Odessa, Ukraine

³ Kharkiv State University of Good Technology and Trade, PhD Economics sciences, Associate Professor of the Department of Marketing and Commercial Activities Kharkiv, Ukraine

natalisavitska2010@gmail.com¹

elenchukurna@ukr.net²

mvmykhailova@gmail.com³

Abstract. Urgency of the research is due to increased competition in the business environment, pessimistic consumer attitude in the economy, growing demands of consumers for restaurant business establishments. The purpose of this research is to substantiate the effectiveness of the influence of emotion marketing tools on the loyalty of clients of restaurants facilities. Ukrainians' restaurant business is developing towards price democratization and uses tools of emotional influence on the consumer behaviour. The specifics of customer communications is the combination of offline and online marketing tools. The research is based on the methodology of the behavioural marketing. The work defines the profile of the visitor of the restaurants, preconditions for the use of marketing tools for emotion in the restaurant business. The methodology of the grade assessment of the restaurants clients' loyalty has developed. The means of formation of the behavioral patterns on the market of restaurant services of Kharkiv city are determined.

Keywords: marketing of emotions; restaurant business; behavioral marketing; competitive advantages; client experience; customer loyalty

JEL classification: M 31

1 Introduction

Under the influence of increasing competition in the business environment, falling real incomes, increasing mobility and consumer awareness, as well as their requirements for restaurant business services, customer orientation is no longer a fashionable trend of enterprise development, but an urgent need to build a marketing strategy of relationships. In recent years, the restaurant business has undergone a phase of shock, with a

sharpening in the period from 2014-2015 and moved to stabilization in 2018. The percentage of restaurants that open and close is balanced and averages 30% per year [3].

According to the Nielsen survey, the consumer confidence index in Ukraine was characterized mainly by pessimistic sentiment in the fourth quarter of 2017, since the index value was 61 points [4]. Confirmation of this trend and its continuation over time are the authoritative research of GfK Ukraine on the consumer sentiment index, which in March 2018 amounted to 57.7 points [6]. The indicators show a positive trend compared to the previous periods, which indicates a slight revival of the consumer market. This data also confirms the trend of emotional economy when consumers seek impressions and positive emotions from the process and outcome of a purchase with a limited budget. The problem of developing a restaurant business requires finding adequate marketing tools to influence the customer experience and behavioral patterns of consumers of restaurant facilities.

2 Discussion of the problem

Important theoretical and practical achievements in the field of marketing emotion was discussed famous scientists, including O. Bolotna [1], Y. Gubareva, M. Oklander [11], O. Ocheretna [7], A. Ries, J. Trout [5], J. Guerreiro, P. Rita, D. Trigueiros [14], R. Bagozzi, M. Gopinath, P. Nyer [2], B. Schmitt [15] and others.

Ries Al, Trout Jack drew attention to the fact that marketing is a battle not of the goods themselves, but of their perception [5]. Thus, the behavior of buyers and consumers depends largely on emotional perception, not just on rational motives.

J. Guerreiro, P. Rita, D. Trigueiros have proven the effectiveness of marketing depending on the cognitive and emotional reactions of the consumer and have revealed the mechanism of their influence on the decision to purchase goods (services) [14]. R. Bagozzi, M. Gopinath, P. Nyer investigated the role of emotions in marketing, their differentiation and various issues of measuring and influencing the level of customer satisfaction [2]. The authors [2] interpret emotions as mental states of readiness for actions that arise as a result of evaluating events or their own thoughts. M. Oklander's scientific school focuses on the dependence of consumer behaviour on the brain's perception of different stimuli in the form of unconscious images, colours, established patterns of behaviour [11]. The scientific controversy at the Ukrainian Scientific School of Marketing unfolds around the concepts of emotional marketing and impression marketing. In the works of O. Bolotnaya [1] and O. Ocheretyana [7], the marketing of emotions is equated with the marketing of impressions because they are built on the emotional connection between the goods (brand, brand) and the consumer. The fundamental difference between these concepts, in our opinion, lies in the distinction between instrumental and resultant approaches. In understanding the impact of marketing tools on consumer behaviour, it is advisable to apply the concept of marketing emotions. Despite the considerable scientific achievements, methodological approaches to determining the influence of marketing tools on the loyalty of clients of restaurant establishments require development and tooling.

3 The statement of basic materials

The basis of the study is the methodology of behavioural marketing, which is based on the triad of behavioural analytics planning of intervention tools in the formation of specified behavioural patterns and behavioural audit. The article contains the results of your own marketing research and secondary information from open sources.

According to a representative sociological survey conducted by the Kiev International Institute of Sociology in February 2018, 30% of the adult population of Ukraine (over 18 years of age) have a dinner in catering facilities and restaurants. The indicated share of the population remains unchanged compared to the same period of 2017. In the regional aspect, the results of the survey allowed to rank the activity of the population when choosing catering facilities and restaurants. The most active consumers of restaurant services were the Western region of Ukraine - 33%, the least active - the Eastern region of Ukraine, in which only 20% of respondents choose restaurants for have a dinner [8]. In Fig.1. is presented illustration of the socio-economic profile of a catering customer.

Surveys [8] show that the most active catering customer are the young - millennials (61% of men and 49% of women) and persons under 40 years of age (56%). There is a general civilization tendency for greater activity of millennials not only in consumption but also in the exchange of opinions and evaluations of the activity of food establishments in social networks when comparing the preferences of other age consumer groups in the domestic market [9].

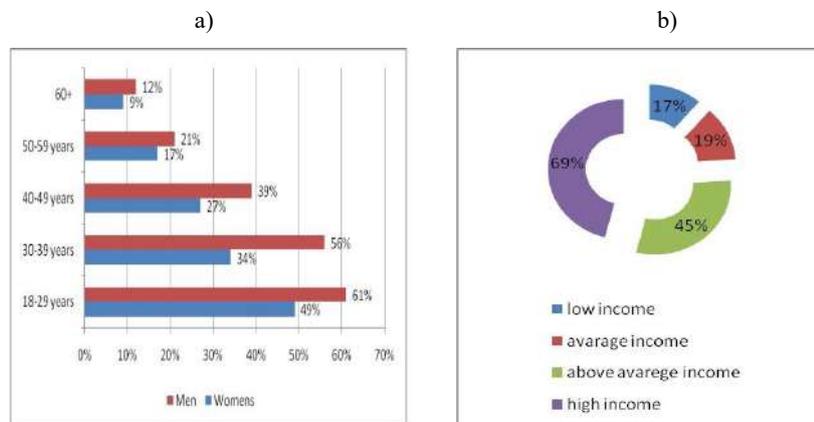


Fig. 14. Socio-economic profile of the catering customer a) sex and age; b) the level of income

Source: systematized by the authors according to the data [8]

By the level of income, as can be seen from Fig. 1b), the most active consumers are persons with an above-average income level, which is 45% of respondents, and high-income consumers - 69% of respondents. An advantage of respondents in choosing catering facilities is shown in Fig. 2.

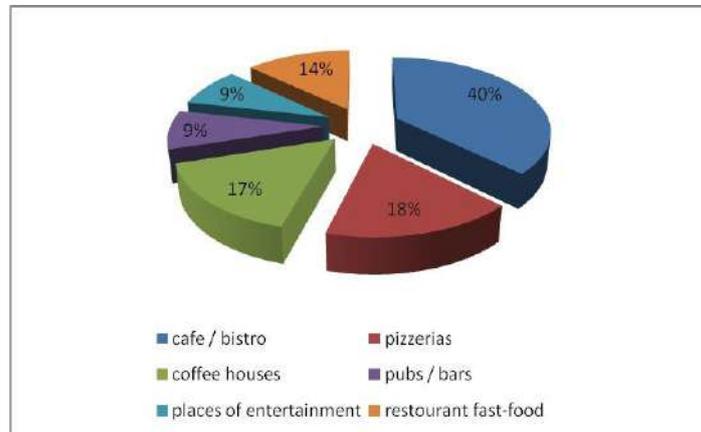


Fig. 2. Distribution of catering customer preferences in choosing the type of catering facility.

Source: systematized by the authors according to the data [8]

According to the results of the survey, the population of Ukraine prefers democratic fast-casual formats operating in the "middle" or "below-average" price segment, which include cafe / bistro 40%, pizzerias - 18%, coffee houses - 17%, pubs / bars, places of entertainment - 9%. This format of the catering facilities provides a democratic version of restaurant service, and the quality of cooking and service attracts customer flow. Fast-food catering facilities focus on fast and inexpensive food, operate in the "lowest" price segment, but are favoured by only 14% of respondents [8].

According to the data [8] given in Fig. 2, restaurants, including high-end cuisine with a creative component - fine-dining, operating in the "above average" price segment, attract only 9% of customers. This distribution of consumer preferences is in line with global trends in the marketing of restaurant services, characterized by increasing requirements for the entire chain of quality of service, the use of quality management tools (TMQ), improving the level of food safety, the introduction of healthy nutrition and increasing requirements for staff [12].

In general, the role of the restaurant business has changed for the modern potential visitor as more and more customers try not only to meet their physiological needs for food, but also to spend leisure time and get positive impressions.

In scientific works of J. Pine, J. H. Gilmore [13] at the end of the twentieth century was appeared of concept of impression economics, which replaced the agricultural, industrial and service stages of economic development in global market. This trend came to the Ukrainian restaurant market after the 2014 crisis, becoming the subject of creating new consumer value not only in concept restaurants, but also in mid- and low-end restaurants.

There are several reasons for the spread of tools of marketing emotion in the restaurant business. In the first, the restaurant services market is characterized as monopolistically competitive, that is, key competitive advantages are generated in the product differentiation plane: by price; territorial location; the physically measured qualities of

the services provided and the clients' subjective perception of the totality of the institution's services.

Secondly, price competition among premium segment catering facilities and restaurants is less important than lower-end restaurant. Since in a competitive market it leads to a depersonalization of supply [10], thus weakening the competitive position of the catering facilities and repelling customers, sowing distrust through possible savings for the quality of the ingredients of the dishes, the deception or the poor service.

Thirdly, the utilitarian notion of service value is destroyed by the means of marketing emotion, in particular, neuromarketing, sensory marketing (relevant music content, aromarketing), which influence the intensity of emotional and cognitive processes of consumer choice [14].

Fourth, impressions create additional consumer value due to the full or partial involvement of the customer in the process of creating a service that allows personalizing the services of restaurants, cafes, bistros. These tools of marketing emotion are lighting, colour, smell, texture, sound, taste, appearance, show program become a unique client experience, which creates competitive advantages of the institution. As a result, strong positive impressions merge with the subject of consumption, become emotionally coloured, therefore unique, and the consumer experience makes the customer not only satisfied and loyal, but also happy [15].

That is, the subjectivity of evaluating the impressions of the consumption of restaurant services is a key point in marketing research. According to our observations, about 70% of respondents rely on emotions in deciding about catering facilities, 81% of clients with a positive service experience are more likely to reuse the services of the catering facilities catering facilities, and satisfied customers will expand the experience and spend even more when they visit again. Therefore, it is important for marketers to know how and what marketing tools have influenced the emotions and impressions of visitors to the restaurant.

In order to identify marketing tools for influencing the loyalty and satisfaction of customers of a restaurant service, a market research was conducted in the market of Kharkiv, which used the method of continuous survey of visitors of establishments (offline or online questionnaire) directly at the points of sale, immediately after receiving the services and the proposed method of the satisfaction rating given in Fig. 3.

The proposed method is presented in Fig. 3, is based on the processing of the results of the questionnaire on a 5-point scale, which allowed to obtain the integral loyalty index (formula 3), formed by the method of harmonious average values of the index of quality of services of the institution (clients formula 2) and the partial behavioural indices, calculated by the formula. The Perceived Quality of Service Index (Formula 2) averages information on customer evaluation of important parameters of the restaurant service chain's quality of service chain. These include: P1 product - breadth of assortment, quality of food and drinks; P2 price - expectations about an institution's pricing policy; P3 place - concept of the institution, convenience of territorial location; P4 promotions - thematic design, atmosphere, events; P5 personell - quality of service and contact staff; P6 emotions - impressions of visiting the institution.

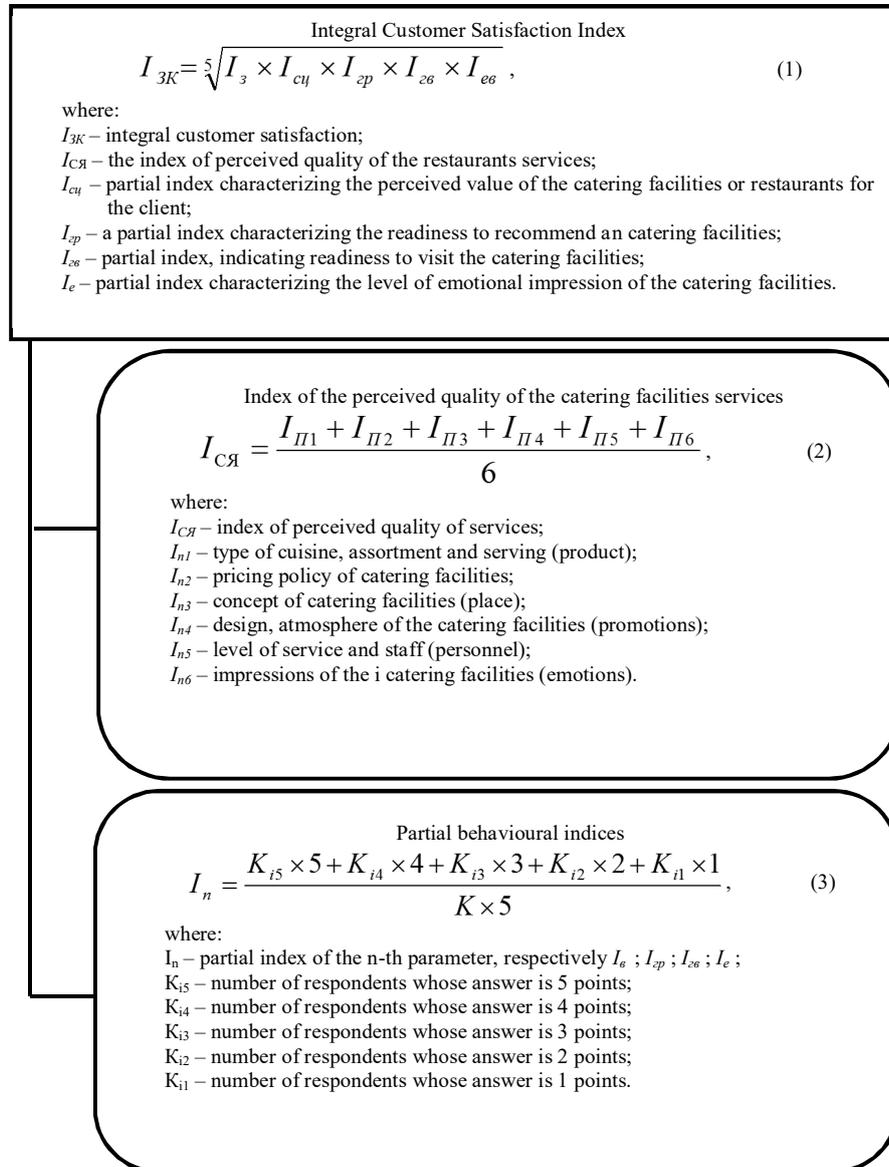


Fig. 3. Methods for assessing customer satisfaction with the services of a restaurant

It was calculated customer satisfaction indicator for each institution of restaurant business. The integral customer satisfaction index varies in the range from 0 to 1. It is enough to distinguish three levels of customer satisfaction with the institution's services in order to manage customer relationships: high (ICC value from 0.67 to 1); average (ICC values from 0.34 to 0.66) and low (ICC values from 0 to 0.33).

This approach allows us to determine the effectiveness of individual tools of the marketing complex and to respond promptly to the needs and expectations of customers. During January-March, the proposed methodology in the Kharkiv market in coffee life networks Coffee life, Aroma coffee, Sweeter, Bakery (Fig. 3). The results of the study showed that the integral customer satisfaction index of these institutions is in the range of 0.4 - 0.6 points, that is, the average level of customer satisfaction with the services of these institutions. The method was presented allowed to identify the competitive advantages of each coffee shop, the gaps in the quality of service chain, and to identify specific marketing tools that will promote positive emotions and create pleasant impressions that will increase the level of satisfaction and ensure re-visit.

It was recommended to use social media marketing (SMM) tools to monitor client behaviour and build positive customer experiences, Given the target audience of under 40. The growth rate of Internet users in Ukraine has been 211.42% since 2012 [16], the reach of online space and other age groups has increased, which has significantly expanded the use of digital marketing tools in the restaurant business. However, the specifics of this business require a combination of offline and online communication tools with clients, so digital influencers (storytelling, blogosphere, retargeting, email marketing, collaborative filtering, and client coaching) are only used as additional emotion marketing tools.

4 Conclusions and policy implications

The domestic restaurant market is influenced by the worldwide trend of restaurant democratization and the dominance of quality management throughout the value chain and quality assurance from procurement to customer service and comfort. The emotional component of choosing a restaurant service establishment has a significant impact on the behavior of the customer, the specificity of communications, which is to combine offline and online marketing tools. In the restaurant services market, emotions, brand, solicitations of a target audience, and a restaurateur's offer are equally important in building customer loyalty and satisfaction.

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SOCIO-ECONOMIC COMPONENTS OF THE INTEGRATION POLICY OF MODERN UKRAINIAN SOCIETY IN THE CONDITIONS OF INFORMATION- PSYCHOLOGICAL WARFARE

Tatiana Sergiienko¹ and Olena Krainik² and Olga Berezhna³

¹National University Zaporizhzhya Polytechnic Faculty of Law Zhukovsky, 64, Zaporozhye, the Zaporozhye region, 69061 Ukraine

²National University Zaporizhzhya Polytechnic Faculty of Civil Engineering, Architecture and Design Zhukovsky, 64, Zaporozhye, the Zaporozhye region, 69061 Ukraine

³Faculty of Metallurgy Engineering Institute of Zaporizhzhya National University Zhukovsky, 66, Zaporozhye, the Zaporozhye region, 69061 Ukraine

¹sergienko7921@gmail.com, ²elenakrainik2@gmail.com, ³berolgar@ukr.net

Abstract. In this study, the conceptual and categorical apparatus of integration are considered. The socio-economic aspects of the integration policy of modern Ukrainian society are studied and it is proved that the process of integration can have both negative and positive consequences. The purpose of the article is to study the socio-economic components of the integration policy of Ukrainian society in the conditions of information and psychological warfare. The basic scientific methods of research are used: induction, deduction, analysis, synthesis, and comparison methods. It should be noted that scientific research that has been conducted allowed substantiating the theoretical and methodological principles of the influence of integration processes on both social and economic development of modern Ukrainian society.

Keywords: integration, international process, integration policy, socio-economic indicators, society, state formation.

JEL classification: F5, F15, H5

1 Introduction

The relevance of the research of this subject lies in the fact that along with the ambiguous processes those occur in the modern world and have a direct impact on the Ukrainian state, the problem regarding the integration policy processes of society in the conditions of information and psychological warfare are updated as well. The modern realities show that the process of integration contributes to the state formation, whereas

the task of our state is the reconciliation of interests of different social groups and classes. Any state develops with evolving of society due to which society differentiation happens. Yet, at the same time, its regulatory systems are becoming more complicated and improved. In this regard, the state begins to perform more functions, increasing its influence on all processes that occur in society. Thus, the function of social integration becomes particularly important.

The problem of the influence of integration processes on the development of the state and society attracts the attention of both foreign and Ukrainian academics. At the same time, the study and analysis of the published works on this problem showed that there is no comprehensive study with a systematic consideration of the problem of integration processes and the selection of various components of integration policy in the modern world.

Considering the information mentioned above, the main research tasks are:

- to consider the conceptual and categorical apparatus of integration and to study the integration theory;
- to study the impact of integration processes on the social and economic development of modern Ukrainian society.

Such formulation of the subject corresponds with the main objective of the study: the socio-economic components of the integration policy of Ukrainian society in the conditions of information and psychological warfare.

2 Characterization of integration processes

Every state that declares itself as a subject of civilization development finds the existing order of relations between different countries or groups of countries, which manifests itself in deterministic forms of economic and political coexistence. Therefore, the problem of integration of Ukrainian society is important for Ukraine.

Before analyzing the socio-economic components of the integration policy of modern Ukrainian society, we should consider the definition of the term «integration» and analyze several integration theories. The term «integration» suggests a set of processes aimed at merging ethnic groups within one state (Makar, 2001). Therefore, integration is the process by which parts or elements of society engage in active and coordinated agreement with the way, lifestyle, activities and goals of the dominant ethno group in society. Thus, integration is considered in «three different phenomena»:

- integration of «life chances», i.e. increasing the levels of education, income, employment, quality of housing;
- cultural integration, acculturation or complete assimilation;
- political integration that occurs when several ethnic groups in society recognize and affirm the legitimacy of the system (Nadolishnii, 1999).

In relation to the definition of «integration policy» –this is an activity that is aimed at the development and regulation of economic relations with other regions and sub regions, which involves the specification of the strategic objectives of the state in the integration

processes as a whole, as well as with individual sub regions, communities and countries, ensuring the achievement of the goals and the preservation of the achieved results. According to logic, the integration policy of Ukraine, as any other country, should be based on the foreseen objective state formation process. Therefore, focusing on the policy of integration, we should refer to the Western concepts of integration, which explain the process of combining the separate parts into a single whole.

Western researchers have developed around ten concepts of integration. The most known are:

- communication;
- functional;
- non-functional;
- normative value;
- unification.

The communication concept of integration was based on the principle of «isomorphism», based on the assumption that all social, political and ethno-political processes, in particular, relations between individual ethnic communities, political nations and states are subject to identical laws, logically. So integration is the development of a social network or communications network. As a result of communication processes, a «security society» emerges, where conflicts will be resolved in other ways.

As a result of communication processes there is a «society of security», where contradictions will be solved in other ways.

Representatives of the functional concept provide for the identification of elements of the social system and an explanation of its place, role, and significance, i.e. functions in the process of social in traction. They consider that the integration process is ensured, first, by the interpenetration of values and needs, and, second, by the activities of such four subsystems as:

- a) economical, performing the functions of the adaptation;
- b) political, defining an ultimate goal and ways to achieve it;
- c) normative, ensuring the integration;
- d) value, which contributes to the reconstruction of an integrated system.

Sufficient to say that the «integration of society» is considered as a process of combining the components of society by harmonizing different social groups, assimilation of different cultural elements and reconciliation of different moral norms. Thus, in order to deepen the integration processes, special mechanisms are required, namely: the universal legal system, the expansion of the rights and obligations, the increasing of the role of symbolic intermediaries that in turn would lead to a united integrated system, with harmonious relationship between its parts.

Non-functional integration theory comes from the fact that the process of integration in one field contributes to the integration in the other. Proponents of this theory emphasize the importance of motivations of participants of integration processes, an adaptation of elites, their specific role and strategic line in these processes; they explore the factors of growth and downfall of community unification.

Unification theory is obtained from the analysis of the processes of integration, according to him, «unification» of those political units that previously had weak ties, or had none. The process of integration, in his opinion, is within cultural homogeneity and territorial proximity.

Thus, it can be seen from the above that integration can be seen both as a process and as the integration of individual parts into a single whole, both at the national and international levels. Western concepts often recall such types of integration as economic, political, military, technological, cultural, and ethno political. Therefore, having Western concepts and basic integration theories into consideration, we may note that determination of the integration process of society comes along with such concepts as stability, lack of conflict, normatively, order, balance, strength, and firmness.

To achieve social progress, peoples create common goals – material and spiritual values formulation (Loban, 2004a). However, there are some barriers because of their own ethnic differences as language, race, culture and traditions. In addition to purely ethnic differences, peoples also share the level of economic, political, cultural development and geographical environment. The internal harmony of the national-state community becomes the basis for the sovereign development of the people that functioned in a multi-ethnic structure for a long time. But it should be borne in mind that such kind of independence is often formal because new states must develop relations with other countries, which in turn may cause conflict and misunderstanding. G. Fedotov noted that the whole history can be interpreted as interchange of integration and disintegration. The first process may be named as growth, development, association, or conquest, enslavement, assimilation; the second would be: downfall, decomposition, or dismissal, the birth of new nations, depending on what statehood or nationality is in the center of our interests» (Fedotov, 1993).

The realities of today show that the events taking place today in Ukraine lead to disintegration processes in society and the state as a whole. According to O. Kryvytska, «scientists face a difficult task: to find out the deep sources of the unnatural state in the Ukrainian-Russian relations and to offer their vision of ways out of the crisis» (Kryvytska, 2017).

The annexation of Crimea and aggression in the Eastern regions of our country were carried out by Russia through economic pressure, propaganda campaign, diplomatic blocking of legal mechanisms of international organizations that resolve conflicts, etc. It is the actions of the Russian Federation in Ukraine that has added important defining techniques to the discussions on the issue of «hybrid war» (Interview with Frank van Kappen, 2014). Thus, the conflict between Ukraine and Russia has led to a crisis of Ukrainian society. The tragic events of recent years have led to dramatic changes in the structure of the identity of a certain part of Ukrainian society (Arabadzhyiev, Seriienko, 2019).

This is due to the fact that «different historical experiences in different regions of Ukraine have created political cultures and identities that vary» (Himka, 2019). Identification of these differences cannot be explained only by historical factors (Loban, 2004b). The events that take place today in Ukraine are ideological, civilization and are intended to subordinate the consciousness of the population and to form a certain worldview with the help of information resources. Mass consciousness that lacks clear

identification is unable to cope with information «poisoning». Information war involves the use of manipulative influence on human consciousness in the ideological and emotional sense. S. Kulchytsky states that four different language and mentality communities were formed as a result of a long stay in the Soviet Empire, i.e. Ukrainian-speaking Ukrainians, Russian-speaking Ukrainians, Ukrainian Russians and «the rest» (Kulchytskyi, 2015).

Therefore, taking into account the current situation in Ukraine, it is the further implementation of successful integration reforms that can lead to the improvement of the political system and, as a consequence, to the solution of the accumulated social, political and economic problems.

Effective steps that will contribute to the integration of Ukrainian society should be coordinated actions of public authorities and civil society in forming the directions of implementation of the cultural policy of the state (Astakhov, 2017). Thus, the phenomena that negatively affect the integration policy in Ukraine also help the strengthening of bureaucratic arbitrariness, which distorts the constructive role of the state. Thus, the main mistake that prevents our society from functioning well is the massacres'is of trust to the power structures. Disintegration leads to institutional distortions (Sergiienko, 2019). In order to get closer to the understanding of the concept of «institutionalization of civil societies», it is necessary to consider in detail the processes of institutionalization of political integration and social order, which focuses on the formation, fictionalization, and interrelation of political institutions. Institutional as pacts emergence inside civil society begins the reform of norms and standards of conduct that correspond with the civilization development of mankind; therefore, institutionalization, as noted by V. Zuieva – «is the process of determining and consolidating the social, political, legal norms, rules, statuses and roles that build 'dispersion' of ties in society into a single whole, that is able to satisfy human needs» (Zuieva, 2003). The process of institutionalization of civil societies is determined by a number of factors of political, economic, legal and socio-cultural nature, which are due to complex processes that are manifested in post-socialist countries (Babarykina, 2018).

The degree and nature of the institutionalization of society, i.e. the number of arising institutions and the ability of their formation, indicates the level of development and type of society, its political system, and associative life, freedom of formation of political and other groups. In this respect, the modern democratic state is significantly different from the archaic, authoritarian and, especially, totalitarian states, whose political and social structure is reduced to a minimum of formal political and civil institutions (Astakhova, 1997). Institutional distortions or deformations are those that do not correspond with the functional nature of institutions and have a destructive impact on the institutional system as a whole. Distortions imply more than the usual imperfection or inefficiency of the institution. The deformation of any link in the institutional system of society generates a clear distortions reaction, which – in the end – can destroy the entire system. The ethical manifestation of this institutional breakdown is a crisis of trust.

The reason for the mass distrust to the government is well known: the property confrontation, which manifests itself as a political and socio-psychological alienation of the masses from the ruling elite, as well as distrust of the lower classes in relation to the

upper classes. Another reason is the low living standards of the population, low wages and pensions, unemployment all of which deepen the alienation of the population (Libanova, 2015).

Therefore, to ensure an effective process of integration of Ukrainian society, it is necessary to implement such an integration policy, that would aim to minimize the risks and threats related to the events that occur within the state, as well as the realization of structural reforms and modernization of the economy, society, social and labor relations and humanization of the economic space (Kindratets, 2004). Taking into account the above statements, the question of ensuring the macroeconomic basis for the modern Ukrainian integration policy implementation becomes genuinely actual. The events that are taking place in Ukraine today require certain measures in the state policy aspect, both in the economic and social spheres.

To ensure the social integration policy in modern Ukrainian society, it is necessary to form effective mechanisms for the implementation of state policy, which is designed to minimize the deterioration of the quality of life and labor potential of Ukrainian citizens. It is worth mentioning that the most important and theoretically least comprehended – in relation to the processes of integration in society – is the phenomenon of social responsibility, which is defined as the willingness to socially recognize the consequences that have occurred as a result of the decision taken by the subject. For the social situation analysis, it is important not only to assess the willingness to recognize the consequences, but also the readiness of the subject – in a situation of choice – to make decisions. The disintegration degree can be accessed via the responsibility and irresponsibility ratio, which is determined by the intention to remove the consequences of the decision or to refuse to decide at all (Serhienko, 2006).

The phenomenon of social solidarity in an unstable society is also being significantly transformed. Its analysis is carried out and based on approach, in the center of which – as a structural unit of society – is the acting reflexive individual. In contrast to the virtues that are closely linked to certain values, for example, the obligation to be fair, honest or merciful, the solitary suggests no moral obligation to be solitary. Solidarity as such does not indicate with whom, when, where and why the one has to be solitary; it necessarily implies the addition of some other value or essence, in the name of which – or for the sake of which – it is necessary to be solitary. On this basis, it is acceptable to speak of solidarity whilst implementing the actions that are considered both heroism and crime in various value systems.

Tolerance is one of the most important conditions for the integration of any social whole, which is seldom homogeneous either structurally or ideologically. The positive role of tolerance in the regulation of social interactions is of a double nature. From one side, the culture of tolerance reduces inherent for social conflicts and explosions. On the other side, it allows finding alternative ways of working through a willingness to listen to other thoughts and ideas, and acceptance of those that are useful and acceptable to society.

3 Conclusions and policy implications

In order to consolidate society, there should be a common platform for communication for the ethnic groups. It is within the interests of the Ukrainian state to form its own structures of the interaction of ethnic groups as soon as possible. The policy of national revival and modernization should become the basic strategy, because only the mental structures of a developed civil nation can become the basis for communication between different cultures. This means that the national state ideology of revival should organically combine the actual national interests. Further research will be focused on studying priority area so internal Ukrainian integration and the formation of national reconciliation, as well as on the analysis of the impact of the international processes on the qualitative and quantitative parameters of the country's economic development.

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GROUP SIZE EFFECTS IN PUBLIC GOOD GAME

Eva Sirakovová

University of Economics in Bratislava
Faculty of National Economics
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
eva.sirakovova@euba.sk

Abstract. The article focuses on group size effect in voluntary contribution mechanism. We present an experiment on voluntary contribution on various accounts (individual account and group accounts). Size of the group represents different budget levels (national budget, transnational budget). In this paper we describe what factors influence the willingness to contribute money to public goods. The main question in our research is whether, with a growing number of participants, the willingness to contribute voluntarily to public goods would decline or increase. We use the experimental economics method – modified public good game experiment.

Keywords: public good game, voluntary contribution mechanism, experimental economics

JEL classification: H41, H61, C92.

1 Introduction

The aim of our research is described what factors influence the willingness to contribute money to public goods. We study the effect of group size, with regard to our research question. The key question was whether, with a growing number of participants, the willingness to contribute voluntarily to public goods would decline or increase. In this paper we present the results of a modified public good game experiment in which our participants could to distribute voluntary contributions to various accounts.

Accounts with a smaller number of participants represented the national budget. Accounts with a larger number of participants have been aimed at bringing the individual states together in one union. This union is a form of transnational budget – the budget of the European Union. In the context of deepening integration, with particular emphasis on deepening fiscal integration within the EU, it is the Member States' common budget that is seen as one of the possible forms of fiscal union in the EU. Therefore, it is very important for us to find out whether the participants would be willing to participate in the creation of a transnational budget, and in what proportion they would distribute their money between private and public accounts.

1.1 Literature Review

In many articles by Samuelson (1954), Stiglitz (1997) or Clarke (1971) we can find the main conclusion - voluntary contribution to public goods is inefficient. According to the mainstream of the theory of public goods (by Samuelson, Stiglitz etc.) people contribute too little to a public goods and producing a public goods is less than effective quantities. However, many opponents said that it is not true. According to Špalek (2011) we must also consider the alternative option of private provision of public goods based on voluntary cooperation. In specific cases, people want to cooperate without financial incentives. These are mainly various social and behavioural incentives – e.g. altruism. Using experimental economics methods, it has been proved, that in some cases people are willing to contribute money voluntarily to public goods.

One of the first experiments in this area was developed by Marwell and Ames (1979,1980), who found in a public good game that people tend to invest an average of 40% to 60% of their endowments in the public good. Since then, the underlying hypotheses and characteristics of the voluntary contribution mechanism have been experimentally explored from many aspects.

The voluntary contribution mechanism is analysed through the public good game experiment. In these kinds of experiments, group members are exposed to decisions to invest a certain amount of money between two accounts: a private account and a public (group) account. The money that is put on a private account is usually paid out to the same extent, so it is only dependent on the individual's decisions. Money that is paid out from a group account is usually valued at a coefficient that is greater than 1, and the yield is the same for each group member.

Kurzban et al. (2001) characterized these decisions as a social dilemma. Every individual player wants to maximize his earnings by investing everything in his private account, but of course, everyone would be better off investing in a public account that is valued by the coefficient. Addressing this problem brings about improving policies and understanding people's social motivations.

Public good game is a kind of experiment that monitors individual decisions of entities to invest in different accounts. Guala (2005) gives an example of this kind of game with four players. All players play simultaneously and anonymously – at the moment of taking her decision, each subject ignores the identity of the other subjects in her group, and how much they are contributing. Now, imagine the total sum invested in the production of the public good by all players is multiplied by a factor of two and then divided equally among the players, independently of the amount of their individual contribution. For groups of four players, the payoff function of each player is:

$$p_i = 20 - g_i + 0.5 \sum_{j=1}^4 g_j, \quad (1)$$

where 20 is the total number of tokens to be shared between a “private” (20 – g) and a “public” account (g). The parameter 0.5 is called the “production factor” and specifies

how much of the public good is enjoyed by each individual, for each unit invested by the group as a whole. This particular environment is characterized by a linear relationship between total payoff and contribution to the public project, and complete symmetry among players (the payoff function is identical for everybody).

Let's just imagine that we have only one player and that he has 20 tokens that he can distribute between a private and a public (group) account. The amount of funds invested in a public (group) account is valued at 1.25. Suppose this player decides to invest tokens evenly - 10 tokens per private account and 10 tokens per public (private) account. What will be his yield?

1. Private Account Revenue = 10
2. GroupAccount Revenue $10 * 1.25 = 12.50$
3. Total gain = $10 + 12.50 = 22.50$

We can see that because the amount on the public (group) account was appreciated by the given coefficient, our player "earned". If he behaved selfishly and would only invest on a private account, his return would be only 20 tokens.

If we analyse the situation from the standpoint of standard economy, public goods should not be produced because there should be no distribution of funds to the public account. Such an explanation is based on the assumption that all players are selfish, interested only in money and are perfectly rational in accordance with Nash's rationality.

According to Guala (2005) in Nash equilibrium, no player has an incentive to change her own strategy. In our example with players who contribute tokens between two accounts – public and private, Nash equilibrium would be that no one give funds to a public (group) account. The theory of voluntary contribution mechanism (VCM) claims something else. People are often willing to contribute voluntarily to public goods, such as cancer research or to charity, even if they do not directly benefit from it and no one is forced to contribute there.

A large number of factors affect the willingness to contribute voluntarily to public goods. Ledyard (1995) divided these factors into three groups:

- environmental factors
- system factors
- factors related to the form of the experiment.

The environmental factors include the number of participants, the gender of the participants, internal rate of return, external rate of return, anonymity, communication, marginal payoffs and rebates etc. A very important and easily controllable aspect is the number of participants. In contrast, there are two assumptions that analyse the impact of the size of the groups. On the one hand, people in a larger group may feel "security" for their non-cooperative behaviour. On the other hand, the growing size of a group may encourage some people to be more likely to contribute to a public account.

In this study we can focus on relationship between group size (or population size) and pro – social behaviour. Many studies such as Issac at al. (1984) and Issac and Walker (1988) have considered relationship between free – riding behaviour and group

size. Issac et al. (1994) found that groups of size 40 or 100 provided a public good more efficiently than groups of size 4 or 10, while standard theory practice the opposite. Kim (2017) researched marginal production of public goods with regard to population uncertainty of group size. He wrote that if the marginal production is constant, there is no significant effect of population uncertainty on the level of contribution. He confirmed that gender, ethnicity and risk preferences is not the main factors driving the level of contributions to the production of public goods.

The system factors include economics training, beliefs, friends or group solidarity, altruism, risk aversion. As for the factors related to the form of the experiment, we can mention, for example, whether we will publish the highest and lowest contributions to the participants during the experiment. Particular attention should also be paid to the design instruction for the experiment.

Andreoni (1995) explained that experiments with public goods have mostly positive tuning instructions for participants that lead to the highlighting of the benefits of cooperation. The instructions highlight the benefits of contributing to a private account. Andreoni verified these claims using an experiment in which one group of participants gave positive tuned instructions and the other group negative instructions. The essence of the game and the parameters remained unchanged in this case. The results of this experiment have confirmed that altruism can certainly be imposed on people. In all of the sessions, the private account contributions were lower in the negative tuned groups. In academic literature there are also many papers about alternative mechanisms based on voluntary contribution theory. For example, Grech (2019) propose new family of mechanisms whereby players may give more or less directly to one another. Grech (2019) shows that with sufficiently (yet not necessarily fully) pro- social preferences, the social optimum can be reached in Nash equilibrium in all social dilemma situation described by alternative mechanisms (including the linear public good mechanism). Another important issue is instability in the voluntary contribution mechanism. Feng et al. (2018) investigate instability on the voluntary contribution mechanism with two quasi – linear payoff functions. Irlenbusch et. al. (2019) analyse the effect of limited feedback in beliefs and contributions in a repeated public good game setting. They find that when the type of feedback is not transparent to the group members, good examples boost cooperation while bad examples hamper it.

2 Methodology and experimental design

To find out how people contribute to different accounts, we choose the method of laboratory classroom experiment. We used a modified so-called. public good game.

The experiment took place on April 30th, 2019. The participants were thirty-six students from the University of Economics in Bratislava who attended the course of Economics Theory II. They were students studying foreign languages and business, first year of study.

The experiment consisted of three treatments, preceded by instructions for the experiment. In the first two, students made individual decisions to invest 50 experimental euros among different accounts – private account, public (group) account I and public

(group) account II. The treatment that will be used to pay the income was selected randomly by throwing a dice. The students who participated in the experiment were not monetary motivated but had the opportunity to gain additional points for their mark.

Students were randomly divided into groups that did not change throughout the experiment; group account revenue was evenly distributed to individual members. No one knew who the group was with. Money from public account I was appreciated by 1.25.

All 18 students from one study group participated in the public account II yield, with was appreciated by coefficient 1,60 and then distributed equally among all 18 participants. The private account was appreciated by a coefficient of 1, so what the student put there was also his individual yield.

The total gain of the student consisted of the sum of the private account, public (group) I account and public (group) II. The resulting yield was converted to points from the credit rating in this way 1 point = 20 experimental euros. The students knew about this before the experiment began.

The anonymity was maintained throughout the experiment. All students were assigned personal numbers that were on the answer sheet.

In first treatment, the participants invested their 50 experimental euros only between two accounts – private account and public (group) account I. Each participant received answer sheet where accounts were marked and where he could take the amount of his investment. The sheet was marked with a special student code. After determining the gains, the sheets returned to the participants to see how their decisions were reflected in their gains.

In second treatment, the participants invested their 50 experimental euros into three accounts – private account, public (group) account I and public (group) account II. After the decision was made and gain determined, they returned to the students to see how the decisions were reflected in their gains.

The final third treatment contained a demographic questionnaire. He was once again marked with a special student code, so that later the responses could be assigned to specific decisions.

3 Results

In this chapter we present the results of our experiment. We primarily look at the factors that influence the willingness to contribute to a public good with regard to our research objective. The main focus is primarily on the impact of group size.

Into Table 1 we summarize average participant contributions to each account in both treatments.

Table 11. Average contribution to each account, in the number of experimental euros

Treatment	Average contribution to private account	Average contribution to public account I	Average contribution to public account II
Treatment 1	29,42	16,06	X
Treatment 2	32,51	11,21	10,33

Source: own processin

Based on the data in Table 1, we can say that in both treatments the average contributions were higher on the private account. In the second treatment, we can see, that the contributions on public accounts have distribute between themselves – we see a significant decline in contributions on the public account I, whit may indicate that people are willing to contribute some amount of money voluntarily within a larger group – in treatment 2. There is not a large difference in average contributions on the public account I and on public account II in the treatment 2. In both treatments the larger contribution is on private account.

In addition to the size of the group, we can further analyse the impact of gender on the willingness to contribute to individual accounts.

Table 2 Average contribution to each account by gender, in the number of experimental euros

TREATMENT	WOMEN			MAN		
	Average contribution to private account	Average contribution to public account I	Average contribution to public account II	Average contribution to private account	Average contribution to public account I	Average contribution to public account II
Treatment 1	27,25	17,40	X	32,13	15,33	X
Treatment 2	30,65	12,80	11,05	34,84	9,22	9,44

Source: own processing

In our experiment participated 20 woman and 16 man. We can see that women seem as more altruistic people than men. The average private contribution of women were lower in both treatments. Women were more willing to participate in both public accounts, although it must be added that the differences are not abysmal.

Another element among students was the field of study. We can analyse the impact of the study field on average contributions on each account.

Table 3. Average contribution to each account by field of study, in the number of experimental euros

Treatment	Business			Foreign languages		
	Average contribution to private account	Average contribution to public account I	Average contribution to public account II	Average contribution to private account	Average contribution to public account I	Average contribution to public account II
Treatment 1	30,78	16,39	X	28,06	15,72	X
Treatment 2	33,17	9,67	10,00	31,86	12,75	10,67

Source: own processing

The number of students from each study field was 18, so we can indicate that they were equally represented. Lower average contribution on private account had foreign language students in both treatments. We can also claim that foreign language students were on average more willing to contribute money on public accounts. However, the differences between average allowances within field of study are not large. We can say that they made very similar decisions.

In the demographic questionnaire, which was distributed to students, we find out whether any of them has the opportunity to file a tax return and what attitude they have to the tax burden increasing.

Of the 36 students, 12 students have already submitted a tax return and the majority – 24 students have never submitted a tax return.

When asked about their attitude towards increasing the tax burden, we gave them a choice of answers - I agree with increasing the tax burden - higher taxes = more public goods, I agree only partially, I disagree, absolutely disagree. Based on the experiment, we found that most students indicated that they did not agree to increase the tax burden - 21 students. 14 students only partially agreed with the increase in tax burden and 1 student totally disagreed.

We also investigated whether students thought it is better to reduce the tax burden because they do not know where their money goes. 22 students agreed partially with this statement; 3 students fully agreed. 11 students disagreed with this statement.

We also considered the attitude of students to the creation of a fiscal union in the EU. The European budget represented us for our public account II in the second treatment of the experiment. So, we asked students about their attitude towards deeper European integration through the creation of a Fiscal union in the EU, characterized in particular by a common budget and a common tax burden for all Member States. It is positive that most students agreed with deeper integration in fiscal area in EU, but they are still unsure about their attitudes. 21 students agreed only partially with Fiscal union

in EU, 6 students agreed absolutely. Although 8 students disagreed and 1 student disagreed absolutely. We can summarize that the majority, however, was in favor of deeper integration in the EU, especially in the direction of creation a fiscal union in the EU.

It is important for us to confront previous statements with reality. It is positive that most students had positive attitude in deeper European fiscal integration. We compared whether this claim is consistent with student's behaviour. We were wondering whether those who stated a positive attitude to the EU common budget and the common tax burden also had higher contribution in the public account II. The results are presented in the following table.

Table 4. Average contribution by attitudes towards deeper fiscal integration in the European Union, in the number of experimental euros

	I agree	I agree partially	I disagree	I absolutely disagree
Attitude towards fiscal union in the EU (number of students)	6	21	8	1
Average contribution on public account II (in number of experimental euros)	9,33	11,43	8,88	5

Source: own processing

The data show that students who had a positive attitude towards deeper European integration also have higher average contribution on public account II. This is a very good finding, because they not only agree with the single fiscal union in the EU but are also more willing to participate voluntarily in the common budget.

In the latest table (Table 5), we summarize all data from our experiment (for treatment 1 and treatment 2) using a descriptive statistic coefficients.

Table 5. Selected statistic coefficients, in the number of experimental euros

	T1					T2				
	mean contribution	standard deviation	minimum	maximum	variance	mean contribution	standard deviation	minimum	maximum	variance
Contribution - public account I.	16,06	12,51	0	45	161,02	11,21	7,74	0	30	61,62
Contribution - public account II.	-	-	-	-	-	10,33	5,84	0	25	35,14

Source: own processing

We can conclude that mean contribution decreases with increase the group size (in treatment 2). The smallest mean contribution is on group account II in treatment 2. We can confirm that there are some free-riders in our experiment – in treatment 1 there were 5 people who did not contribute to public account I (their contribution was 0 experimental euros). In treatment 2 there were 3 people who did not contribute to public account I and only one person did not contribute to public account II.

4 Conclusion

The central finding from this research is that people are willing to contribute voluntarily on public accounts in certain situations. According to the data of experiment people are willing to participate in the financing of public goods. In our experiment we have confirmed the theory of voluntary contribution mechanism. It is also very important for us to find out that students were predominately positive about the fiscal union in Europe. This was confirmed by their contributions on public account II. We also confirmed, that people are willing to contribute voluntarily, even within larger groups. As we thought, contribution on private account was larger than on public accounts. Another very important conclusion is, when group size increase (in treatment 2) contributions on private account increase too. It imagines the so-called “free-riding” behaviour in the voluntary provision of public goods.

Of course, we should be careful in our interpretations of these data. Our students know they were being studied and that could affect their behaviour. In addition, the sample of 36 students is not very significant. We cannot make general assumptions based on this research. However, it was our first experiment in this area and good opportunity to try to run experiment. In the future, we would like to expand our research with more participants and run an experiment in real laboratory (not classroom experiment).

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IS HOLACRACY BRINGING DOWN HIERARCHY OR IS IT ONLY AN APPEALING MARKETING SLOGAN?

Zuzana Skorková¹ and Zuzana Holická² and Michal Kováčik³

University of Economics
Faculty of Business management
Department of Management
Faculty of Economic Informatics
Department of Accounting and Auditing
Dolnozemska cesta 1
852 35 Bratislava
Slovakia
zuzana.skorkova@euba.sk¹
holickazuzana@gmail.com²
kovacik.taa@gmail.com³

Abstract. Our paper deals with the topic of holacracy, which introduces a futuristic alternative to the traditional and tested organizational structures, as with time, they are unable to provide the required level of agility and flexibility. In theory, holacracy is an alternative to the bureaucratic structures, stressing its flexibility and innovative potential built on responsibility, engagement, discipline, and freedom of individuals. We showcased the implementation of the holacratic system of organization management on the case study of the company of Zappos, which has been the largest company implementing the principles of holacratic management. The goal of our research is to identify the main features of holacracy at Zappos and to compare them with the features of bureaucratic organization. We will review the holacratic features through the prism of the individual functions of management (planning, organization, control, leadership, and human resources). The paper aims to provide a critical review of holacracy and to point to its limited practical application. The results of our case study debunk the myth that holacracy at Zappos is a hierarchy-free system.

Keywords: holarchy, bureaucracy, Zappos

JEL classification: M54

1 Introduction

“The greatest danger in times of turbulence is not the turbulence; it is to act with yesterday’s logic.”

Peter Drucker.

In the early 2000s, the business world underwent turbulent changes, caused mainly by acceleration of achievements in the scientific and technical world, as well as the cultural and global diversity of the population. Due to these aspects, global world of competition got fiercer and forced the companies to re-invent themselves and to re-evaluate their continuous impact on the modern market (Kolkitchaiwan – Chantuk, 2018).

The basic premise of a company as the basic building block of the business environment is acquiring and retaining a competitive advantage guaranteeing long-term position of the company on the market.

However, in order to retain the competitive advantage, it is no longer enough to perform business activities effectively (i.e. to offer products and services of the respective quality and by the set deadlines to satisfy the needs of the customers). Due to this, the major assumption for acquiring the decisive and long-term competitive advantage (and the resulting profit) is the ability of the company to react fast and well to the dynamically changing market conditions.

In order for the companies to be able to react to the external impacts of the market adequately, they need to have an agile and flexible organizational structure. Thus, the companies focus on implementing various bureaucratic organizational structures, which turn rigid and obsolete with time. Last, but not least, they display a high rate of inefficiency, as the hierarchy suppresses the innovation potential of organizations (Krasulja et al., 2016).

Organizations are turning to and focusing on alternative holacratic organizational structures, which allow them to react to the turbulent environment changes quicker. The author of the concept Brian J. Robertson defined holacracy as “a new way of organizational structure and management, replacing the conventional hierarchy, using the principle of distributed authority instead of vertical management. This allows the individuals and the teams to act freely while achieving company goals.” (Robertson, 2016)

Holacracy is considered a relatively new and trendy model of company management. It became popular in the 2000s. Many authors question its topicality, as the model integrates knowledge of theoretical ideas and approaches, which have been known for many years. In particular, the model structure was influenced by sociocracy, integral theory and the concept of mandatory control structure (Krasulja, 2016). In our paper, we will focus on holacracy implemented at Zappos. We will provide critical review of the holacratic management systems at all the levels of management functions and assess whether the company truly benefits from a hierarchy-free system.

2 Literature Review

Companies usually have bureaucratic management. Bureaucracy was built on the need to have a class of people with sufficient knowledge and competence to manage public affairs. It emerged when the number of people exceeded the level where one could rely on self-organization (Skorková, 2018).

The basic attributes of bureaucracy are known. Max Weber (1925) is the father of classical theory of bureaucracy. Weber himself considered it a perfect example and elaborated the basic rules of operation for bureaucracy:

- Regular activities have to be clearly assigned to the responsible employees as their official duties. The employees know what their duties and responsibilities are.
- The principle of hierarchy is that the subordinated unit in the organization reports to a superior unit. At higher levels of management, there is more power, authority and responsibility.
- The organization has a set system of rules of any work operation applied.
- The officers should use formalistic non-personalisation when performing their duties. They should perform work tasks without passion, interest, sympathy or antipathy.
- Promotion needs to respect the abilities and skills of the employees, taking into account their work experience, personal performance and contribution to the company.
- Control needs to be able to rule out corrupt behaviour of the officers.

Bureaucracy has always had strong opposition. One of the best-known critics of bureaucracy is R. K. Merton (1940), who agreed with Weber's attributes of bureaucracy, but disproved the notion that the attributes lead to efficient company operations. He introduced the term 'trained incompetence' or bureaucracy ritualization, summing up the tendency of people to repeat routine trained activities in bureaucratic environments – irrespective of the changes of the situations and conditions. Selznick (1948) speaks of non-intentional consequences of how the companies work, as their operations lead to establishment of problems (and the need to solve them), diverting them from fulfilling the original company aim. Stinchcombe (1959) and Udy (1959) criticised Weber's notion that bureaucracy is the same as rationality. Among the current critics of bureaucracy, there is Birkinshaw (2013), pointing at the specific problem of non-specific responsibility for problems and additional costs for companies in bureaucracy. There are also the critical works of Hamel (2017, 2016, 2014) and Zanini (2017).

It is not easy to introduce a viable alternative to bureaucracy. There have been several efforts to compensate bureaucratic dysfunctionalities. However, a system reducing the negative aspects of bureaucracy cannot be considered an alternative thereto. The system is still bureaucratic, although with certain modifications. An alternative model would need a completely new platform on the social, economic, political, legal, and other relevant levels (Bolfiková, 2008).

The trend of gradual elimination of hierarchies is visible in flatter organizational structures. It is being achieved by implementing information inter-connection and making information available to others, eliminating the need of thorough hierarchic setting

of the company (Kassay, 1999). An important part of the process is the shift from specific definition of job positions to more complex understanding of the process as a global unit, allowing the employees to focus on the needs of their customers instead of only following the orders of their superiors. In the late 1990s, the horizontal organizational structure was considered the most perspective form of organizational setting for the 21st century (at least for the next 50 years) (Hučka et al., 2011). As the authors Dědina – Malý (2005) established, the basic hierarchy of a company remains intact, even if the horizontal structure is extremely reduced to management and teams. Next to the attempts to eliminate hierarchic organizational structure, there are also new concepts which are opposite to the traditional bureaucratic structures.

One of them is the concept of holacracy, which is a truly new alternative. It is named non-hierarchic (inclusive) management model and is based on distribution of authority. There are several successful companies which have implemented holacracy (Zappos, Blinkist, Arca, Precision Nutrition, David Allen Company etc.).

Holacracy as a management system uses elements of ‘innovative structure’ (ad hoc-racy) and has adopted its characteristic features, as described by Mintzberg (1979):

- high level of horizontal specialisation based on general knowledge;
- tendencies to grouping specialists into functional units with the objective to focus on providing products and services to a specific section of the market;
- selective decentralization in the team and among the teams; and
- cooperation based on adjustments.

Organizations using the principles of holacratic management have a specific form of organizational structure based on concentrated roles, representing a complex circle organization hierarchy without top and low boundaries (Morgan, 1997).

Graphically, the organizational structure of holacracy resembles circles and sub-circles, which may intersect, stand alone or be a part of a bigger circle (a supercircle). The supercircle represents a certain functional area of organization, while the sub-circle represents a specific function. The roles represent roles, which are the core or organizational holarchy. Often, the isolated circles are interconnected, with both the circles representing a double interconnection (Skorková, 2017). The main principles of holacracy are:

- *Dynamic planning* instead of traditional planning and control – following a common goal by constant adjusting of real data, representing the current situation (the reality). Plans which may not look perfect in the beginning are constantly being adjusted to the real conditions and confronted with reality, using various feedback processes.
- *Interactive organization learning* – real tension of the company is considered the baseline for organizational learning. Learning is understood and executed as a process of gradual changing and adjusting – interactively and without any radical turns.
- Integrational decision making – central and innovative process in form of meetings. There are three levels of meetings:
- Strategic meetings, dealing with the question “where to?” – this type is being used at setting key strategies of the company.

- Meetings on administrative issues of the company, dealing with the question “how?” – clarifying the cooperation between the teams and the individual roles, and re-assessing responsibilities and guidelines.
- Operative meetings, dealing with the question “what?” – dealing with everyday specific actions.
- *Evolutional and purpose-oriented organization* – in the foreground, there is the purpose of the organization (not the profit). This purpose is defined and evolves constantly.
- *Systematic stress management* – the tension between known and unknown situations is not considered a defect to be eliminated, but an impulse for change and growth.
- *Leadership* – is a special chapter of holacracy. It is often described as ‘management without managers’, as it is based on the principle of non-dominant management, with the employees being able to process the problems at their own. Holacracy deals with the fractal distribution of authority and leadership for the purposes of general liberation.
- *Fractal self-organization* of organizational hierarchy (holarchy) – the organization is considered a single entity with own life. Holacracy aims for natural structure required for the purposes of the company. The organization is not managed and controlled from one central point. The control is organically distributed between several self-managed groups which cooperate to achieve a common goal. Various levels are interconnected with two roles (double-linking), serving as channels and allowing the information flow in the holarchy system.

3 Aim and Methods

The aim of our research is to identify and assess main features of holacracy at the company of Zappos and to compare them with the features of a bureaucratic organization. We are using a case study – a scientific method based on scientific elaboration of a practical and specific case of corporate practice. The case study is based on description. We analysed the case study from the perspective of its evolutionary features at from the company’s establishment to today. We used comparison, analysis and synthesis of available secondary data. Based on the data available, we will answer the research question whether Zappos has indeed been able to eliminate hierarchy and whether the implemented holacracy is in fact hierarchy-free organization.

The subject of our research is the company of Zappos – online shoe retailer, with nearly twenty years of experience in e-commerce. It offers a wide spectrum of products. There are more than thousands of types of brand premium products, satisfying the needs of the customers of all ages – from children and teenagers to adults. In 2007, the company introduced new product lines of clothes, handbags, bags, and other accessories to its shoe portfolio.

The increased interest of the customers in luxury high-end products made the company of Zappos to set up the exclusive web site of www.luxury.zappos.com in 2012. By launching the new platform, the company entered the perspective segment of fashion design fans and street fashion trendsetters interested in the current products of the

fashion houses. Apart from providing full-value and complex service, the site helps undecided customers by showing a banner of the must-have models as prepared by the styling experts, and the individual preferences of the customers. The interactivity and responsiveness of the web site supports the differentiation of the shopping experience and adds the fun factor to the 'common' online shopping.

The offer and distribution of affordable and trendy fashion and the constant ability to adjust to various needs of the customers and provision of extraordinary customer care, even with less profit, became the elemental pillars of internal philosophy behind the success of Zappos. The unique customer care and establishment of emotional connection between the trained call centre operator and customer resulted in higher revenue, reaching over two billion US dollars. Before Zappos implemented holacracy, it employed 1,500 people.

4 Holacracy at Zappos – Case Study

The online shoe retailer of Zappos.com is one of the largest companies which decided to implement holacracy as an alternative organization system based on self-management.

Despite the company being well-positioned and showing stable employee satisfaction, the growth of revenue generated was stagnating. The situation made the CEO Tony Hsieh worry that the trend would lead to wider bureaucracy throughout the company. He looked for ways to prevent that. In 2012, he learnt of a new platform of organization management at the science congress in Austin. It deals with the true problem of companies – conflict situation caused by execution of authority and power by superiors towards their subordinates. The conflicts and power war prevent the companies to use their potential in full. Therefore, Zappos started to change to a holacratic organization, with help of the author of the holacratic concept (B. Robertson). In January 2013, a team from Zappos had a two-day intense training on holacracy. They assessed and examined whether it was suitable for the company. Three months later, the implementation of holacracy went into the pilot testing – with the HR department, which employed one hundred and fifty employees at that time.

After successful testing, in early 2014, the management decided to implement holacracy in all departments of the company. Meanwhile, the company reshaped the usual sales strategy based on sales volume and started focusing more on satisfying the needs of less customers, who – despite higher price – are willing to invest in high-quality products.

Tony Hsieh implemented the new management system in order to increase the adequacy of reactions to the changing market conditions, improve the team dynamics, increase the idea intensity and experiment production, and last, but not least, to boost the engagement of the employees, supporting the maintenance of management transparency. Nevertheless, the transformation of a hierarchic company to a holacratic one was not easy.

Several employees responded negatively to the holacracy implementation and said it was a misguided social experiment, introducing chaos, confusion and frustration to

the company. As the assignment of new unknown mandates and tasks was not clear, there were many meetings and the company was in total disorganization, the internal tension grew.

The absence of hierarchy, elimination of management lines and loss of the possibility of career growth caused uncertainty and many members of management worried about losing their jobs. This was confirmed by the manager Hollie Delaney: *“Before the company restructuring, I was HR manager and my ultimate career goal was to aspire for the position of vice-president. I had the education and power necessary. However, under holacracy, I had to give up power and the promise of career growth. My job stopped fulfilling me. I felt unneeded. After a demanding search, I found a role which was a fit for me, based on the specific set of authority and responsibilities it needs. I am the manager of the Healthy, Happy Zapposians Circle, with its primary goal being the wellbeing of our employees.”*

Unlike Delaney, some managers were unable to embrace the new organization system. Their insufficient commitment to the system led to unconscious management boycott, manifested by ongoing tendencies to hold to the original system and strengthen the old form of centralized power, while slowing down the holacracy implementation process.

In its public statements, Zappos claims to be hierarchy-free organization base on free flow of information, trained employees who cooperate and support the flow of knowledge and innovation potential in the company. At the same time, it promotes complex implementation and adaptation of elements of holacratic management, characterised by use of egalitarian management, focusing on motivation and empowerment of employees, while boosting the use of their complex potential.

Unprecedented and persistent use of holacratic principles created the base for upgrading the organization model to the target level. Zappos even aspires the transformation of the highest level of self-governed organizations (the teal organization), which is similar to live organisms, applying elements of full and autonomous management, as well as fulfilling the evolutionary potential and nature of company establishment (Laloux, 2015).

According to Garton – Nobl (2017) Zappos was on the ‘bleeding edge’ of the organization transformation, resulting of insufficient use of the available potential of organization setting due to ongoing problems of organizing and difficulty of maintaining the new organization system.

Another factor preventing the successful completion of the potential of the organization paradigm is the confusion and frustration of the employees caused by the change implemented. The pressure caused to the employees, manifested in hesitation and uncertainty, resulted in them repeating known habits, i.e. leaning towards repeated natural re-hierarchization of the organization, what several employees confirmed.

In order to keep their jobs, they naturally started to group around dominant individuals with much experience in their area of expertise, and with certain personal characteristics, knowledge, and creative and manager potential. The selected individuals became the unofficial leaders of the groups. The selected ‘managers’ were expected to propose new ways to keep the activities performed in compliance, while maintaining individual visibility on the company level.

However, adopting wrong decisions due to the dynamic nature of agile initiatives in all areas of the company has caused a series of problems and resulted in unsuccessful transition from hierarchy to holarchy. The idea of dropping the hierarchy altogether was not successful. This opinion is seconded by the study by Garton – Noble (2017). The author wrote: *“The company is getting rid of excessive use of hierarchy only in the areas of customer care, advertisement, and human resources, but in strategic areas like financing and planning, hierarchy is still preferred and used.”*

Despite radical flattening and groups of individuals in functional teams, the organizational structure of the company still shows tendencies to use hierarchy. The original form of hierarchy was not kept, but rather sunk deeper into the company. The change of the organizational structure is latent, as the holarchy, due to intersections and unification of teams, matches the graphical depiction of bureaucratic structure.

Based on the established facts, we can say that there is still hierarchy at Zappos. The results of the case study performed by means of a case study and literature research have been confirmed by the theory of Peter Drucker, questioning the existence of hierarchy-free organizations or companies dropping holacratic principles. He considers them ridiculous and shallow, even non-sense without any real base or foundation.

According to him, every organization needs to have a final authority represented by a manager deciding on adoption or dismissal of a proposal. The superior as the top formal authority expects the subordinates to obey and execute the actions in line with the rules set and the decisions adopted. The hierarchy is considered an integral and natural part of the organization, established irrespective of the organization system applied (Drucker, 2002).

In our paper, we focused on comparing the holacratic system of Zappos with the bureaucratic management. Our conclusions and findings are summed up in Table 1.

Table 1. Summary of changes caused by implementation of holacracy at Zappos

Traditional Organizations	Holacratic Organization at Zappos
Planning	
Predictive and control model of planning	Heuristic model of planning
Non-structured and long meetings	Managing and tactical meetings
Extensive company rules, standards and provisions	Constitution containing a set of transparent rules
Organization	
Hierarchy	Holarchy
Job position descriptions	Roles
Departments	Circle group teams
Authoritative management	Distributive management
Leadership	
Authoritative leadership	Invisible – authentic - leadership
Focus on the leader	Focus on the employees
Superiority of the leader	Equality of the leader and the employees
Strict compliance with the regulations and internal guidelines; system of sanctions	Compliance with 10 key values

Absence of a cultural dimension of the leadership	Respecting the company culture is the base of leadership
Human Resources	
Recruitment by means of advertising at job portals and in newspapers	Recruitment by the Zappos.com domain, career programme and social media
Selection of applicants based on their competence	Selection of applicants based on their competence and values and cultural orientation
Adaptation process focused entirely on performance of activities of the job position	Adaptation process focused on compliance with the corporate culture
Specialised education and general training	Trainings on corporate culture, customer care, specific trainings as required for the employees
Control	
Bureaucratic control	Clan control
Fixed standards and procedure	Using standards if required
Control executed by the authorised superior	Self-control of autonomous employee
Activity focused job position descriptions	Goal focused job position descriptions
Focus on results	Focus on activities
Company culture is not source of control	Company culture is the integration element of control

Source: authors' work

Based on our findings, we consider Zappos a post-bureaucratic organization actively eliminating the negative manifestations of bureaucracy – in particular, the system rigidity. The company supports the flexibility and freedom of actions of individuals and eliminates unnecessary restrictive rules defining their behaviour.

The post-bureaucratic companies smartly integrate three organization innovations:

- reaching allocation effectiveness on shared markets by signing internal agreements;
- natural dynamic hierarchies based on the principle of vertical management and competences with equal knowledge; and
- applying performance-oriented cultures with the stakeholders organized on the principle of interdependence (Hamel – Zanini, 2018).

As it is seen at the findings in Table 1, holacracy has brought many positive changes exceeding the limits of bureaucracy. It shifts the focus to values and corporate culture, becoming the main criterion at recruiting. Then, there is the shift from traditional control to clan control, with the culture being the integration element of the control. We consider all the changes very positive.

5 Conclusions and Policy Implications

The ideal of organization system is constantly changing due to radicalization of the business world. Companies focus on forming organizational structures, ensuring the required level of productivity of the workforce, while being able to react swiftly to external conditions and secure continuous research and innovations. Self-managed

teams with defined bureaucratic hierarchy provide maximum use of the most vulnerable resources of the company – the time, talent and energy of the employees. Experimenting helps the employees to learn and increase their readiness for workload. Creating an alternative, seemingly hierarchy-less organizations helps release the pressure the employee's experience and boost their creative potential.

However, the employees tend to establish natural hierarchic structure around the most experienced peers in non-hierarchic structures. This tendency has been present since early times and is visible in the world of animals, as well. Hierarchy is an inevitable and necessary part of forming organizational structures. However, the purpose of hierarchy should be to serve the fundamental goals of the company. Whether it stays as the management system of the company fully depends on the employees. The end of hierarchy is uncertain, as it is still the one structure ensuring the performance of the required and assigned work tasks. The increased complexity of tasks requires the presence of hierarchic setting, defining and providing order in an organization, within it is framework of authority and responsibilities. However, Kolkitchaiwan – Chantuk (2018) claim that the organizations need to maintain and keep a hierarchic structure safeguarding the nature and purpose of the company.

By fulfilling the aim of the paper, we provided a new perspective to the specific issue of holacracy, introducing new organization settings as a revolutionary, generally applicable and available solution for any organization. However, our own research based on literature research and case study demonstrates that although modern paradigm of holacracy is trying to eliminate bureaucratic dysfunctions, it has not been able to bring down the hierarchy in the corporate world.

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INFORMATION ON ADOPTED ACCOUNTING POLICIES IN THE NOTES TO THE FINANCIAL STATEMENTS

Petra Sрниšová

University of Economics in Bratislava
Faculty of Economic Informatics
Department of Accounting and Auditing
Dolnozemská cesta 1/b
Bratislava, 852 35
Slovakia
srnisova@outlook.com

Abstract The notes, being an integral part of the financial statements, provide both numerical and verbatim information which supplements and explains the figures in the balance sheet and in the income statement. For a proper understanding of the figures it is necessary for the users to know the accounting methods and accounting policies applied by the entity while preparing the financial statements. Users will find about them in the notes, in the Article "Accounting policies adopted". We will analyse the scope of mandatory information in this Article. We will compare the content and the scope of required information for all size groups: micro entity, small entity and large entity. Finally, we will conclude if the required information is sufficient to provide a satisfactory explanation of the figures in the balance sheet and income statement for the financial statements' users.

Keywords: accounting choices, accounting policy, notes to the financial statements.

JEL classification: M 40, M 41

1 Introduction

The set of financial statements in double-entry bookkeeping consists of three components: the balance sheet, the income statement and the notes. The arrangement, designation and content of financial statements and the scope of disclosures are governed by Ordinances issued by the Ministry of Finance of the Slovak Republic. The financial statements are regulated by three ordinances, and each entity follows the ordinance which is applicable to the size group to which the entity is classified. In accordance with the Act no. 431/2002 Coll. on Accounting, as amended (hereinafter referred to as

the „Act on Accounting “), we distinguish three size groups of accounting entities: a micro entity, a small entity and a large entity. This categorization is based on the Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated statements and related reports of certain types of undertakings. The directive requires each member state to distinguish small businesses from large ones and, in connection to this, enable a regulatory burden in proportion to the size of the company (Mamić Sačer et al. 2015). The purpose of the categorization into the size groups is to avoid an unreasonable administrative burden on entities that are classified as micro entities and small entities by setting lower requirements in accounting. Correspondingly with this objective, the scope of information to be disclosed in the financial statements is different for each size group. The simplification in reporting has led to the introduction of a simplified form of the micro entity's financial statement, as well as a significantly shortened range of information in the notes. (Parajka and Ondrušová, 2014)

The balance sheet and the income statement in Slovak republic have a given form with a fixed structure. The names, order and scope of each item are obligatory. They shall not be amended, supplemented or omitted. Rows for which the entity has no content, remain blank. The uniform structure of the balance sheet and the income statement has several benefits for users and for preparers of financial statements, too. From the users' perspective, the advantages are the clarity and comparability of financial statements. Because of the uniform structure, users are easy to navigate in the balance sheet and in the income statement. The figures in the balance sheet provide information about the financial position of the entity. The figures in the income statement indicate its profitability. Both statements contain data for the current and immediately preceding accounting period, therefore it is possible to perform various analyses based on the data from the financial statements. The uniform structure of the balance sheet and the income statement allows to compare the financial statements of the same entity over several accounting periods, as well as financial statements of different entities classified in the same size group. For the preparers of the financial statements, the unified structure represents, above all, the possibility of automatized compiling of the statements using an accounting software. It reduces the risk of errors and accelerate the process of the financial statements' preparation.

The notes, being a third integral part of the financial statements, contain information that explains and supplements the figures in the balance sheet and income statement. Items disclosed in the notes complement the primary statements by providing information on details (including disaggregation), assumptions, judgements, risks, claims and rights in relation to line items or unrecognized items (Riise Johansen and Plenborg, 2018). The required scope of the notes depends on the size group into which the entity is classified. The lowest requirements are on the extent of information of a micro entity and, on the other hand, the largest and most detailed information is presented in the notes of large entities. The notes also provide general information about the entity and information about the accounting policies adopted. Unlike the balance sheet and the income statement, the notes do not have a binding uniform structure. The Ordinances on the financial statements set out the content of the notes, but their formal structure is

not prescribed. The basic segmentation of notes according to their content is given in Table 1:

Table 1. Content of notes - basic segmentation

Micro entity	Small entity	Large entity
Article I. General information	Article I. General information	Article I. General information
	Article II. Information on company bodies	
Article II. Accounting policies adopted	Article III. Accounting policies adopted	Article II. Accounting policies adopted
Article III. Information that explains and supplements the balance sheet and the income statement	Article IV. Information that explains and supplements the balance sheet and the income statement	Article III. Information that explains and supplements the balance sheet
		Article IV. Information that explains and supplements the income statement
	Article V. Information on off balance sheet assets and liabilities	Article V. Information on off balance sheet assets and liabilities
	Article VI. Events arising after the balance sheet date	Article VI. Events arising after the balance sheet date
		Article VII. (This article does not have a heading. It contains information about transactions between the reporting entity and related parties.)
	Article VII. Other information	Article VIII. Other information
		Article IX. Statement of changes in equity
Article X. Cash flow statement		

Source: Šlosárová – Blahušiaková, 2017.

1.1 Model and Data

In this paper, we will focus on the Article "Accounting policies adopted", which is mandatory for all entities classified in any size group. We will analyse the scope of required information in this Article. We will compare the content and the scope of required information for each size group. Finally, we will conclude if the information required in the Article "Accounting policies adopted" is sufficient to provide a satisfactory explanation of the figures in the balance sheet and income statement for the financial statements' users.

The study subject of this paper is the Article "Accounting policies adopted" presented in the notes to the financial statements prepared in accordance with the legislation in the Slovak Republic. The sources of the study are the Ordinances on financial statements issued by the Ministry of Finance of the Slovak Republic: Ordinance of the Ministry of Finance of the Slovak Republic MF/15464/2013-74 on stipulation of details on the arrangement, designation and content of items of separate financial statements and the scope of the data specified in the separate financial statements for disclosure by micro accounting entities as amended (hereinafter referred to as the "Ordinance on financial statements of micro entities"), Ordinance of the Ministry of Finance of the Slovak Republic MF/23378/2014-74 on stipulation of details of the separate financial statements and the scope of the data specified in the separate financial statements for disclosure by small entities as amended (hereinafter referred to as the "Ordinance on financial statements of small entities") and Ordinance of the Ministry of Finance of the Slovak Republic MF/23377/2014-74 on stipulation of details of the separate financial statements and the scope of the data specified in the separate financial statements for disclosure by large entities and entities of public interest as amended (hereinafter referred to as the "Ordinance on financial statements of large entities").

The paper is processed on a theoretical level. Several methods of scientific research have been applied to compile the knowledge and information acquired. Standard research methods, such as selection, analysis and synthesis—representing the basic methodical approach to the paper processing—are applied. To formulate the conclusion, the comparison method and deduction are used.

2 Accounting policies adopted

Accounting in the Slovak Republic is governed by binding legal standards. However, there are areas that allow an alternative approach of the entity or which have a recommending character. The entities are given the scope to apply an individual approach and to consider their specific needs, which are influenced by a number of factors; in particular by the object of their activity or the environment in which they operate. Decision-making processes in accounting may also be affected by those who manage the entity's activities; by the capabilities and limits of the used software; or by the level of the user's knowledge, respectively the lack of knowledge of the software's functionality. There is the risk managers incline towards sending as favourable as possible signals regarding the performance of the company (Balaciu et al., 2014).

Alternative accounting methods include all cases where there are several alternative solutions of a particular problem, or when the problem encountered by the entity is not dealt in detail in the legislation. In these cases, the entity must decide which accounting methods to use and how to ensure the compliance with the accounting principles. They cannot be dealt in a random manner. An entity has to adopt a solution method of the problem and retain it continually. (Šlosárová – Blahušiaková, 2017) Alternative accounting methods relate to measurement and accounting, in particular: selection and determination of measurement bases, selection of accounting methods, estimation method of impairment loss of assets, estimation of provisions' valuation.

An entity is obliged to adhere to the selected accounting method continually. If there is a change in conditions, the entity is required to reassess its approach and ensure that, under the new conditions, the true and fair view is assured. If the entity detects a violation of the principle, it chooses a new method which complies with the true and fair view principle.

The users can find information on the accounting policy and accounting methods application, as well as information on changes in their application, in the notes to the financial statements, in the Article "Accounting policies adopted". Without the knowledge about the applied accounting principles and accounting policies, the user is unable to properly interpret the figures in the balance sheet and the income statement.

The Article "Accounting policies adopted" includes information about: (1) presumption the entity is carrying on its business as a going concern; (2) changes in accounting policies and accounting methods; (3) correction of significant prior periods errors; (4) measurement method of assets and liabilities; (5) nature and purpose of transactions not shown in the balance sheet. The scope of this information varies depending on the size group.

Entities of all size groups indicate in the notes that the entity will carry on its business as a going concern. When the presumption is not met, small entities and large entities are required to provide information about non-compliance with the going concern concept and corresponding accounting method.

Small entities and large entities inform about the application of accounting policies and accounting methods that are important in assessing assets, liabilities, financial position and profit or loss. Micro entities do not have this obligation. If there is a change in accounting policies or accounting methods, entities of all size groups are required to disclose the changes. They state the reason for their application and their effect on the value of assets, liabilities, equity and profit or loss. If, as a result of a change in accounting policies and accounting methods, the values for the immediately preceding accounting period become incomparable, small entities and large entities are obliged to explain these incomparable values.

Entities of all size groups mandatorily provide information on correction of significant prior periods errors which have been booked in the current period. They disclose the sum at which the correction of errors affects the profit or loss brought forward. Disclosure of sums of minor error corrections and their impact on profit or loss for the current period is not mandatory.

The information on measurement of assets and liabilities, which can be found in the Article "Accounting policies adopted" by all size groups, relates in particular to: the

measurement of individual items of assets and liabilities; the depreciation plan for fixed assets, which includes information on depreciation periods, depreciation rates and depreciation methods; grants and assets for which they were awarded. The scope of required information on the measurement of assets and liabilities of a small entity and a large entity is nearly identical. Some information is not required from a large entity because it is included in other articles of the notes. However, there are significant differences comparing to the requirements on disclosed information of a micro entity. They are mostly related to the fact that the micro entity is subject to reduced measurement requirements. For example, a micro entity does not use the equity method. Micro entity does not measure securities, derivatives and equity interests at fair value, neither at the initial measurement nor at the balance sheet date. However, there are areas that are commonly found in the micro entity's accounting, but the notes lack information about them: determination of the estimates of an impairment loss and value adjustment.

Small entities and large entities also disclose the nature and purpose of transactions that are not included in the balance sheet but the risks or benefits arising from those transactions are material, or disclosure of those risks / benefits is necessary to assess the entity's financial position. The entities shall report the financial impact of these transactions. Micro entities are not obliged to disclose such transactions.

3 Conclusions and policy implications

The set of financial statements includes three components, which form one ensemble. The data contained in its components is interrelated and complementary. The balance sheet and the income statement contain numerical data. The notes provide both numerical and verbatim information that supplements and explains the figures in the balance sheet and in the income statement. For a proper understanding of the figures in the balance sheet and the income statement, it is necessary for the users to know the accounting methods and accounting policies applied by the entity while preparing the financial statements. Users will find about them in the notes, in the Article "Accounting policies adopted". This article is mandatory in the notes of the entities of all size groups, but their content varies.

The scope of required disclosures in the Article "Accounting policies adopted" in the financial statements of a small entity and a large entity is almost identical. The lowest requirements are set on the micro entity's notes. Micro entities are not obliged to inform about the application of accounting policies and accounting methods that are important in assessing assets, liabilities, financial position and profit or loss. They only inform about any change in the accounting policies or methods used. In terms of measurement, we identified the most significant differences in the disclosure requirements of a micro entity compared to a small and a large entity. There are lower requirements in measurement set on a micro entity and therefore some information is not relevant, such as the use of the equity method or the fair value measurement of securities, derivatives and equity interests. However, there are areas that are commonly found in the micro entity's accounting, but the notes lack information about them. These include, in particular,

determination of the estimates of an impairment loss and value adjustment. Value adjustments reflect temporary impairment loss of assets and are created for all types of assets: tangible and intangible fixed assets, inventories, financial assets and receivables. The amount of the value adjustment is determined by an estimate that represents the amount of justified assumption of asset's impairment against its carrying value. The estimated amount of the value adjustment is based on the management's subjective judgement. The absent information on value adjustments is the more exigent, as the assets are figured in its carrying value in the balance sheet of the micro entity, which means their value is adjusted for correction - accumulated depreciation and value adjustments. Thus, we are not able to determine from the balance sheet whether value adjustments were created or not. If they were, we cannot figure out their sum. We will not receive this information from the notes neither. It would be beneficial for the users if details on value adjustments were mandatory in the notes of the micro entity.

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THEORETICAL APPROACHES OF FACTORS OF TAX EVASION FOCUSED ON ACCOUNTING AS A SOURCE OF INFORMATION IN THE TAX'S LIABILITY CALCULATION

Jaroslava Šepel'ová

University of Economics
Faculty of National Economy

Dolnozemská cesta 1
Bratislava 852 35

Slovakia

jaroslava.sepelova@euba.sk

Abstract. This paper deals with the determinants of tax evasion of legal entity's income tax. There is a description of problems associated with tax avoidance and tax evasion. Based on the studies of several authors we distinguish between basic and extended factors which affect behaviour of the tax entity to avoid pay taxes and make tax evasion. These factors are elements of motivation of the individual's decision to commit tax evasion, or not. We pay attention especially to the special type of tax evasion, the one which is related to accounting manipulation. We also provide a detailed picture of the incentive factors of mentioned fraud.

Keywords: tax evasion, corporate tax, accounting.

JEL classification: H25, H26

1 Introduction

The problems of tax avoidance and tax evasion have been associated with tax policy since its formation. Tax avoidance is defined as effort to find vulnerabilities in legislation and therefore avoid pay taxes. Tax evasion is defined as a systematic derogation of tax laws. The result of tax avoidance and also tax evasion is loss of tax revenues of the state budget, which can cause serious damage to proper functioning of the public sector and endanger ability of the government to finance public spending.

The attitude of taxpayers is defined by a wide range of factors which influence taxpayer's behaviour. These determinants impact his decision to execute tax evasion, or not to do. We should define these factors to be able to understand and subsequently eliminate tax evasion. This article explores the most important determinants of tax evasion and tax avoidance from the point of view of literature. First part of this study de-

scribes basic factors affecting tax evasion of corporate income tax. The content of second chapter consists of description of extended factors which influence tax evasion of income tax of legal entities.

The second part deals with especial factors of tax evasion which are caused by manipulation of accounting. Accounting is an information system that provides a source of information which are necessary to calculate the tax liability of the company. Because of this reason, we consider, that it is important to examine motivational factors and determinants which are causes of manipulation with accounting.

2 Basic factors affecting tax evasion

One from the first microeconomic models with relevant results in the sphere of tax evasion is the Allingham and Sandmo model (1972). These authors follow conclusions published by Becker (1968) and Tulkens and Jacquemin (1971). They study economic crime. Becker's economic analysis contributes to form state's optimal tax policy, in consideration with illegal activities of taxpayers. Allingham and Sandmo model (A-S model) was designed primarily for individuals, but this model is also applicable in conditions of small business.

Main assumption of A-S model is uncertainty. Taxpayer decides to do or not to do tax evasion in uncertainty. He is not aware if tax audit will be carried out, after he receives certain income. His decision depends on several factors. Exogenous factors of his decision are the probability of disclosure, the tax rate, the amount of the fine in case of his unlawful behaviour detection and his total gross income. The probability of detection is based on his own- personal but also mediated experiences. Expected probability of detection is often higher than real one and taxpayers tend to overestimate it (Sandmo, 2004). The result is that the number of tax evasions decreases with increased likelihood of detection. Sandmo also explains that probability of tax evasion detection depends on the amount of earned income of tax entity (Sandmo, 2004). This conclusion is based on assumption that tax inspectors calculate taxpayers' usual income from their previous experiences. If taxpayer's income is lower than usual, the suspicion and likelihood that this entity will be controlled and its activity detected, increases. Authors examine tax rate in their model dynamically. Tax rate is determinant that affects the value of tax leakage with a double effect. Substitution effect, which appears when tax rates rise, and taxpayer tends to reduce earned revenue. Thereby he increases tax evasion. However, an increase of tax rate may also result in reduction of taxpayer's income which result is increased risk aversion. So, taxpayer's income is one of the evasion determinants. With taxpayer's income growth, the willingness of taxpayer to risk is also growing, subsequently the expected range of tax evasion also increases. Other determinant of tax evasion in A-S model is amount of fine or sanction in case of tax evasion detection. It affects person's willingness to undertake risk. Mentioned sanction has similar effect as probability of disclosure of tax evasion. With increased amount of sanctions, the propensity of risk and tax evasion decrease. In re-published Sandmo's article from 2004 he found, that probability of tax evasion detection and level of sanctions are equal. Sandmo also adds, that decision-making process of tax entity is also affected by

the decision-making process of other taxpayers. With increased tax evasion of other taxpayers, subjective taxpayer's probability of its own detection reduces and thus his tax evasion increases.

Marreli (1984) also investigates tax evasion issues. He examines direct and indirect taxes. He confirms that with lower aversion to risk, taxpayer avoids direct taxation more than indirect. Probability of detection and tax rate affect amount of tax evasion, so they are its determinants. His conclusions match the results of previously mentioned A-S model. Companies generate less tax evasions with higher probability of disclosure. He explains that tax rate's effect is variable. Large corporations are doing proportionally smaller tax evasion than small businesses. Author's other work- Marrell and Martin (1988) focuses on tax evasion in the oligopoly environment. In this work, there are analysed several parameters such as: the probability of detection, the amount of the fine and the tax rate. These parameters are affected by the state. Author confirms that there is the same effect in oligopolistic market as on the other types of markets. Likelihood of tax evasion detection and amount of fine decrease the trend of tax evasion and tax rate effect is ambiguous.

One of many authors who analyse factors affecting corporate tax evasion is Virmani (1989). In his tax evasion model, he describes companies that report inappropriate earnings. This model is based on these assumptions: probability of tax evasion detection increases with higher revenue and function of cost coverage depends on the revenue earned. So, determinants of tax evasion are probability of tax audit, tax rates and amount of sanctions. Virmani assumes that larger companies are more often controlled by the tax authority and they are trying to reduce their revenue by misrepresentation in income statements. However, this strategy of large companies is ineffective if the authority segmentates companies on the basis of expected earnings. The dependence of tax evasion on tax rates is explained by two types of tax rates. The tax rate that causes total tax evasion and tax rates that causes partial tax evasion. But tax evasion exists at all tax rates under specific conditions. Unlike the A-S model, Virmani points to the fact that with higher sanctions tax evasion increase. Virmani's model is based on the interdependence of probability of tax audit and taxpayer's income. Taxpayers with higher income are trying to reduce probability of tax control by a greater reduction of their income (higher tax evasion) than lower income taxpayers who do not have to conceal such a high proportion of their income to make them less likely to be taxed.

Slemrod wrote very extensive study of tax evasion. Slemrod, as well as the above-mentioned authors, focuses attention on determinants of tax evasion. He sets out clear tax recommendations for government to reduce tax avoidance. He examines, that tax evasion could be reduced with increased law enforcement resources, increased probability of detection and increased sanctions. One of determinants of tax evasion is the disclosure of information of the amount of paid tax, which may increase tax liability for some companies (Slemrod, 2004). Slemrod and Crocker (2004) created a specific model of tax evasion where the main determinant is impact of taxpayer's sanction. According to this model, if sanctions are exposed to responsible managers, not to companies, tax evasion is more limited. Thus, sanction is personalized to the person who has decided to commit tax evasion.

Wang and Conant (1988), who followed the A-S model, also dealt with monopolist's decision of tax evasion. They state that tax-avoidance decisions have no effect on the decision of the size of output of companies. Output decisions and tax evasion are two separate issues. Noted authors don't consider likelihood of detection or sanction. In their model, monopolist increases output until marginal costs of production are equal to the tax-less marginal profit earned with overestimated costs. In Wang and Conant model, amount of production is set at the traditional optimum ($MR = MC$). Monopolist decides to do tax evasion or not to do, after this equality is reached. He considers tax rate, amount of the fine and probability of disclosure. Taxpayer will determine the optimal tax evasion while he respects the principle of maximalisation of expected earnings after tax. The conclusion of Wang and Conant's work is that income tax cannot be used by fiscal policy to reduce monopoly distortions. When a monopolist becomes aware of the impact of probability of detection and fines (respecting his expected marginal utility), the optimum output won't be affected by income tax or fines. Business decisions about output and tax evasion are separate. Income tax is thus neutral in decision-making process of monopolist.

Unlike Lee and Kreutzer, Yaniv (1986) examines neutrality of income taxes in the monopoly environment in an expanded model. Determinants of tax evasion are probability of control and sum of sanctions. These factors are based on the level of overvaluation of costs (i.e. the extent of tax leakage).

Gordon (1990) also explores decision of monopolist. But in Gordon's work monopolist carries out tax evasion in a different way. In this model, monopolist sells items and services for cash without issuing the relevant document to customers. Thus, this trader sells for a discounted price, but without any document. It means that mentioned income may not be included in the bookkeeping. He saves indirect tax on goods sold (value added tax and excise duty) and at the same time direct corporate income tax. One of the reasons why such a situation occurs is that customer is offered with better price. Other reason behind this tax evasion is described by Gordon in his study. He says that monopoly performs a certain degree of price discrimination. The phenomenon of selling goods or services for cash without issuing any document is one of the most widespread forms of tax evasion. Determinants that affect monopolist's decision are height of sanction and probability of detection. With higher fine or higher probability of disclosure, monopolist increases the price to reduce tax evasion.

3 Extended factors affecting tax evasion

Economists apart from traditional (basic) factors also study less common, extended factors. These determinants explain tax entity's decision to make tax evasion, or not to. James Alm published several studies of tax evasion determinants. He considers corruption as a factor which significantly influence tax evasion, in his work. He states that corruption opens space for tax evasion, but on the other hand with increased tax evasion the level of corruption also increases. In his study, corruption is identified as statistically significant determinant of tax evasion. The results of Alm's models and studies are recommendations for tax practice. Activity to remove problem of corruption has

two consequences. These consequences are the direct reduction of corruption and the indirect reduction of tax evasion. According to Alm, the uncertainty of tax entity in relation to tax authority is determinant of tax evasion. He states that with increased uncertainty of tax entity his income in the statements also increases. The feeling of taxpayer's uncertainty is result of these factors: lack of information, frequent changes in tax legislation, and ambiguity of tax rules. Bilothach also studies problem of corruption. He conducts research mainly in developing countries. In his work he examines the relationship between audit officer as a tax authority and tax entity. When there is low supervision of officer's activity and he is undervalued, potential for tax evasion is higher. Thus, taxpayer has the option to make tax evasion, when he assumes that the behaviour of officer is corrupt, and officer would receive a financial reward for not recording his tax evasion.

Spicer and Lindsedt also examine relationship between tax entity and the state in their work. They describe this relationship as a business relationship, not as a pressure of the state to force taxpayers comply with tax rules. When tax entity pays high taxes its purchasing power is reduced, and this taxpayer couldn't buy publicly supplied goods and services. Tax entity decides whether to make business relationship with the state, itself. Tax evasion arises if taxpayer considers, that mentioned relationship is unfair. He sacrifices his purchasing power and consideration in the form of public goods and services is not adequate. The relationship of justice and willingness to pay taxes was also examined by Andreoni, Erard and Fernstein. Their research follows traditional model of Allingham and Sandmo. They add three other tax deduction factors to previously mentioned traditional model. These factors are the morale of tax entity, the sense of justice of taxpayers and the state's efficiency in providing of public goods and services.

According to many authors, taxpayer's age is determining factor in his willingness to pay taxes. Jackson and Miliron (1986) confirm the hypothesis that older taxpayers are much more cautious in relation to the tax authority and they rarely make tax evasions. Lower caution or less risk aversion is one of the attributes of generational differences among young people. When scientists examine differences in willingness to pay taxes between the sexes and they found relatively unambiguous results. Men tend to be at risk, while women are committing smaller amount of tax evasions (Mason and Calvin, 1978). Nowadays, scientists investigate decreasing trend of gender differences and there is also phenomenon of equalization of differences between sexes in their willingness to risk (Collins, 1992).

Achieved level of education also affects taxpayer's decision of tax evasion. Jackson and Milliron (1986) claim that education is determinant of tax evasion which have to be examined on two levels: the general level of financial education and a specific degree of knowledge about possible tax evasion options. They say that with higher financial literacy taxpayer's willingness to pay taxes also improves. This happens due to taxpayer's positive perception of function of taxes in the state budget. Knowledge of tax evasion's options has negative impact to tax regulations compliance (Jackson and Milliron 1986).

4 Factors which influence an individual's decision to commit tax evasion, or not, in relation to the accounting system

Company's accounting is important source of information. It is used to create statement of taxable income of legal persons. The profit or loss as the result of the economic activity of the company is also part of the mentioned statement. All the company's transactions are reflected in the accounts and thus they have an impact on profit or loss and, inevitably, on the tax base.

Because of the reasons explained above, it makes perfect sense to consider the factors which cause deliberately false information in the accounts, as fraud in the accounts is also reflected in the tax return. An effective technique of detecting and setting up sufficient measures (in the case of accounting frauds) is to well understand these factors of motivation of tax entities.

Accounting frauds have high impact on different areas of business activities. In the literature, these frauds are also called management frauds or managerial frauds, because logically, management is also involved in frauds of large scale.

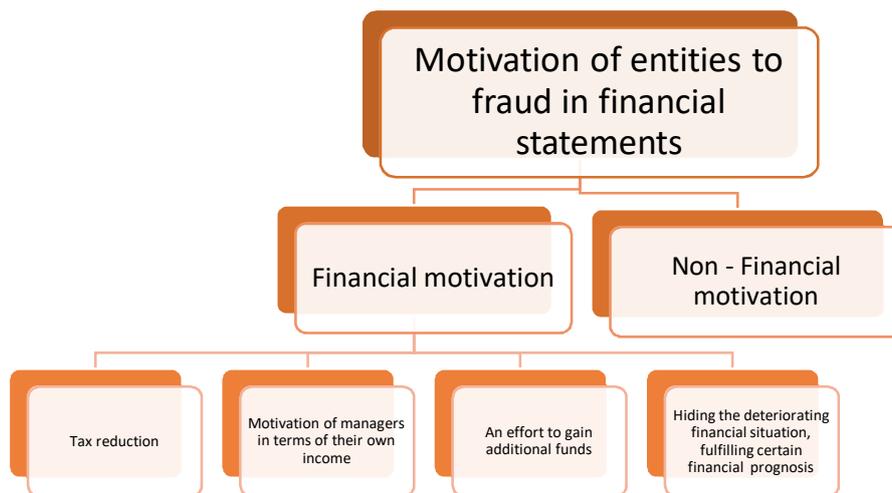


Fig. 1. Division of motives to commit frauds in financial statements. *Source: author's processing.*

An important financial motive of commitment of financial fraud in reporting by company's managers is their own financial motivation. Management (as well as other employees) feel considerable pressure if the company's success is directly linked to their salary or valuation. This may lead managers to choose the fraudulent reporting path (Jones, 2011). Manager's wage- usually tied to the reported profit of the company- does not motivate the manager to increase the value of the company. Manager tries to increase only company's economic result (Cheffins, 2009). On the contrary, agent theory argues, that manager's risk aversion can be reduced if he is also a partial owner of the

company (Davis, 1997), although recent research contradicts this theory. Number of frauds with unreal high profit in reporting, were committed by managers and CEOs, who own a significant portion of the company (McKee, Santore, 2008). Albrecht et al. (2008) discussed about the basic nature of fraud. They considered major famous accounting scandals. They examined that auditors play an important role in fraud detection. Albrecht et al. identified one of the main reasons of many frauds, which are improperly placed performance incentives. Contrary to these results, Dechow (1996) didn't find evidence in his companies' research, that managers use to manipulate with accounts to increase their own wages.

An important financial factor which motivate to fraud in financial statements is the necessity to raise funds. Dechow et al. (1996) examined an effort to attract low cost external financing and investors and the desire to avoid debt contracts, as factors, which can motivate management to manipulate with company's financial income. Dunn (1999) examined a sample of 113 companies which issued fraudulent financial statements in the period 1992-1996. He compared them with an equal number of businesses that did not fraud in financial statements. He made this comparison to identify the motives and opportunities which result in fraudulent financial accounting. He found that the motivation for fraudulent financial reporting was positively linked to the necessity to increase additional capital of the company.

The fulfilment of commitments and resolutions is an important tool of manager's decision making in terms of company's credibility. The studies, described so far, found that effort to meet analyst prognosis can motivate management to commit frauds in financial reports. Managers know that the consequences of failure to follow analyst's forecasts could damage the company's credibility. This fact may also put the pressure on management to manipulate with revenue through frauds in financial statements (Albrecht et al., 2007). Rezaee and Riley (2010) reported that publicly traded companies are under pressure to report revenues and other financial results in line with analyst's prognosis.

According to the author's opinions on the motivation of subjects to fraudulent reporting, subjects are often trying to cover unfavorable financial results of the company. Rosner (2003) found out that failing firms may be motivated to participate in fraudulent financial reporting to hide their financial difficulties. Johnson et al. (2008) determined that those committing fraud are likely to be motivated by the desire to avoid a large fall in share prices.

Beasley et al. (2010) identified the secrecy of the worsening financial situation of the company as one of the most common causes of fraud in the financial statements. Considering the focus of the article, it is necessary to pay more attention to tax liability as one of the factors of frauds in accounting. Tax evasion is one of the motivating elements of reporting fraudulent financial statements. Although Shackelford and Shevlin (2001) in their work reported that the amount of research of fraudulent reporting to reduce tax liability is inadequate.

However, there are several authors who have worked on this motivational factor of fraudulent reporting. Shackelford and Shevlin (2001) point to the fact that research is more devoted to publicly traded companies, while only little attention is paid to SMEs, despite the fact that their importance for the economy and hence for the tax revenue of

the state budget is more significant. Harris (1993) was one of the first authors who addressed the issue of manipulating accounting for tax frauds. He claimed that management deliberately manipulates revenues and costs to keep the tax liability as low as possible. Similarly, Guenther (1994) dealt with this issue, in particular with fraudulent reporting of company costs in an effort to reduce tax liabilities

Eilifsen et al. (1999) and Hellman (1999) analyzed the link between the calculation of taxable income and accounting income in order to point out the effect of accounting practices on tax liability. This link represents a self-control mechanism for publicly traded companies and companies seeking to attract additional capital. Considering their plan, these companies are not able to reduce their tax liability by using frauds affecting the amount of their sales in their financial statements. However, it should be noted that underestimation of revenues is only one of the possible ways of doing frauds in the financial statements (we discuss the method of frauds in the financial statements in detail in the next chapter).

Fraud in reporting is more appealing to countries with close links between accounting and tax liability and in countries where the costs of raising additional capital are high. C.T. Spathis is an important author who examined tax liability as a factor in fraudulent financial reporting. In his work, he points out on the fact that the financial statement serves as a basis for the calculation of the tax liability of the company. He claims that fraudulent reporting results in a reduction of tax liability.

He sees the problem mainly in reporting overstatement of assets and expenses. He tested his theory on Greek companies (Spathis, 2002), and he confirmed the hypothesis that one of the motivations for financial statement fraud is tax liability reduction. Frank, Lynch, Rego, (2004) draw attention to the problem of double reporting of the company's results. According to them, the subjects report a different value of income to shareholders, but at the same time they report revenues separately for the calculation of tax liability.

Desai (2005) also approached the issue in the same way by pointing out that companies report financial statements to shareholders and potential investors, but report another financial statements for tax purposes. A study by Badertscher, Philips, Pincusa, Rego (2006) confirms that companies are trying to manage their revenues in a way that minimizes their tax burden using illegal operations. They also studied the link between the financial statements and tax liability. They pointed out that companies are trying to capture the benefits between accounting and tax reporting, particularly by overstating costs.

From the view of the complexity of perception of fraud motivation in the financial statements, it is also necessary to mention the factors of non-financial motivation in accounting frauds. Based on the conclusions of Shleifer and Vishny (1997), and thus the ownership structure has an important impact on value creation and the performance of the company, it can be stated that the values of companies can also be seen in deciding to make frauds in reporting. Much of the research in this area is devoted to family-run and state-controlled enterprises. Dunn (1999) states that family businesses pose a risk considering the control that is concentrated in the hands of the founders or owners. Tong (2008) also tends to believe that founders have disproportionate controlling and voting rights stemming from the ownership of most shares.

Kenyon (2009) stated that small, family and fastgrowing businesses may be more susceptible to fraud. Prabowo and Simpson (2011) found out that family ownership is more detrimental to company performance whenever the family is very involved in decision making. Hasnan et al. (2008) empirically tested the impact of family businesses and determined that family businesses exert management pressure on frauds in financial reporting. The second group of enterprises examined under the effect of ownership on fraudulent reporting are state-controlled enterprises.

Borisova et al. (2012) examined the impact of government ownership on governance and management using a sample of European Union firms. They found out that state ownership is associated with lower quality of management and is generally detrimental to business management. In contrast, Hasnan et al. (2008) empirically tested the impact of politically related companies or state-owned companies on the occurrence of financial reporting fraud. However, they found no relationship between politically connected firms and fraud in the financial statements.

5 Conclusions and policy implications

Tax avoidance and tax evasion are currently contradictory phenomenon of fiscal policy. Nowadays there is international openness and interconnection of economies, which make the impact of tax avoidance and tax evasion even more interesting. In this article, we characterize several factors influencing tax evasion, based on analyses with worldwide dimension. Determinants or the factors that affect behaviour of taxpayer, need to be known and correctly understood. Only after that we would be more effective in reduction of tax evasion.

We divide factors that affect tax evasion decisions into basic and extended ones. The origin of the basic factors is based on the first models of taxpayer's behaviour towards tax authority. These basic models were later extended of other aspects. We define them as extended factors. Therefore, extended models develop original ones. Basic factors are probability of detection of tax evasion, amount of the penalty if tax entity doesn't comply with tax rules and tax rate. In the group of extended factors, we examined only selected factors, namely: morality, education, age, gender, and relationship between taxpayer and the state.

Accounting is important tool for the final determination of the tax liability or current company. Among other factors, accounting frauds may also result in tax evasion. Therefore, in the second part of this paper we dealt with the factors which influence frauds in the accounting. We divided these factors into financial and non-financial ones, based on the literature studied. Tax reduction is one of the financial factors, which influence the manager's motivation to fraud in accounting.

It should be noted, that in this article there are not mentioned all factors which influence taxpayer's behaviour. From the whole range of tax evasion determinants, we devote these ones which are firmly defined in theoretical concepts.

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USING COST-SENSITIVE PREDICTIVE MODELING IN DIGITAL MARKETING

Ing. Romana Šipoldová

University of Economics in Bratislava
Faculty of Economic Informatics
Dolnozemská cesta 1
Bratislava, 852 35
Slovakia
romana.sipoldova@gmail.com

Abstract. In the present fast-moving times, when real-time decisions are needed, data quality is highly appreciated as high-quality predictive models are created based on it. Nowadays, analytics is turning into a mature, value-adding technology. A special benefit is considering future costs and revenues. In my final thesis work, I pointed out the issue around increasingly evolving digital marketing to optimize the example online campaign. The aim of my project is to describe the procedure of the application of a strategy that is sensitive to profit/loss, and to compare the models of standard logistic regression and weighted logistic regression with the application of such a strategy. When perceiving the goal of a selected digital campaign from the advertiser's point of view, achieving the best click-through rate (CTR), the media agency must also consider the potential costs of cost per click (CPC) or the most effective profit. This balance (win-win strategy) needs to be understood and needs to be reached very sensitively. The goals I tackle in my model focus on setting bids optimizing CPC (cost per click). I have already taken cost-sensitive classification techniques into account while learning the model. They optimize the predictions of the target variable by specifying the costs.

Keywords: logistic regression, click-through rate, cost per click.

JEL classification: M 3, C 2

1 Introduction

To make your online campaign as effective as possible it is necessary to reach your target audience as accurately as possible. The more accurate the targeting of the campaign is, the better price/ratio can be achieved.

1.1 Types of media buying References

When advertisers want to buy advertising inventory, they have two options: traditional buying or programmatic buying

Traditional buying.

In traditional buying, an advertiser buys advertising inventory on a specific website. Depending on the affinity index of the website for the specific target audience, the advertiser can only hope to reach as many user that fall into his target audience as possible.

Programmatic buying.

Programmatic buying does not generally focus on a specific website. The advertisement can be displayed to a specific user anywhere on the internet. Publishers sell advertising inventory through advertising exchange platform in real time. They create a supply that meets with the demand of advertisers (or media agencies) and in real time, the advertisers can bid against each other for each specific ad impression which is then displayed to a specific user. The whole principle is comparable to buying and selling stock exchange shares. The owner of the advertising inventory offers the ad impression with a set floor price to the auction, and advertisers submit their bids. The ad impression is won by the highest bidder, although he will actually pay a price close to the second highest bid, so-called second-best price auction. Finally, the winner's ad is displayed on the publisher's website. This whole process only takes milliseconds to complete.

The goal is to create a model that, based on input variables, predicts the purchase of the most effective impressions in the price / quality ratio, which are most likely to result in a click. Because, in addition to focusing on the most effective impression for a reasonable price, you still need to track one of the core KPIs set for the business goal - CTR (Click Through Rate = Clicks / Impressions).

This paper illustrates the importance of cost tracking and their involvement in the model in an example. The dataset includes data from a sample online campaign and the goal is to create two predictive models that optimize Cost Per Click (CPC) bidding. The first model is a standard logistic regression model and the second model is a weighted logistic regression model that uses cost-sensitive predictive technique (Zadrozny – Langford – Abe, 2003).

My research is based many researches but mostly on research of Belgian university professor Wouter Verbeke (2018) who has been working on Profit Driven Business Analytics in his research. In this work, the findings and knowledge of his research have been implemented in the marketing field to improve and increase the efficiency of buying of advertising inventory. In a business settings, it is essential to acknowledge costs and benefits to learn better models, with better meaning cost-optimal.

2 Preparation of dataset

The modeled variable – dependent variable is the binary variable Click – that is, whether the result of a bought impression is a click or not, meaning whether the user has clicked on the banner or not: Other variables entering the model – explanatory variables are:

- Day of week (Sunday = 0, *User_day*)
- Time [hours] (*User_hour*) – day of week and time in hours are variables which express the day and hour when the user encountered the ad
- Website domain of the impression (*Domain*) – website where the user encountered the ad
- Size of the banner (300x250, 728x90, 300x600, etc., *Size*)
- Device (mobile, tablet, etc., *Device*)
- Placement position (above, below or unknown, *Position*) – placement position relative to fold

Before creating both models, it is necessary to edit the data file. Since it contains 100,000 observations, you must first make sure that the 0 and 1 ratio in the dependent variable is not too different, that is, whether you do not have the problem with deficiency of category 1 in dependent variable (Ling – Sheng, 2008). Let's create a frequency table of the variable Click (Table 1):

```
title "Frequency of variable Click";
ods noproctitle;
proc freq data=library.input_table order=internal;
    table click / nocum;
run;

ods proctitle;
title;
```

Table 1. Frequency of variable Click

Click	Frequency	Percent
0	96 462	96.46
1	3 538	3.54

Source: SAS Enterprise Guide

The share of category 1 in dependent variable Click in the dataset is very small (only 3.54%). To solve this problem, you can use the King and Zeng method (2001) to edit the rare event data – take all observations where variable Click = 1 and use the Random sample method for the remaining observations to select the same number of observations for which Click = 0. This means that the result file contains $3\,538 \times 2 = 7\,076$ observations.

```

proc surveyselect data=library.input_table
  (where=(click = 0))
  out=work.random_sample
  method=srs
  n=3538;
run;

proc sql;
  create table library.data as
  select *
  from library.input_table
  where click=1
  union
  select *
  from
  random_sample;
quit;

```

New datafile DATA has 7 076 number of observations and will be used to create predictive models. Because of the complexity of next calculations, continue only with this dataset Data. The input variables are divided into the model according to the variable type:

- Dependent variable – *Click*,
- Classification variables – *Position, Domain, User_day, Size* and *Device*,
- Quantitative variable – *User_hour*.

Since the weights of weighted logistic regression are the costs of individual impressions, your predicted category in the dependent variable is category 0. It is because the goal is not to buy expensive clicks, but the most effective ones for the lowest possible impression price.

2.1 Model of Standard Logistic Regression

Code for the Standard Logistic Regression Model:

```

ods graphics on;
data data_logreg1;
  set library.data;
run;

title "Logistic Regression Results";
proc logistic data=data_logreg1
  plots(only)=roc;
  class position (param=ref descending) domain
  (param=ref descending) user_day (param=ref descend-
  ing) size (param=ref) device (param=ref);

```

```

model click (event = '0')=user_hour domain user_day
size device position /
selection=none
rsquare
link=logit;
output out=work.pred_data_logreg1(label="Logistic
Regression Predictions")
predprobs=individual;
run;
title;
ods graphics off;

```

You now check the convergence criterion, the statistical significant of the model and the statistical significance of the individual variables.

Model is statistically significant, and all variables are also statistically significant ($P > \text{ChiSq}; <.0001$). Convergence criterion are satisfied so you can consider this model to be correct. The criteria / statistics that speak about model quality are in next part of this paper because comparison of created models is based on this criteria and statistics (Allison, 2012). Therefore, we now create a second model – a Weighted Logistic Regression Model.

2.2 Model of Weighted Logistic Regression

Weighted Logistic Regression is one of cost-sensitive learning techniques. By assigning weights to observations in the training set, weighting approaches achieve the cost-sensitive class distribution (Elkan, 2001). Weights are typically determined by a frequency variable in the dataset. Out weighting variable is variable CPM.

Code for the Weighted Logistic Regression Model:

```

ods graphics on;

data data_logreg2;
set library.data;
run;

title "Logistic Regression Results";

proc logistic data=data_logreg2
plots(only)=roc;
class position (param=ref descending) domain
(param=ref descending) user_day (param=ref descend-
ing) size (param=ref) device (param=ref);
freq cpm;
model click (event = '0')=user_hour domain user_day
size device position /
selection=none
rsquare
link=logit;

```

```
output out=work.pred_data_logreg2(label="Logistic  
Regression Predictions")  
    predprobs=individual;  
run;  
  
title;  
ods graphics off;
```

Again, make sure that this model is satisfied for all the necessary criteria.

3 Model Comparison

See the following tables for a comparison of each model (Allison, 2012). All tables and a figure in the first column belong to Model of Standard Logistic Regression (Table 2, Table 4, Table 6, Table 8, Table 10, Figure 1) and tables and a figure in the second column belong to Model of Weighted Logistic Regression (Table 3, Table 5, Table 7, Table 9, Table 11, Figure 2).

Model of Standard Logistic Regression

Table 2. Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	9 811.419	8 256.290
SC	9 818.283	10 871.651
-2 Log L	9 809.419	7 494.290

Source: SAS Enterprise Guide

Model of Weighted Logistic Regression

Table 3. Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	66 857.438	55 215.199
SC	66 866.264	58 224.838
-2 Log L	66 855.438	54 533.199

Source: SAS Enterprise Guide

Table 4. R-Square and Max-rescaled R-Square

R-Square	Max-rescaled R-Square
0.2790	0.3721

Source: SAS Enterprise Guide

Table 5. R-Square and Max-rescaled R-Square

R-Square	Max-rescaled R-Square
0.2172	0.2955

Source: SAS Enterprise Guide

Table 6. Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	2 315.129	380	<.0001
Score	1 944.279	380	<.0001
Wald	1 107.724	380	<.0001

Source: SAS Enterprise Guide

Table 7. Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	12 322.239	340	<.0001
Score	11 045.876	340	<.0001
Wald	6 619.183	340	<.0001

Source: SAS Enterprise Guide

Table 8. Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
user_hour	1	4.879	0.0272
domain	359	602.726	<.0001
user_day	6	16.163	0.0129
size	10	70.565	<.0001
device	2	134.382	<.0001
position	2	26.896	<.0001

Source: SAS Enterprise Guide

Table 9. Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
user_hour	1	32.325	<.0001
domain	319	4 160.985	<.0001
user_day	6	62.779	<.0001
size	10	642.130	<.0001
device	2	875.074	<.0001
position	2	200.307	<.0001

Source: SAS Enterprise Guide

Table 10. Association of Predicted Probabilities and Observed Responses

Percent Concordant	79.8	Somers' D	0.596
Percent Discordant	20.2	Gamma	0.597
Percent Tied	0.0	Tau-a	0.298
Pairs	12517444	c	0.798

Source: SAS Enterprise Guide

Table 11. Association of Predicted Probabilities and Observed Responses

Percent Concordant	76.3	Somers' D	0.526
Percent Discordant	23.7	Gamma	0.526
Percent Tied	0.0	Tau-a	0.248
Pairs	596771700	c	0.763

Source: SAS Enterprise Guide

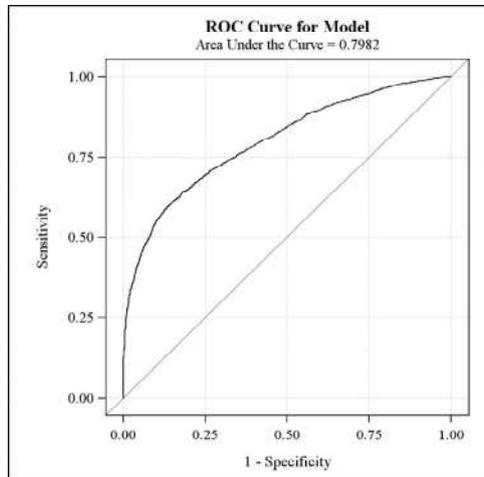


Figure 1. ROC Curve for Model of Standard Logistic Regression

Source: SAS Enterprise Guide

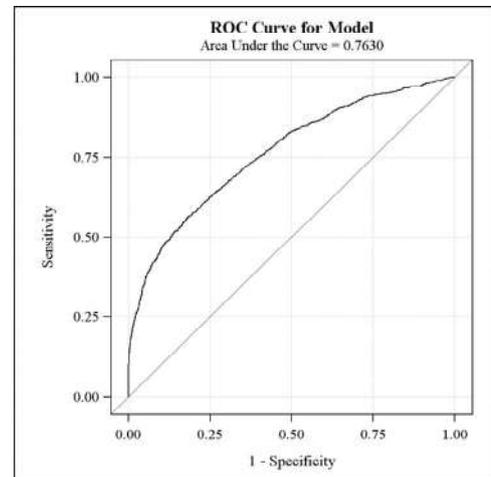


Figure 2. ROC Curve for Model of Weighted Logistic

Source: SAS Enterprise Guide

When comparing the individual models, from the statistical (analytical) point of view the model of standard logistic regression is performing better (Allison, 2012). However, is this also a better business model? Based on predicted values and total costs, you calculate the average CPC (Cost per click) for both models. First, sum up the costs for the purchased impressions – the ones that the model has predicted to result in click. Then divide the sum by the count of correctly predicted clicks (those which are clicks in input and also in output – predicted by model). Run following code two times to generate two result tables:

```
%let title=Standard /*Weighted */ Logistic Regression
Model;
%let outputtab=pokus1 /*pokus2*/;

data &outputtab;
  set pred_data_logreg1 /*pred_data_logreg2*/;
  N+1;
  if first._INTO_="1" then
    Cena_CPM=0;

  if _INTO_="1" then
    Cena_CPM+cpm;
  if first._INTO_="1" and first._FROM_="1" then
    Click1_1=0;
  if _INTO_="1" and _FROM_="1" then
    Click1_1+1;
  CPC=Cena_CPM/Click1_1;
  format CPC euro7.2;
```

```

run;

title1 "Average CPC";
title2 &title;

proc print data=&outputtab noobs label;
  var CPC;
  label CPC="Average CPC";
  where N=7076;
run;

```

There are two outputs – average CPC for a Model of Standard Logistic Regression (unweighted) and average CPC for a Model of Weighted Logistic Regression.

Table 12. Standard Logistic Regression Model – Average CPC

Average CPC
€13.75

Source: SAS Enterprise Guide

Table 13. Weighted Logistic Regression Model – Average CPC

Average CPC
€13.57

Source: SAS Enterprise Guide

Although the Unweighted (Standard) Logistic Regression Model is performing better from the statistical (analytical) point of view according to the criteria, from a business point of view considering also the cost of purchased impressions (CPM) the Model of Weighted Logistic Regression is better.

4 Conclusion

The goal of this paper is to show the benefits of using analytics and data for planning advertising campaigns and in buying advertising inventory. Using programmatic buying instead of traditional buying can deliver much better results and, in particular, save costs while delivering more relevant content to potential customers. However, it is also very important to choose the best model in programmatic buying. It emerged that choosing the right model can save campaign costs and bring better results. We compare two approaches to programmatic buying – the first one is without using campaign costs in modeling and the second one is with use of campaign costs.

The conclusion of this modeling is that the model, which also takes into account the costs invested in the campaign, is more usable for the business strategy because it is more flexible and more sensitive to buying individual impressions.

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SYNCHRONIZATION OF BUSINESS CYCLES BETWEEN SELECTED EUROPEAN COUNTRIES

Agáta Šuláková

University of Economics in Bratislava
Faculty of National Economy
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
agata.sulakova@euba.sk

Abstract. This paper deals with the business cycle synchronization within Europe for a period of years 1995-2018. The group of analysed countries is represented by the core economies of Eurozone, candidate countries for euro adoption and also European countries that are neither members of the Eurozone nor the European Union. Cyclical component of gross domestic product is detrended by Hodrick-Prescott filter. Symmetries in business cycles are then analysed by the coefficient of correlation. The aim of this paper is whether the business cycles in the European economies have become more or less synchronized since the year 1995.

Keywords: optimum currency area, monetary union, Eurozone

JEL classification: E 32, F 45

1 Introduction

The topic being discussed is whether the European Monetary Union candidate countries meet the conditions of an optimum currency area. However, meeting these criteria may not be sufficient for the successful functioning of the monetary union. Economists define different criteria for the theory of optimum currency area, the fulfilment of which will increase the probability that the benefits of the monetary union will outweigh the costs. These criteria include the mobility of production factors, which is an integral part of the monetary area. The next criterion is the degree of the openness of the economy or the diversification of the production. Other criteria of the optimum currency area are similarity in inflation rates, structural similarity of gross domestic product formation, similarity of cyclical economic developments and similarity of shocks, political integration, wage and price flexibility, financial market integration and fiscal integration. With increasing synchronization of the business cycle, a probability of asymmetric shocks decreases.

According to Černíková (2010), Germany has a key role within the core of the Eurozone. Countries with similar economic development to Germany demonstrate increasing correlations of their business cycles to the whole Eurozone. Altavilla's results (2004) suggest that, although during the period of recession, the euro area countries shared a similar output dynamically. His results also suggest that adhesion to the new currency area is likely to lead to stronger synchronization of European monetary union member's business cycles. Kappel (2015) confirmed that the countries of the core, especially Germany, the Netherlands, Austria, Finland and France, have the highest alignment of the business cycle. On the opposite side, the countries of the periphery, Greece, Italy and Slovakia, have a lower alignment of these business cycles. According to Darvas (2007) synchronization has increased in all European monetary union members since the start of the run-up to this monetary area, when these countries began a process of fulfilling the nominal convergence (Maastricht criteria) to be ready to adopt the euro as their currency in 1999. On the other hand, he also claims that the non-European monetary union countries and even the US, Japan and Russia have also shown greater comovement with the euro core cycle. According to Furceri (2005), most of the European countries were better synchronized with the European monetary union in the 1999-2004 period than they were during 1993-1998. Kose (2003) proves in his study that globalization leads to an increase in the degree of synchronization of business cycles.

1.1 Methodology

For evaluating business cycle synchronization in this paper, we calculate the fluctuation of gross domestic product GDP, macroeconomic variable, around its trend. The cyclical component of GDP is detrended by the Hodrick-Prescott filter for $\lambda=1600$. Data are seasonally and calendar adjusted. The cyclical component of GDP is obtained through the Hodrick-Prescott filter, which has the following expression:

$$\min \sum_{t=1}^T (y_t - y_t^*)^2 + \lambda \sum_{t=2}^{T-1} [(y_{t+1}^* - y_t^*) - (y_t^* - y_{t-1}^*)]^2 \quad (1)$$

where

- y_t is gross domestic product in time t ,
- y_t^* is trend component,
- λ is a multiplier.

Measure how two variables are related is correlation. The most used correlation coefficient is a Pearson correlation coefficient (r_{xy}), which has the following expression:

$$r_{xy} = \frac{s_{xy}}{s_x s_y} \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad (2)$$

where

- r_{xy} is the Pearson correlation coefficient,

s_{xy} is the covariance x and y,
 s_x is the standard deviation of x,
 s_y is the standard deviation of y,
 \bar{y} is the mean of y,
 \bar{x} is the mean of x.

Values of the correlation coefficient can be from -1 to +1. The strongest relationship between two variables x and y are when the value of correlation is 1. The value -1 means the perfect negative relationship. When the correlation is 0, it means that there is no linear correlation between two variables.

Model and data.

Our sample includes seasonally and calendar adjusted quarterly data in the period 1995Q1-2018Q4 for a sample of 15 selected European countries. The years are grouped in 6 non-overlapping 4-year periods: 1995Q1-1998Q4; 1999Q1-2002Q4; 2003Q1-2006Q4; 2007Q1-2010Q4; 2011Q1-2014Q4; 2015Q1-2018Q4. All our data are from Eurostat's National accounts database. Unfortunately, not all-time series are available for the full period. For Croatia data are available only from the first quarter of 2000, for The Czech Republic data are available only from first quarter 1996.

2 Results

We have separated the trend and cyclical components from the quarterly data of gross domestic product by Hodrick-Prescott filter. One criterion of the optimum currency area is the criterion that countries in a monetary union must show similarity in the business cycle. If we correlated the GDP data of two countries, we would get biased results due to the trend component. By using the HP filter, we have the cyclical component of GDP available for our model. Using the Pearson correlation coefficient, we can determine the strength of the relationship between the business cycles of the two countries. The results indicate a high degree of business cycles synchronization among euro area countries, especially in countries of the core of the euro area. Synchronization of the economic cycle is one of the most important conditions for the successful functioning of the monetary union.

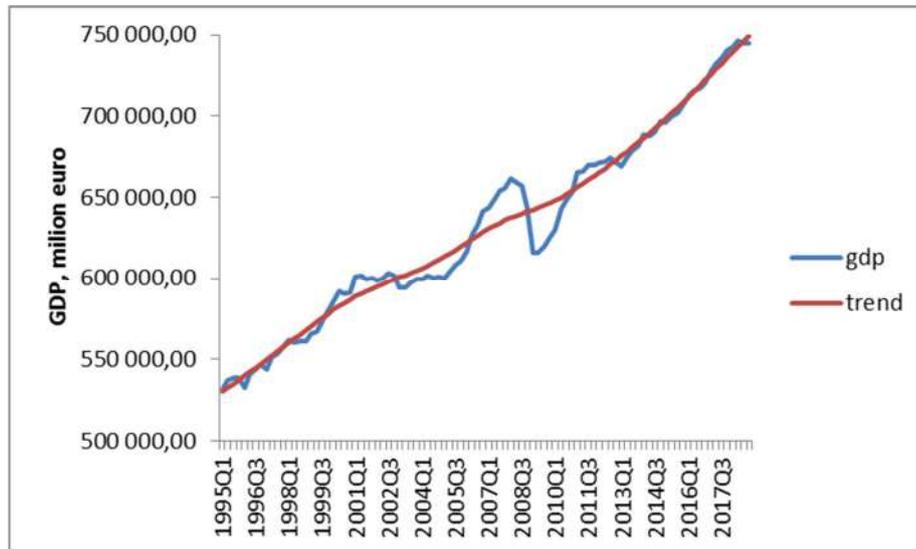


Fig. 1. GDP and trend component of Germany 1995-2018. *Source: Eurostat (2019), author's calculations*

The results of the individual correlations show that the highest similarity of business cycles show Germany and France. They are the two largest economies within the euro area and the European Union. They are the core economies, too. The values of the Pearson coefficient is 0,86; which is a very strong dependence.

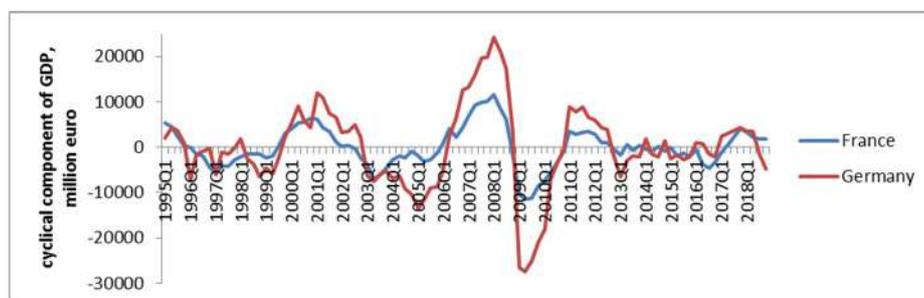


Fig. 15. Cyclical component of GDP, France and Germany, years 1995-2018. *Source: Eurostat (2019), author's calculations.*

An example of the least dependent pair of countries is the pair of Greece and Germany. Paradoxically, Greece is not only a member of the European Union, but it is one of the first countries that adopted the euro as its currency. One of the criteria of the optimum currency area is, that member country shares a similar economic cycle with countries within the same monetary union. The magnitude of the correlation between the business cycle of Greece and Germany is only 0,12, which means a very weak dependence. Also,

Greece shows approximately the same correlation with another core economy, with France.

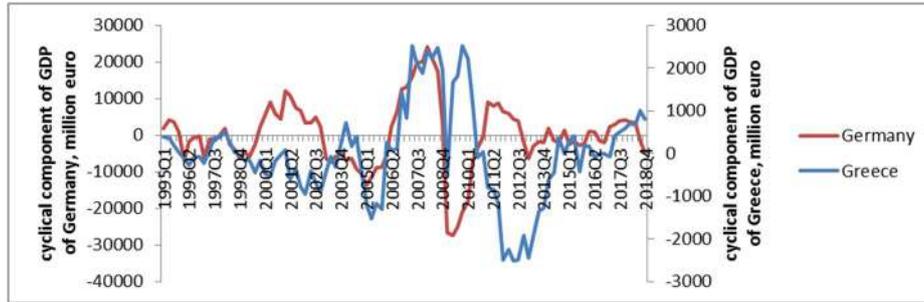


Fig. 3. Cyclical component of the GDP, Germany and Greece, 1995-2018. *Source: Eurostat (2019), author's calculations.*

We expressed the core of the euro area as an aggregate indicator Eurozone 12, which includes 12 countries that first adopted euro. Aggregate Eurozone 12 contains Belgium, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Greece, Spain, Portugal, Austria and Finland.

Table 1. Coefficient of correlation between Eurozone 12 and candidates countries

	Bulgaria	Czech Republic	Croatia	Hungary	Poland	Romania	Sweden
Eurozone 12	0,2863	0,85058	0,78097	0,71915	0,5668	0,42757	0,87562

Source: Eurostat (2019), author's calculations

There are six potential candidates for the entry to the euro area - Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania and Sweden. Sweden is the country, which according to the criterion of the similarity of the economic cycles, meets this criterion to the highest extent. The correlation between the business cycle of Sweden and Eurozone 12 is 0,85. The country with the second-highest correlation between its business cycle and Eurozone 12 is the Czech Republic with a coefficient of 0,85. It means also a strong relationship. Slightly lower size of dependency is reported by Croatia 0,78. Hungary is followed by 0,72 and Poland 0,57. The two remaining candidate countries, Bulgaria and Romania, show a very weak correlation. Romania achieved a correlation 0,43 and Bulgaria only 0,29.

Table 12. The Coefficient of correlation between Eurozone 12 and selected European countries

	United Kingdom	Germany	France	Norway	Switzerland	Denmark	Greece
Eurozone 12	0,72711	0,94755	0,9168	0,43451	0,86582	0,80674	0,29312

Source: Eurostat (2019), author's calculations

Paradoxically, this criterion is better met by countries that have a special position towards euro adoption or non-member countries. Switzerland has a correlation with the Eurozone 12 0,86 and Denmark 0,8. Greece which introduced the euro at the beginning of the millennium has the same results as candidate country Bulgaria. Greece has a business cycle dependence with Eurozone 12 only 0,29.

The following table shows the development of the correlation of the business cycle between candidate countries and Eurozone 12. In many countries, there has been greater synchronization of business cycles since 1995. In the late 1990s, some countries showed a negative relationship. This means that business cycles of the Czech Republic, Bulgaria, Poland and Romania developed in the opposite direction to the countries of Eurozone 12.

The opposite trend is most evident in Hungary when the relationship between the business cycle of Hungary and Eurozone 12 in 1995-2010 was stronger than in years 2011-2018. And for the last period of 2015-2018, the dependence is almost zero, which means no relationship.

Table 13. Correlation between candidate country and Eurozone 12 1995-2018

		Bulgaria	Czech Republic	Croatia	Hungary	Poland	Romania	Sweden
	1995-1998	-0,26339	-0,18689		0,83538	-0,26068	-0,39831	0,79068
	1999-2002	0,18482	0,94394	0,36783	0,45507	0,51779	0,07097	0,63339
eu12	2003-2006	0,80087	0,88910	0,65830	0,87374	0,18297	0,53778	0,95895
	2007-2010	0,77665	0,97124	0,90634	0,96397	0,82122	0,54797	0,95203
	2011-2014	0,94473	0,94685	0,58653	0,38595	0,91687	-0,66302	0,90107
	2015-2018	0,75269	0,42972	0,62394	0,09989	0,56189	0,81690	-0,24685

Source: Eurostat (2019), author's calculations

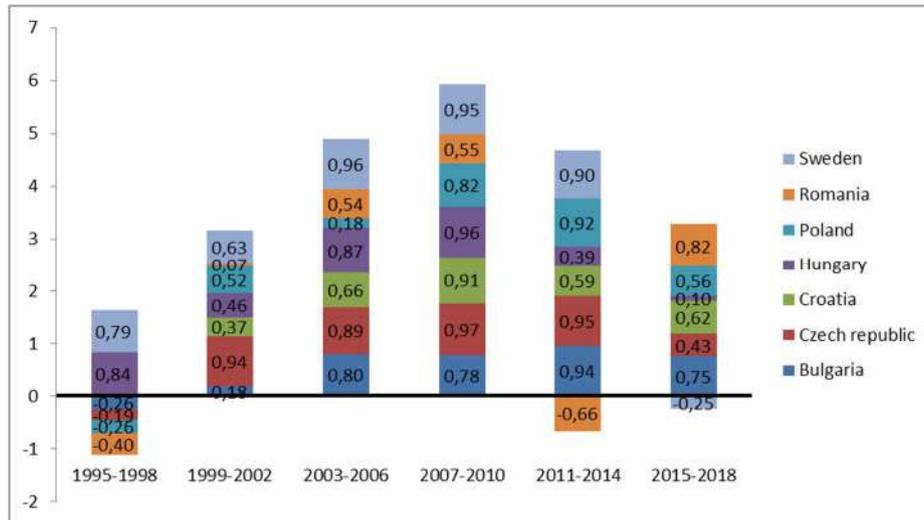


Fig. 4. Correlation Between candidate country and Eurozone 12 1995-2018. *Source: Eurostat (2019), author's calculations*

There is evidence of the development of the correlation between candidate countries and Eurozone 12 in the previous graph. It shows that at certain times of the business cycle, cyclical component dependencies are more interlinked. For the period of 1995-1998, the aggregate indicator is the lowest. At this time, the economies of the current candidate countries were not as economically linked to the core of the future euro area. Most of the candidate countries went through a process of transformation in those years and only gradually became economically connected with other European countries. Also noteworthy is the fact, that countries had the highest dependence between them in years 2007-2010. At that time, the expansion phase culminated and subsequently shifted into an economic recession.

3 Conclusions and policy implications

European monetary union is quite a heterogeneous union. In most countries, there has been greater synchronization of business cycles since 1995. In the late 1990s, some countries showed a negative relationship. This means that business cycles of the Czech Republic, Bulgaria, Poland and Romania developed in the opposite direction to the countries of Eurozone 12. The opposite trend is most evident in Hungary when the relationship between the business cycle of Hungary and Eurozone 12 in 1995-2010 was stronger than in years 2011-2018. For the period of 1995-1998, the aggregate indicator is the lowest. At this time, the economies of the current candidate countries were not as economically linked to the core of the future euro area. Also noteworthy is the fact, that countries had the highest dependence between them in years 2007-2010. In the long term, we consider the accession of all countries in the European Union to the Eurozone a natural integration process.

This paper has provided a number of preliminary results, richer data sets and more rigorous estimation methods are needed to improve our understanding of the business cycle synchronization, which has important implications for macroeconomic policies in European countries.

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INDUSTRIAL ROBOTS IN JAPAN¹

Ing. Viktória Švardová

University of Economics in Bratislava
Department of Economic Policy
Dolnozemska cesta 1
Bratislava, 852 35
Slovakia
viktorija.svardova@euba.sk

Abstract. In 2017, the global manufacturing industry crossed the threshold of two million robots in operation for the first time. Also, the highest value of annual sales volume was ever reached. The market with robots is growing at enormous pace and shipments of industrial robots are growing in most countries. The leading manufacturer of robots is Japan. More than half of all the robots in the world are made in Japan. Despite this fact, the operational stock in the country is decreasing from the beginning of the 21st century. The main aim of our paper is to look at more detail on this phenomenon. Why it is, that in the world where more and more industrial robots are used during the production process, in the country that is the leader in automation the operational stock of robots has been decreasing. In the last part of our paper we are dealing with the Japanese exports, especially with the exports of robotics.

Keywords: automation, robots, exports, Japan.

JEL classification: E00 O33 F16

1 Introduction

Nowadays, the automation of the production process and the increased usage of robotics are highly debated topics among the world's policy makers, because they affect various aspects of the economy. There are many reasons of implementing robots in the production process – to lower production costs, to increase productivity or to replace workers in dangerous occupations. Robotics of new technologies and artificial intelligence may bring huge opportunities for the world economy, but it is also important to bear in mind, that increased automation has various risks that need to be regulated.

Japan is the leader in the automation and in the production of robots. It is considered the most advanced robot nation in the world. Except for economic and social reasons, why Japan has the leading role in development of robotics and artificial intelligence, the cultural reasons are also hugely affected it. From 1950s, the manga comics and

¹ The paper is part of research project EUBA I-19-105-00.

animation became very famous in the country. The first and the most famous comic is Astro Boy who is a robot male with human emotions. Through this animation people in Japan developed positive feelings towards robots. Also, during the history, the Japanese people did not consider robots as an enemy to humans. Until today, they are generally viewed positively in the country.

In 1970s Japan started to adopt industrial robots in the production process. In 1980s, Japan became the largest automotive manufacturer in the world, which led to the usage of more advanced robotics technologies in the production process. The reason why Japan started hugely use robots over human labor are to reduce labor cost, increase workplace safety and also improve productivity and product quality. These are the main economic and social reasons why Japan gained the leading role in robotics.

Today, Japan is the leading manufacturer of robots - 55 % of the world's robots are made in Japan. It is also the second largest market for industrial robots after China. Manufacturing is highly automated in the country and the robots do much of the dangerous and repetitive work in the factories. On the other hand, due to the decreasing Japanese population, the service industry will also need to be automated in the future (The Economist, 2018).

2 Data on industrial robots in Japan

The annual publications of International Federation of Robotics contain data about industrial robots and service robots. During our research we used also the reports called World Robotics Industrial Robots 2018 that cover information about multipurpose industrial robots. The data is divided according to type, country, industry and application. It informs about the amount of robots' stock and sales used in different industries and their different applications each year from 1993 until 2017. In the database, the robots are divided into robots' sales and operational stock of robots. Robots' sales refer to a number of robots installed in a year. The operational stock of robots measures the number of robots currently deployed. The Industrial Federation of Robotics database also classifies the industrial robots by applications. The robots may be used in areas like handling operation, machine tending, welding, soldering, dispensing, processing, assembling and disassembling. The industries, in which the robots are used, are divided into groups like agriculture, mining, quarrying, manufacturing, electricity/gas/water supply, construction and education/research and development. (IFR, 2018)

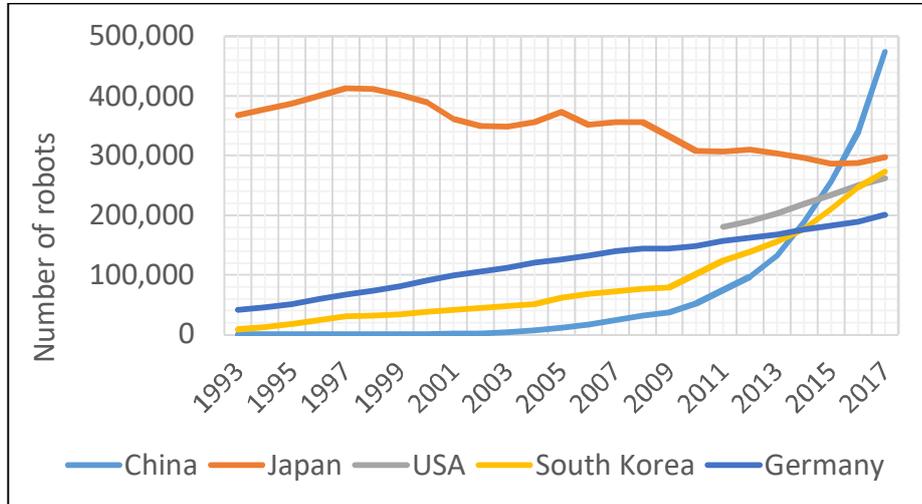


Fig. 1. Operational stock of robots in 2017 – top 5 countries. *Source: author's calculations based on IFR database.*

Figure 1 represents the top five countries with the highest number of robots based on the International Federation of Robotics database. In 2017, there were about 2 million robots in the world and about half million of them are in China. On the second place is Japan with about 300 thousand robots in the country. In all of the selected countries, the operational stock of robots is increasing while in Japan, that is the leading manufacturer and user of robotics worldwide, the operational stock of robots is decreasing.

There are few reasons, why the operational stock of robots is decreased in Japan (IFR, 2005 and 2006). The Japanese share of the industrial robots on the world's stock were almost 70 % in 1993 (Figure 2). This high share was caused mainly by the calculation error. Data on the industrial robots in Japan used to cover all types of industrial robots, both multipurpose and dedicated robots. Exclusion of the dedicated robots caused sharp drop in new installation between 2000 and 2001. From 2001 the data became much more comparable with the data from other countries. The share of the industrial robots was continuously decreasing and in 2017 the value reached less than 15 %.

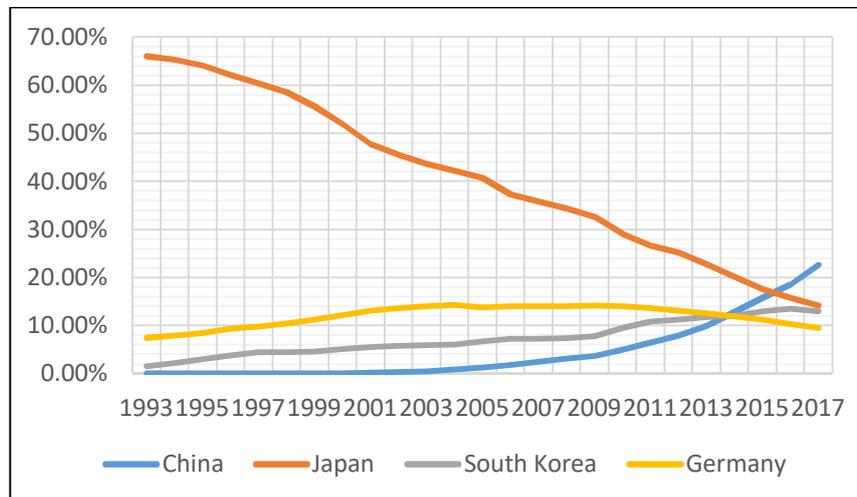


Fig. 2. Share of the industrial robots in the selected countries on the world's robots' stock.
Source: author's calculations based on IFR database.

Another reason why the operational stock of robots rapidly decreased at the beginning of the 2000s is, that many of the early robots were taken out of service. Based on the International Federation of Robotics, the average service life of robots is 12 years with an immediate withdrawal from service afterwards (IFR, 2018). The operational stock of robots was also decreased in the early 2000s because of the real drop in the market. The Japanese investments rapidly declined (including investments to robotics) and also the market fell by 33 % to just under 4 billion US dollars. While the total investments in Japan in 1990 were almost 35 % of the GDP, in 1994 it fell to 30 %, in 2002 to 25 % and the last big drop was in 2009 to 21 % of GDP (World Bank). In 1990s the asset price bubble in Japan collapsed that was followed by an extended period of corporate restructuring and banking crisis. Japan had serious fiscal problems due to the weak economic growth, so the increased spending driven by the frequent fiscal stimulus packages were financed largely by borrowing. The gross government debt in Japan was 226 % of GDP in 2014 that was the highest ever recorded in the OECD. In 2013, Japan launched Abenomics that had three objectives – a bold monetary policy, flexible fiscal policy and a growth strategy to overcome the slow economic growth in the past years (OECD, 2015).

After strong investments in robotics in 2005, there was a continuing decline in robot investments. Another sharp drop in the operational stock of robots in Japan was in 2008, when the worldwide economic crisis started. As in many countries in the world, the scheduled investments in the main industries were also restrained in Japan. The industries that were affected the most are the industry of electric machinery and components, industry of communication equipment, industry of rubber and plastics, machinery industry that were substantially cut the investments in robots' installations. Not just the crisis, but also the earthquake and tsunami affected the robotics industry in 2009.

The following years, Japan was again the biggest robot market in the world. Although Japan fell to the third place after China and the Republic of Korea in 2015, the largest number of industrial robots were still operating in the factories of Japan. The market cycle for industrial robots was affected by the automotive and by the electronics industry that are very significant in the country's production.

Despite the economic problems in Japan in the last decades, the output per capita is almost as much in Japan as in the OECD countries over the last four years. On the other hand, the operational stock of robots is still slightly decreasing in the last few years. Between 2012 and 2017 the operational stock declined by 1 % on average per year, but in 2017 increased by 3 % to almost 300 000 robots. But the last years decline of the operational stock of robots can be also explained by the shifts of the production from Japan.

According to International Federation of Robotics (2018) the robots' stock in Japan declined mainly in the automotive industry in the recent years. The Japanese car companies are expanding their production abroad and they are establishing new facilities abroad mainly in United States, Mexico, China as well in other Asian countries. Furthermore, the automotive parts suppliers also moved their production closer to their customers.

Even Kenney and Florida (1994) dealt with the Japanese relocation of production abroad. They analyzed the Japanese maquiladoras in the Mexico. Most of the production require low-skilled labor force and labor-intensive activities. During the examined period there were approximately 66 Japanese maquiladoras in Mexico that employed more than 20 000 workers mainly in the industry of electronics.

Over the past few decades, the production had to be also offshored to other lower-wage economies like China and other Asian countries due to the increasing costs. The first wave of offshoring was concentrated in Taiwan, Hong Kong, South Korea and Singapore. After the increased labor costs due to the development in these countries, Japanese firms had to move their production to other countries in order to decrease costs. During the mid-1990s, the Japanese FDI started to flow to China. In the last few years around one-third of Japanese investments in Asia flow to China into the manufacturing sector. (Berger-Thompson and Doyle, 2013)

Although nowadays, the situation has changed between Japan and China. Because of the trade war between USA and China, Japanese firms have started to relocate their production from China. USA imposed huge tariffs on Chinese made goods that forced Japanese firms to move at least small amount of production without building new factories. (Park – Yamakazi, 2018).

3 Japanese exports

In the previous part, we dealt with the operational stock of robots in Japan. Now we would like to analyze the Japanese exports including exports of robots.

Since 1960s the exports of high technology products fueled the Japanese economic growth. In 2017, Japanese exports account for approximately 17 % of GDP. The struc-

ture of the exports has changed over time. In the past, Japan was competitive in agriculture, so the main exports goods were agricultural products. Later, the exports consist of manufactured goods, textiles, steel and cars. There are two massive shocks that influenced the amount of Japanese exports. The first one is the global financial crisis in 2008 and 2009 and the second one is the east Japan earthquake in 2011 (Figure 3).

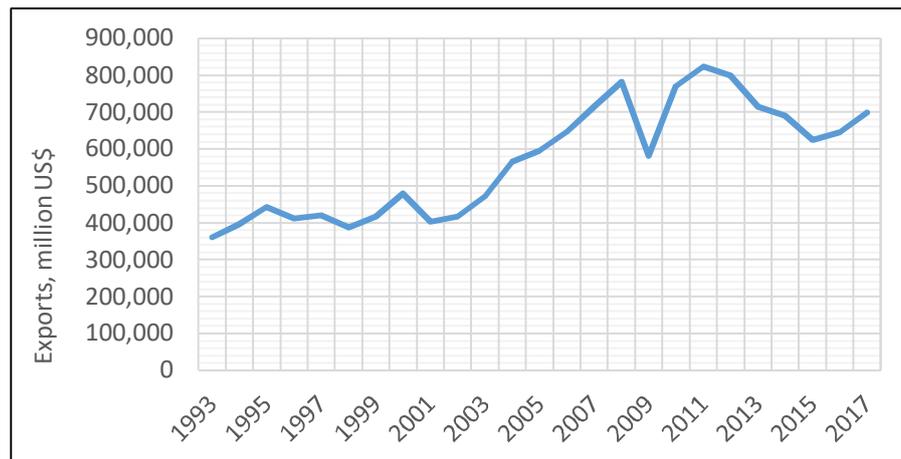


Fig. 3. Total exports of Japan. *Source: author's calculations based on WITS database.*

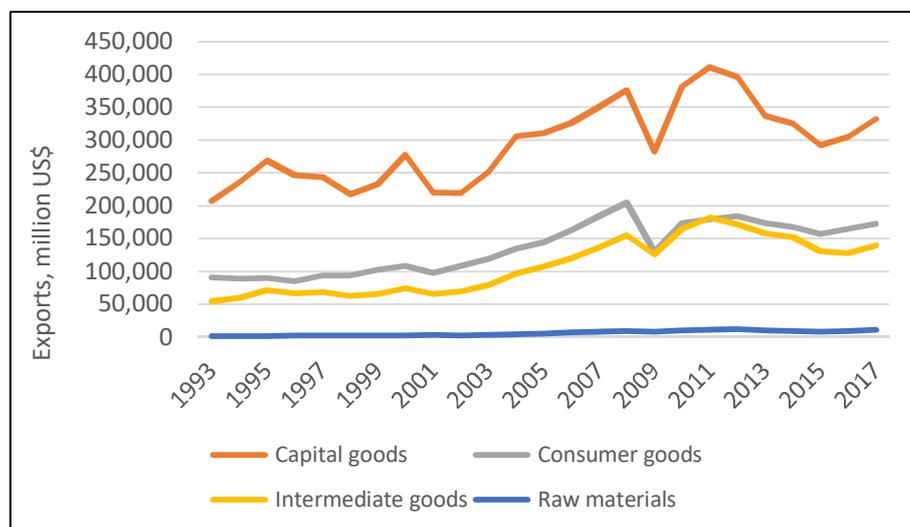


Fig. 4. Structure of Japanese exports. *Source: author's calculations based on WITS database.*

From 2008 to 2009 exports decreased by almost 40 % for all products, and particularly exports of automobiles declined by 50 %. However, the Japanese economy was seriously affected by both crises, the Global Financial Crisis hit its economy more than the east Japan earthquake. The main difference between these two shocks were, that in the

case of the financial crisis it was very difficult for firms to estimate the magnitude and duration of the crisis. On the other hand, after the east Japan earthquake there were some uncertain elements, but the firms were able to guess in some extent the seriousness of negative shocks from the beginning. (Ando – Kimura, 2012).

Figure 4 represents the structure of Japanese exports. It is obvious that from 1993 until today, the vast part of Japanese exports is represented by the export of capital goods. It is followed by the exports of consumer goods and then by the exports of intermediate goods. In 1993, most of the capital goods were exported mainly to United States, Hong Kong and Singapore, while in 2017 Japanese capital goods were exported mainly to China, United States and to Republic of Korea. According to the Mizuho Research Center (2018) the driving force behind the exports of capital goods are industrial robots.

In 2018, Japan shipped around US\$740 billion worth of goods that represented 5,7 % improvement compared to 2017. More than half of the exports were delivered to the Asian countries, almost 22 % were imported to North America and another 13 % all of the exports went to Europe. The Japan's top export product groups are vehicles, machinery including computers and also electrical machinery and equipment. These three product groups represent more than 75 % of all exports of Japan. (Workman, 2019)

Although the main export products of Japan are cars, automobile parts and accessories, Japan is the biggest manufacturer and exporter of industrial robots in the world. Most of the top robotics companies are from Japan, for example Fanuc Corporation, Kawasaki Robotics Inc., Mitsubishi and Yaskawa Electric Corporation that belong to the biggest robotics producers in the world.

Based on the analyses from International Federation of Robotics (2018), exports of Japanese industrial robots were increasing on average by 20 % per year in the period from 2012 until 2017. In 2017, Japanese exports hit the record when by 45 % more robots were exported. Regarding to Japanese imports of robotics, only about 1 % of all installations of robots are from abroad that represents an extremely low level of robots' imports. The prediction for the robotics in Japan is 15 % increase in domestic installations in 2018 and further annual increase about 5 % to 10 % in the following years.

4 Conclusions and policy implications

Japan is considered to be the leader in robotics in the world. More than half of all the robots worldwide are made in Japan and also the biggest robotics producers are located in Japan. At the same time the operational stock of Japan is decreasing. Our main aim of our paper was to analyze and explain this phenomenon and look in more detail on the Japanese exports.

At the time of increased automation and usage of robotics, Japan is facing various social and economic challenges that include low birth rate, aging population and decline of the productive-age population. Also due to the strict regulations of immigration flow to the country, Japan is facing a rapid decline in the labor force. This situation creates a strong incentive for automation and increased usage of robotics. On the other hand, based on the analyses from Pew Research Center (Wike-Stokes, 2018), young people

between 18 and 29 are significantly more worried about the impact of automation on employment than the older generations in Japan. They believe that increased usage of robotics will deepen the inequality between the rich and the poor.

Although Japan belongs among first countries coping with such difficulties, they are definitely not the last one. It is a matter of time, when other developed countries will have to deal with the problem of aging population and lack of productive-age population that may end in increased usage of robotics not just during the production process, but in the everyday life, too. In that case, Japan can provide an example that in what way the countries may deal with such economic and social difficulties and what may be the consequences of various regulations.

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EU-SOUTH KOREA FREE TRADE AGREEMENT AND ITS IMPACT ON SLOVAKIA'S EXPORTS TO SOUTH KOREA

Ondrej Tomčík

University of Economics, Bratislava
Faculty of Commerce, Department of International Trade
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
ondrej.tomcik@gmail.com

Abstract. The EU-South Korea Free Trade Agreement has proven to be beneficial to both the EU and South Korea, even though more benefits were reaped by the EU party. Comparison to Japan showed that the FTA helped South Korea to maintain and strengthen further its position on the EU market. The EU increased its exports to Korea substantially. Such “new generation” FTAs can enhance bilateral trade while constraining negative effects thereof. Slovakia, on the other hand, didn't benefit as much as anticipated. The underlying reason was a fall of exports in vehicles and electrical machinery to Korea.

Keywords: Free Trade Agreement, Slovak export, South Korea.

JEL classification: F 13, F14, F 15

1 Introduction

Liberalization of the global trade which had advanced outstandingly since World War II has come under strain with the tenure of the protectionist American President Donald Trump in recent years. Quote of one of his tweets that the trade wars are good has become notorious as the strongest declaration of the trade protectionism in recent decades, and his policy along with Brexit, caused uncertainty and major disruption to international trade. The European Union has become the most important international entity maintaining its pro-trade stance upholding the freedom in global trade. Signing the European Union and South Korea Free Trade Agreement (FTA) in 2009 has been viewed by many as the most significant achievement of trade liberalization since the creation of the European single market. The newly created Free Trade Area between the EU and South Korea has been dubbed by the EU commission documents as the first of a new generation of free trade areas characterized by the comprehensive nature and high level of ambition. In addition to the traditional provisions concerning trade in

goods and services such as rules of origin, industries issues, and tariffs reduction referred to as border measures, this new kind of FTA provisions address issues beyond border, i.e. issues of intellectual property (including protected designation of origin, protected geographical indication, and traditional specialties guaranty). There are also included provisions addressing public procurement, competition, transparency of regulation and sustainable development. The provisions specifically articulate commitments against non-tariff obstacles on sectors such as automobiles, pharmaceuticals and electronics.

Similar EU free trade agreements with Canada (The Comprehensive Economic and Trade Agreement – CETA) and Japan (European Union-Japan Economic Partnership Agreement – EPA) have followed. The negotiation of the Transatlantic Trade and Investment Partnership agreement with the USA was hampered by Mr. President Trump and consequently suspended by the EU Commission.

Negotiations of the Agreement commenced in May 2007 and concluded in March 2009. It was signed on 15 October 2009 and provisionally applied from 1 July 2011 effectively eliminating about 70% of tariffs. It entered into force on 13 December 2015 after being ratified by all signatories, removing 99% of tariffs as a result.

Slovakia as a member of the EU was meant to be a beneficiary of the treaty as well. The aim of this paper is going to be an assessment of the export performance of Slovakia to South Korea within the existing EU - South Korea legal framework. Comparison to the Czech Republic in the same respect will be conducted in order to discover whether there is a pattern of trade performance on the South Korea market common among the post-communist EU members.

1.1 Qualitative assessment review of the EU-South Korea FTA

As the first agreement of the kind, The EU-South Korea agreement's results are subject to Commission's regular reassessments. According to a survey conducted by the Commission, the FTA has a positive influence on many qualitative measurements of bilateral trade exchange (European External Action Service, 2017). Both parties have experienced the positive effect in similar areas, such as automotive, machinery, and electronics; thus it has enhanced intra-trade industry as a result. Customers and producers have access to a broader range of specialized products exploiting economies of scale and specialization increasing innovation and competitiveness of both economies. As the trade barriers on both sides were eliminated, the supply chains of producers have become more integrated. It allowed for suppliers to benefit from an increased number of customers, whereas producers on the other hand benefit from higher competition among suppliers, thus decrease their input costs. Enterprises participating in the survey also indicated that as a result of the FTA, they have upgraded their products and services in order to respond to increased trading opportunities as well as to address challenges aroused in connection to the FTA. As for cross-border and support services, the FTA was recognized as highly effective in providing a stable framework for European companies providing services in Korea and lead to developing new specialized services (European Commission, 2019).

From the point of view of the European food industry, the impact of FTA on Sanitary and Phyto-sanitary regulations were extremely important. Changes to Korean food safety regulations allowed for some EU dairy products to be recognized as safe to consumers' health. Although significant progress has been made in Sanitary and Phyto-sanitary measures, there remain some restrictions in place on the Korean site that need to be addressed (European University Association, 2018).

The survey also states that about 90 % of the respondents rated the Intellectual Property Rights (IPR) provisions between 5 and 7 out of 10. The FTA's IPR provisions are regarded as useful for the systemic rules, but concerns are still expressed about some aspects of enforcement. Geographical indications are regarded as very useful by food and beverage companies for branding and marketing their products.

The FTA also proved successful in the customs and trade facilitation as it removed various difficulties and made the process more straightforward. Despite the significant progress, 40% of respondents report some difficulties with fulfilling rules of origin, whereas 45% express significant difficulties. These difficulties sometimes cause delays in customs clearance or valuation and determining duty rates.

1.2 Quantitative assessment review of the EU-South Korea FTA

In quantitative terms, the FTA agreement can be considered a success as well. Figures show an increase in both imports and exports. It helped the EU economy to achieve positive numbers of bilateral trade balance between the years 2012 and 2018 (Figure 1)

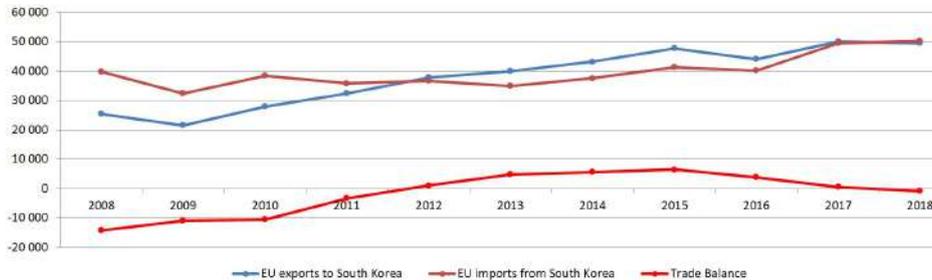


Fig. 1. Exports, Imports and the balance of trade in goods between the EU and South Korea (millions of EUR). *Source: Own processing based on Eurostat (2019)*

Within ten years, the EU exports to South Korea have almost doubled from 25.5 billion to 49.5 billion Euros, and the exports of South Korea to the EU have seen a rise of 10 billion Euros. Whereas the EU economy benefited considerably from the FTA, Korea has managed to secure and shore up its position on the EU market.

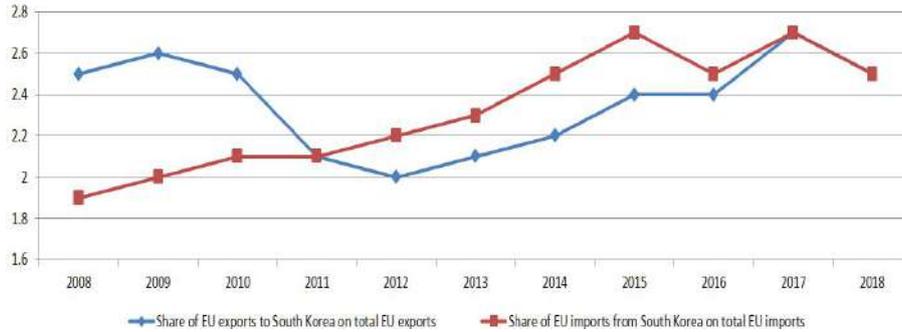


Fig. 2. The share of EU's exports to South Korea on total EU exports and the share of EU imports from South Korea on total EU imports (%). *Source: Own processing based on Eurostat (2019)*

As shown in Figure 2, after the year 2011 when the FTA came into force, the share of EU imports to South Korea experienced an upturn in the declining trend, which had been triggered by the global financial crisis in 2008.

The impact of FTA with South Korea on the bilateral trade is apparent from the comparison of the trade performance with Japan (Figure 3).

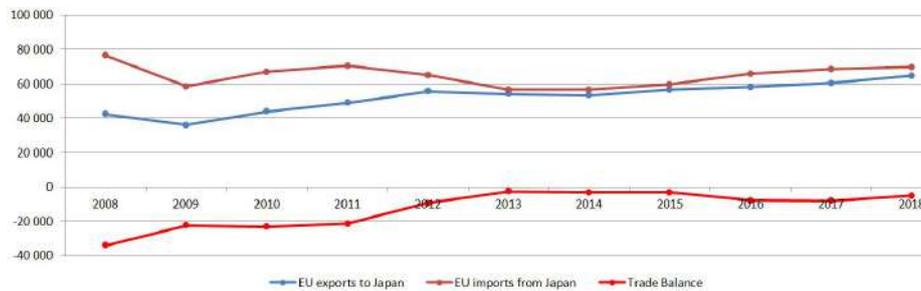


Fig. 16. Exports, Imports and the balance of the trade in goods between the EU and Japan (millions of EUR). *Source: Own processing based on Eurostat (2019)*

EU exports to Japan rose from 42.4 billion Euros in 2008 to 64.6 billion in 2018. That is an impressive growth in exports, but lacking behind the growth of export to Korea in relative as well as in absolute terms. The trend in Japan exports to the EU market shows the striking difference that the FTA makes for South Korea. Japan exports to the EU market sustained significant losses as the value of its exports to the EU fell from 76.4 billion Euros in 2008 to just 69.6 billion Euros 10 years later. The share of Japan's export to the EU on the total EU imports dropped from 4.8% to 3.5% within the same period. The underperformance of Japan in the EU market compelled the Japanese government to sign the EU-Japan Economic Partnership Agreement in 2018.

One of the leading EU's stakeholders' concerns voiced by Italian and French car-makers was the impact of such a treaty on the European automotive industry. As shown in Figure 4, those concerns turned out to be unfounded.



Fig. 4. Value of the EU exports and imports of goods to/from South Korea in the HS Commodity group 87 - Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof (millions USD). *Source: Own processing based on UN Comtrade database (2019)*

The export of European car manufacturers to South Korea almost quadrupled i.e. rocketed from 2.6 billion worth of production in 2008 to more than 10 billion USD in 2018. Meanwhile, the export of Korean manufacturers went up by more than 50%, from 7.5 billion to more than 12 billion USD in 2018. This growth was slowed down by the fact that Korean manufacturers Hyundai and Kia moved part of their production to the EU.

As for now, there are plenty of statistics allowing us to assert that the conclusion of the EU-South Korea Free Trade Agreement has benefited both the EU and South Korea, while the EU enjoyed stronger positive influence than South Korea. It has unarguably brought about new opportunities for European businesses including those of Slovakia.

The extent to which Slovakia managed to benefit from the Agreement is assessed by calculating the Grow Contribution of Commodity Index (GCC) that allows for visualization of Slovakia's export performance in respective commodity groups relatively to the situation in 2009.

2 Slovakia's dealings within the framework of the EU-South Korea Free Trade Agreement and the comparison of Slovakia's export performance with another EU member state – the Czech Republic.

With eliminating 99% of tariffs on EU products on Korean borders (Deutsch-Koreanische Handelskammer, 2018), the production of Slovak enterprises also enjoys this preferential treatment. The government of Slovakia is aware of the potential of the FTA with South Korea and puts forward a foreign trade strategy that aims at increasing Slovakian exports to emerging markets of East Asia. With investments of Korean companies to Slovakian production capacities, South Korea has become a strategic partner in the region. Korean export to Slovak republic is characterized by a substantial portion of supplies for the domestic production facilities owned by Korean producers such as Kia or Samsung. These supplies, after being used in production, constitute a great portion of Slovak exports to third countries. For a number of Korean companies, Slovakia

serves as a gateway to the EU market. On the other hand, Slovakia's exporters are still failing to seize the opportunities provided by the FTA with South Korea (Figure 5).

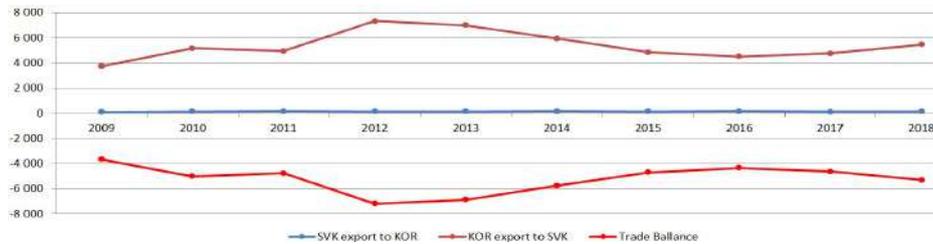


Fig. 517. Value of Slovakia total exports and imports of goods to/from South Korea (million USD). *Source: Own processing based on UN Comtrade database (2019)*

The figures show that immediately after the full implementation of the FTA, the inflow of Korean goods to Slovakia rapidly gained its strength, and after that started slow decline, in part as a result of the transfers of the production capacities from Korea to the EU. Slovak exports to Korea remain low even after the FTA entered into force. The disproportion of the Slovak trade with South Korea is very obvious. To spot the course of the trend in exports it requires adjusting the chart scale (Figure 6).

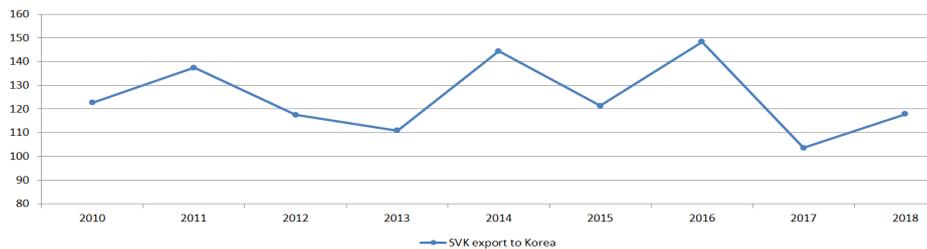


Fig. 6. Value of Slovakia total exports to South Korea (million USD). *Source: Own processing based on UN Comtrade database (2019)*

During the period, Slovakia's export went through a series of ups and downs without assuming any evident upward or downward tendency. At the end of the period in 2018 the exports ended up at a 5 million USD lower point than they were in 2010. The breakdown of the data is given in the Figure 7, which sets out the distribution of the Slovakia's export to Korea across respective commodity groups.

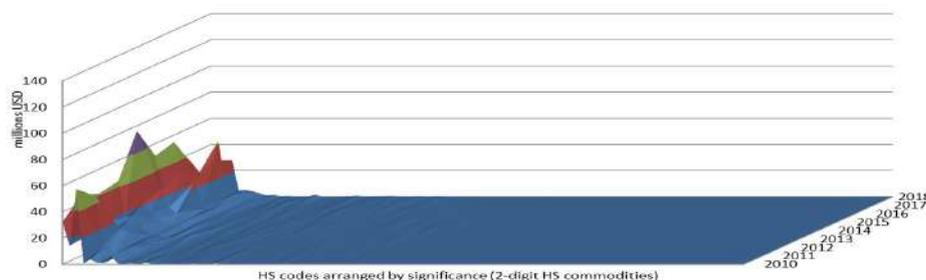


Fig. 7. Export of Slovakia to South Korea – values of respective HS commodities groups sorted by value. *Source: Own processing based on UN Comtrade database (2019)*

Neither the range of the goods nor the quantities indicate any signs of improvement. Almost half of the HS Commodities¹ weren't traded at all during the specified period. Of those commodities exported to South Korea in 2018, commodities in the Chapter 85 (Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof) constitute 36 %, Chapter 40 (Rubber and articles thereof) 24%, and commodities in Chapter 85 (Electrical machinery and equipment and parts thereof) account for 11% of total exports to Korea. In other words, more than 70% of Slovakia's exports to Korea is happening in those 3 Chapters.

As a member of the European Union, Slovakia benefits from the preferential trade tariffs under the FTA as do the other EU member countries. Therefore export performance of other EU countries can be used as a benchmark to evaluate the export of Slovakia.

The economy of Slovakia is characterized by a high degree of openness and so it's the Czech Republic's economy. Similarly, industry accounts for a great share of Czech GDP and the two economies are also similar in size, which makes it a suitable reference for comparison.

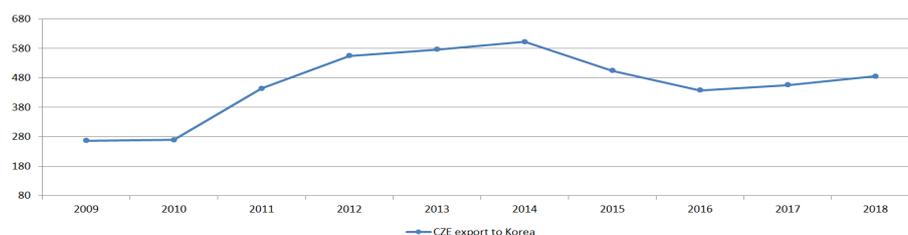


Fig. 8. Value of Czech total exports to South Korea (million USD). *Source: Own processing based on UN Comtrade database (2019)*

The Charter shows that the Czech Republic managed to increase significantly its exports to Korea during the period. Most significant increase was recorded during the year 2011, i.e. the year of the FTA coming into effect, which indicates that most of the

¹ Here the HS Commodities are represented by 2-digit aggregate commodities groups.

growth can be ascribed to the FTA. Figure 9 presents the contributions of individual groups of goods to the overall export.

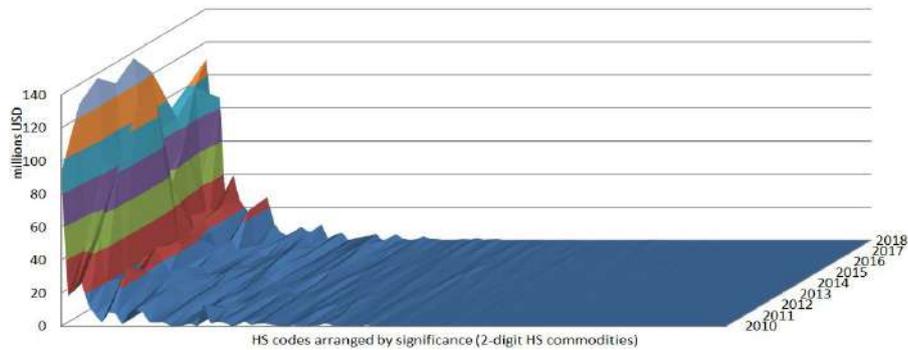


Fig. 9. Export of Czech Republic to South Korea - HS values of respective commodities groups sorted by value. *Source: Own processing based on UN Comtrade database (2019)*

The Figure 9 shows that the surface is less flat than that of Slovakia. That means more product groups were exported from Czech Republic to Korea than in the case of Slovakia. It reflects the bigger amount of goods per commodity. Despite the similarity of the two economies, comparing absolute numbers might be tricky, when the size of one is twice as big as the other one, which is the case of the Czech Republic and Slovakia.

To reveal the commodity structure of the growth and comparison of the two countries in this respect, the relative contribution of the growth of a respective commodity group to the overall export growth must be calculated:

$$GCC_y^i = \frac{x_y^i - x_{2009}^i}{x_{2009}^t} \quad (1)$$

where GCC is growth contribution of commodity i to overall growth in a given year y ;

x_y^i is export of commodity i in the year y ,

x_{2009}^i is export of commodity i in the year 2009,

x_{2009}^t is export of all commodities in the year 2009

i is a 2-digit HS code commodity group; $i = \{01, 02, 03, \dots, 98, 99\}$

$y = \{2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018\}$

Visualization of GCC respectively for Slovakia's and Czechia's export to South Korea is provided in Figure 10 and Figure 11.

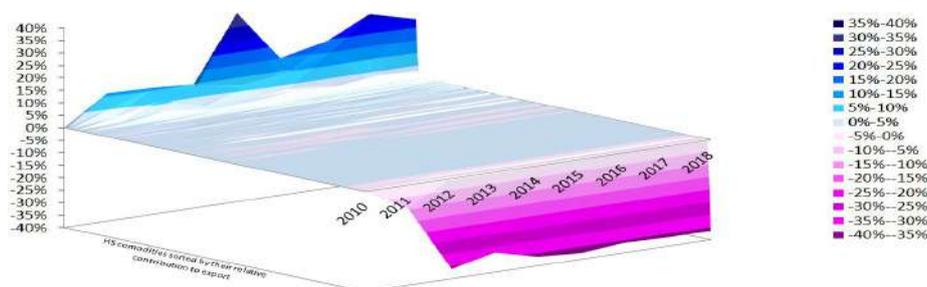


Fig. 18. The relative contribution of the export growth of a respective 2-digit HS commodity group to the overall growth of Slovak exports to Korea. *Source: Own calculations based on UN Comtrade database (2019)*

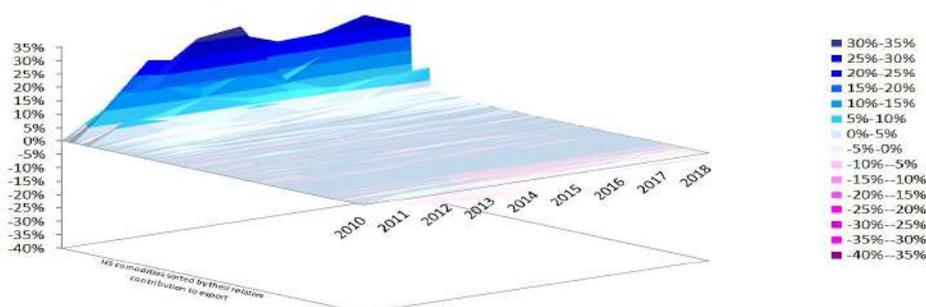


Fig. 11. The relative contribution of the export growth of a respective 2-digit HS commodity group to the overall growth of Czech exports to Korea. *Source: Own calculations based on UN Comtrade database (2019)*

Both pictures show notable growth in just a narrow range of products with most of product groups attaining moderate but positive contribution to the overall export growth. Whereas in the case of Czech Republic, where none of commodity groups encountered a significant fall in exports, in the case of Slovakia there was recorded a particular downfall in two statistically significant commodity groups - HS85² from 53 million USD to 13 million USD, and HS87³ from 32 million to just over 7 million USD. Fall in these two commodities are the main reasons behind the unfavorable trend in the Slovak exports to South Korea.

² Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles

³ Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof

3 Conclusions and policy implications

The study revealed that the EU-South Korea Free Trade Agreement benefits the EU as a whole, but in the case of the Slovak republic, it has been a failure. Slovakia increased its imports from Korea whereas exports experienced decrease during the reported period. The heavy reliance on the car and electronics industries leads to a decline in exports caused by these two commodities despite a moderate growth in others. The fact that a great deal of Slovak production is installed to final production of the other EU member states to be re-exported to South Korea afterwards is of little comfort in these circumstances. More diversified economy would be beneficial to better balanced trade.

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INTERACTIVE MARKETING IN PROPERTY DEVELOPMENT – SMART BUILDINGS

(Case study)

Linda Vašková

University of Economics in Bratislava
The Faculty of Commerce
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
linda.vaskova@gmail.com

Abstract. The aim of the paper is to identify the stage of importance of responsive devices in property development industry and its impact on users' agility. In the first part we deal with theoretical background and explanation of the users' terminology of smart buildings. In the next part we describe methodology and data which are used to analyse the stage of the impact on motivation and productivity of users' base on case study. We identified the key methodologies and indicators behind development of the high-quality office space, which impact productivity of users: lighting, temperature, air quality, security, rest rooms. Last part of the paper focus on results presentation and identification of the impact stage. Internet as an everyday part of consumers life is also getting increasingly influencing on consumers behaviour in property development industry. The use of mobile technologies and the internet can be identified as key consumer factors in smart buildings. We identified the impact of technological development and digitization on their users in property development industry.

Keywords: smart building, responsive devices, property development industry

JEL classification: M 31, M 54, O 33

1 Introduction

Offices are becoming smarter. In a Smart Office, responsive devices communicate via internet in order to analyse and optimize all aspects of the workplace. Technology makes office life easier and more comfortable, but if the technology is used in the right way, it can improve employee performance and well-being of users as well. Nowadays, there is a trend in property development industry to make smart offices - healthy offices. Research done by CBRE (2019a) has shown, that a combination of technology and healthy working environment leads to results in more motivated and more effective employees.

Digitalization, social and demographic trends lead to growing interest in workplace wellness. With ongoing competition between companies in terms of wellbeing environment for talented employees is likely to become a crucial aspect of recruiting and retaining employees over the next years. Technology can help people to get fitter, faster and more efficient. Trend also leads to the fact, that apps which are used for tracking technologies will play a significant role in the workplace. Creating an environment which allow uses to stay healthy and engaged has a massive impact to their motivation, productivity and higher level of commitment. By creating such an environment is company making a smart business investment.

1.1 The term of Smart Building

Digitalization is playing an important role in daily activities in many industries as well as in property development. Due to the technology evolution, it is possible to deliver all services that occupants need, while making the building as efficient as possible, with minimizing costs and reducing the environmental impact of the building over its life cycle. A number of large smart buildings have been built in Slovakia recently with complex functionalities. Starting already from the architect's design, which is already smart and underlined by cooperation with future users. It is not just about high quality premises, but also technologies in the background with smart systems that strengthen the value for users and enhance the building's sustainability.

Since buildings are one of the largest sources of energy consumption in most cities of the world, energy management is one of the major concerns in their design. To ameliorate this problem, buildings are becoming smarter by the incorporation of intelligent supervision and control systems. Data captured by the sensors can be interpreted and processed by rule-based computation methods of biological inspiration for predicting the future behaviour of the building in a knowledge-based interpretable human-like manner. (Rodríguez-mier, Mucientes, Bugarín, 2019)

A smart building is the building which is using technology to share information about what goes on in the building between systems, in order to optimize the building's performance. This information is then used to automate various processes as heating, ventilation, air conditioning, security and others. The main motivation behind the smart building is to avoid of wasteful use of energy and resources, to cut the cost and to improve energy efficiency.

The term Energy Information System (EIS) - has been used by vendors and users to refer to a variety of technologies and capabilities that manage energy, resources and devices within commercial buildings, broadly known as smart building solutions. EIS is a general term and may not accurately represent the wide range of solutions currently available in the market. (Aamidor, 2016) There are three core types of smart building and energy management solutions now available:

- Information system: Acquires data from one or more other systems or devices, aggregates and provides reporting and visualization tools in order to understand trends, enables decisions to be made and action to be taken.

- **Analysis system:** In addition to data acquisition from various systems analysis, system adds additional metrics and data points from other sources (like weather data or occupancy data) and performs quantitative, statistical, or other analysis, to identify specific issues or insights beyond the raw data may indicate. Include modelling to provide measurement and verification capabilities or fault detection and diagnostics. (FDD)
- **Control system:** Connects to and controls assets within buildings using schedules or other factors to change set points and adjust conditions.

Intelligent building technologies (IBTs) are networked hardware and software solutions that can optimize buildings' operational efficiency, improve environmental and energy performance, enhance human comfort, health and productivity and elevate building safety and security for the benefit of building owners, operators and occupants. (Aamidor, 2018).

The main features of Smart Buildings.

System connection: The most fundamental feature of a smart building is that the core systems within the building are linked. Water meters, pumps, fire alarms, power, lighting and many others are all connected. This is the most important feature, which makes a building “smart” – the ability of the systems to communicate.

The use of sensors: Sensors are an integral part of smart buildings and play an important role in collecting data to inform about where to allocate resources, in order to provide an information on where people are at certain times of the day and which areas are high traffic.

Automation: Information is gathered and analysed, by the systems placed in a smart building, which is being done constantly and in real time. This ongoing monitoring allows automated adjustments that can control conditions across an entire building.

Data generation: Smart buildings generate a large volume of valuable data about their own use.

The main benefits of Smart Buildings

There are many benefits of implementing smart systems within a building from cost efficiency to improving the environmentally friendly credentials of the construction.

The influence in productivity: Air quality, physical comfort, security, sanitation, lighting and even room and space availability can all be delivered at an optimum level to enable occupants to perform well.

Reducing energy consumption: Smart buildings are greener, more energy efficient and more cost effective.

Realistic data: The use of sensors and cameras provides precise data on how the building is being used, which can be converted into insightful decision making. Space

utilization can be improved based on actual data, as the building generates actionable living intelligence automatically.

Operational savings: This includes the savings that can be made in terms of everyday spend and maintenance on equipment. It also extends to the potential savings that are offered by identifying underutilized resources and the potential for growth into unused spaces.

Data protection: Equipment sensors measures data without using identifiable images of staff or the public.

Internet of Things (IoT) along with other technologies such as Big Data, Cloud Computing, and Monitoring provides to everyone new types of services in order to improve everyday life. As a bases technology for the sensor management system in the smart building is a cloud server being used, collecting the data produced from each sensor in the smart building. The real-time performance of these technologies provides a clear picture of how the space is being used, how it can be optimized and what may break in the future. These data are easy to be managed and controlled from distance, by a remote (mobile) device operating on a network set up in IoT technology. (Plageras and col., 2018)

As a result of this solutions for collecting and managing sensors' data in a smart building could lead users to an energy efficient use of smart building, and thus to a Green Smart Building. The continued demand for green, energy-efficient buildings will require technology to monitor and optimize resource consumption. Applying these technology enablers to real estate broadly will drive technology adoption. Offices are becoming talent attractors with technology taking a leading role. To have a clear picture of true utilization real time data are inevitable.

2 Smart systems in Smart building

A. What can smart building do:

Smart building capabilities include the ability to track an occupant from arrival on site to departure, with real-time capability to adjust air quality, temperature, light, audio, and visual capabilities based on movement throughout the environment what can influence their comfort. System uses an advanced integration and analytics platform to securely gather and analyse data from sensors, various building systems, meters, and other devices. The combination of intelligent design, advanced technology, proactive operations planning, and strategic maintenance protocols can be applied to achieve optimal facilities performance.

B. How can Smart building influence its users – Trends in Property development:

Out of many trends in property development management one of the most important is focus on alignment between building efficiency and user experience through use of enabling technology. High user experience is than leading to higher motivation of em-

ployees, higher productivity, engagement and commitment. Demand is focused on continued accessibility to Internet of Things (IOT) sensors and remote monitoring, occupancy management and energy management, better building analytics in order to drive informed strategy. (CBRE, 2019b)

Case Study HB Reavis office by Symbiosy

Technologies behind smart buildings can enhance employee experience, improve engagement and enable company culture, however the most important part is to implement them successfully. Following a rapid growth and a company culture transformation, HB Reavis completed its new headquarter office. The complexity of the 7000-square meter project combining offices, co-working and event space, brought several challenges regarding smart technologies. Real data from smart systems, as well as pre and post-occupancy research with employees demonstrate the impact of the new design on employee experience.

There is a direct proportion between workspace design and people well-being what is reflected in their productivity. Modern work space that supports personal development, reduces stress, has a positive impact on health and commitment. With modern technologies focused on extensive data collection, is possible to develop space in a way, that enhances the productivity. Technology and sensorics platform are being used to get insights on how to use the space in the most effective way, how collaborative networks work and what the quality of indoor environment is. By combining five sub-brands of HB Reavis, they all together bring in exceptional office space solutions.

A case study from HB Reavis is showing how technologies behind smart buildings are being used and implemented in many already completed offices and others, which are being planned.

- The right flow of space helps people naturally meet, pass on information, collaborate and create things together. Ultimately, it boosts company's potential for productivity and innovation.
- A well-planned workspace eliminates busy spots and dead zones, ensuring every asset is effectively utilized. The office becomes a vibrant place, where everyone has the type and size of space to suit the work they do, along with storage and relaxation areas.
- By technologies behind, people are provided with real time information about situation in the office, what will reflect in more effective work, their productivity and makes them happier and healthier.

Base on interactive 3D virtual office plan, it is possible to see how the office is being used and how people behave in the office, which areas are most busy ones at certain times.

Finding the best place to work at certain times: Base on sensor installed, the underlying algorithm evaluates preferences collected in the profile database and combines them with environmental monitoring and occupancy data, to suggest the best available options.

Environmental environment: Base on customized environmental preferences around each employee preferences, behaviour and feedback data are being gathered. Data about temperature, noise and light are combined with bookings, schedules and predictions, to ensure the employee always has their surroundings set to the maximal comfort.

Biometry: Face recognition is a hi-tech solution, which is being used in the office for access control using accurate biometric recognition. This solution is the most secure while improves employee experience due to its invisible nature.

Productive environment: Environmental measurement via sensors and the ability to be in control by a room control panel and ventilation settings, allow people to adjust space conditions in real time. Good working conditions enable employees to spend their day productively in a stress-free workplace and boost their well-being in an individually tailored environment.

Visitor management: Using Outlook meeting invitations, by generating a unique code which can be used for booking a parking spot, provides access to elevators and office spaces for invited visitors.

Real time data collection allows to manage meeting room occupancy, collect data about indoor air quality, outdoor air pollution or travel times in the city.

Due to sensors and technologies installed in the right places, unique data collection and its professional interpretation, the office spaces are becoming predictive and proactive. Changing work environment can improve the quality of the office life



Fig. 1. Occupancy and booking. *Source: Symbiosy – HB Reavis.*



Fig. 2. Office conditions. Source: Symbiosy – HB Reavis

3 Conclusions and policy implications

Traditional office is being transformed and quality of work place is becoming a competitive edge in attracting the best talents, promoting efficiency, high performance, while meeting corporate goals. Good working environment is becoming an inseparable part of corporate culture. Intelligent building technologies are being developed and commercialized. When installed and adopted they are poised to dramatically increase building energy efficiency, operating efficiency, comfort, productivity, safety and security of their occupants and owners. Digitalization is playing an important role in daily activities in many industries including property development. The demand on the market is for high quality premises as well as technologies in the background with smart systems that strengthen the value for users and enhance the building's sustainability. Combination of technology and healthy working environment results in happier, more productive and more effective employees. This article is pointing out that technology development and digitalization are influencing property development as many other industries proven by case study.

Acknowledgement.

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SUSCEPTIBILITY OF JOBS TO AUTOMATION IN SLOVAKIA

Matej Vitáloš

University of Economics in Bratislava
Faculty of National Economy, Department of Economic Policy
Dolnozemska cesta 1
Bratislava, 852 35
Slovak Republic
matej.vitalos@euba.sk

Abstract. The aim of this paper is to estimate the extent to which jobs in Slovakia are threatened by the ongoing process of automation. By implementing the Frey and Osborne (2013) methodology, we estimate that 56.9% of total Slovak employment is at high risk of automation, 24.5% at medium risk of automation and 18.6% at low risk of automation. Over the five-year period (2013-2018), the share of employment in the high risk category fell by 2.3 percentage points and rose by 0.3 and 1.9 percentage points in the medium, respectively low risk category. We further provide evidence that there are gender differences in the risk of automation. In general, automation seems to be a greater threat to men than to women.

Keywords: automation, computerization, employment.

JEL classification: J 21, O 33, J 16

1 Introduction

The aim of this paper is to estimate the extent to which jobs in Slovakia are threatened by the ongoing process of automation. We distinguish between low, medium and high risk occupations, depending on their probability of automation (thresholding at probabilities of 30% and 70%).

This methodology was initially coined by Frey and Osborne (2013) who examine how susceptible jobs are to automation¹ by implementing a novel methodology to estimate the probability of automation for 702 detailed occupations. According to their estimates, around 47% of total US employment is in the high risk category (people employed in jobs with a probability of automation over 70%). They emphasize to make no attempt to estimate the number of jobs that will actually be automated, but rather

¹ Frey and Osborne (2013) use the term computerization and refer to it as job automation by means of computer-controlled equipment. In our paper we use the terms computerization and automation as synonyms.

focus on potential job automatibility over some unspecified number of years (they expect it to be one or two decades). They also provide evidence that wages exhibit a strong negative relationship with the probability of automation.

By implementing the Frey and Osborne (2013) methodology, other researchers come up with their own estimates.

Based on a European application of Frey and Osborne's (2013) data, Bowles (2014) estimates the proportion of the European workforce, which will be significantly affected by technological advances in the coming decades. His estimates range between 46.7% for Sweden and 61.9% for Romania.²

Pajarinen and Rouvinen (2014) find that over one third (35.7%) of Finnish employment is highly susceptible to automation in the next decade or two. Their replication of Frey and Osborne (2013), using data for 2012 rather than 2010, suggest that 49.2% of US employment is in the high risk category. Both in Finland and in the US, better paid occupations are less threatened by automation.

Pajarinen, Rouvinen and Ekeland (2015) estimate the corresponding share for Norway – 33%. Compared to the US, Finland and Norway seem to have a greater mass in the middle of the distributions. Authors claim that it is mostly due to the fact that occupational structures in Finland and Norway are different from those in the US and that it is driven to a lesser extent by the fact that upon moving from the US to the international classification, they were forced to present averages for the occupational groups, which induces a slight “convergence towards the middle” phenomenon.

For Germany, corresponding share is 59% – 18.3 million jobs (Brzeski and Burk, 2015).

Building on the expert assessment carried out by Frey and Osborne (2013), Nedelkoska and Quintini (2018) estimate the risk of automation for individual jobs based on the Survey of Adult Skills (PIAAC). This analysis improves on other international estimates of the individual risk of automation by using a more disaggregated occupational classification. The risk of automation is estimated for the 32 OECD countries and their estimates ranges between 25.7% for Norway and 43.1% for Turkey.³

One of the latest applications of the methodology developed by Frey and Osborne (2013) is done by Crowley and Doran (2019). They deploy the automation risk methodology at a national level using occupational and sector data and apply a novel regionalization disaggregation method to identify the proportion of jobs at risk of automation

² All estimates of Bowles (2014): Sweden – 46.69%, United Kingdom – 47.17%, Ireland – 48.51%, Netherlands – 49.50%, Denmark – 49.54%, France – 49.54%, Belgium – 50.38%, Latvia – 51.08%, Germany – 51.12%, Finland – 51.13%. Lithuania – 51.85%, Slovenia – 53.19%, Czech Republic – 53.65%, Estonia – 53.94%, Austria – 54.10%, Slovakia – 54.70%, Spain – 55.32%, Hungary – 55.34%, Italy – 56.18%, Poland – 56.29%, Greece – 56.47%, Bulgaria – 56.56%, Croatia – 57.91%, Portugal – 58.94%, Romania – 61.93%

³ All estimates of Nedelkoska and Quintini (2018): Norway – 25.7%, Finland – 26.4%, Ireland – 26.8%, United States – 27%, Sweden – 27.5%, Denmark – 27.6%, Israel – 28%, Canada – 28.6%, Netherlands – 28.7%, Spain – 30.2%, Estonia – 30.8%, Slovak Republic – 30.8%, Czech Republic – 31.2%, Chile – 31.4%, France – 32.8%, Greece – 35.3%, Italy – 35.5%, Russian Federation – 35.5%, Japan – 39.2%, Lithuania – 41.9%, Turkey – 43.1%

across the 200 towns of Ireland, which have a population of 1,500 or more. They conclude that the impact of automation in Ireland is going to be felt far and wide, with two out of every five jobs at high risk of automation.

1.1 Methodology

We use automation probability estimates provided by Frey and Osborne (2013).

First, together with a group of researchers, Frey and Osborne subjectively hand-labelled 70 occupations, assigning 1 if automatable, and 0 if not. The label assignment was based on eyeballing the O*NET tasks and job description of each occupation and labels were assigned only to the occupations about which they were most confident. Second, they used objective O*NET variables corresponding to the defined bottlenecks to automation. More specifically, they were interested in variables describing the level of perception and manipulation, creativity, and social intelligence required to perform it. They identified nine variables that describe these attributes. Afterwards, they tested how well their subjective assignment can be explained by these nine chosen subjective O*NET variables on the basis of a statistic model. Then, based on their algorithm, they were able to estimate the automation probabilities for all of the remaining occupations (632 occupations).

Frey and Osborne (2013) work with 702⁴ detailed occupations within the Standard Occupational Classification (SOC) system. SOC is a US federal statistical standard used by federal agencies to classify workers into occupational categories.⁵

In order to estimate the share of Slovak employment in the low, medium and high risk categories, we have to convert the automation probabilities defined for US occupations into the International Standard Classification of Occupations (ISCO) system. Due to differences in the two classification systems, the number of occupations for which we have estimates of the probability of automation drops to 350. Furthermore, we only have employment data at the 3-digit ISCO-08 level, so we further aggregate the automation probabilities estimated for 4-digit ISCO-08 occupations into 3-digit ISCO-08 occupations. Because of this aggregation, we work with a final number of 114 occupations for which we have estimates of the probability of automation.

1.2 Data

Data on Slovak employment at 3-digit ISCO-08 level are available in the Labour force sample survey results in the Slovak Republic publications. These publications are published quarterly, so the data we are interested in are available for each quarter of each year.

⁴ SOC system covers 867 detailed occupations, but Frey and Osborne (2013) end up with a final dataset consisting of 702 occupations for which they estimate their probability of automation.

⁵ <https://www.bls.gov/soc/>

2 Susceptibility of jobs to automation in Slovakia

In 2018, 56.9% of total employment in Slovakia was in the high risk category – workers in jobs most at risk of automation (Figure 1). Five years earlier, in 2013, this percentage was slightly higher – 59.2% (Figure 2). Over the five-year period, the share of employment in the high risk category fell by 2.3 percentage points. In absolute terms, however, the number of workers in the high risk category increased from 1.34 to 1.41 million during this period. This is due to an increase in total employment between 2013 and 2018.

Looking at the category of workers who are least threatened by automation (with an automation probability of less than 30%), their share in total employment in 2018 was 18.6% compared to 16.7% in 2013. In absolute terms, 459 thousand workers in 2018 and 378 thousand workers in 2013.

There was almost no change in the medium risk category – between 2013 and 2018 the difference was only 0.3 percentage point. Specifically, 24.2% of all workers were moderately threatened by automation in 2013 and 24.5% five years later.

There are also gender differences in the risk of automation. In general, automation seems to be a greater threat to men than to women. In 2018, compared to 52.1% of all female workers, 60.8% of all male workers were in the high risk category (Figures 3 and 4). That is a difference of 8.7 percentage points. Almost the same can be pointed out for 2013. Exactly 63% of men highly threatened by automation compared to 54.3% of women (Figure 5 and 6). Again, the difference is 8.7 percentage points.

A relatively large difference between genders can also be observed in the low risk category. In 2018, 15% of all male workers worked in jobs at low risk of automation compared to 23% for women – a difference of 8 percentage points. This difference is almost constant over the five-year period. In 2013 it was 13% for men and 21.2% for women – a difference of 8.2 percentage points.

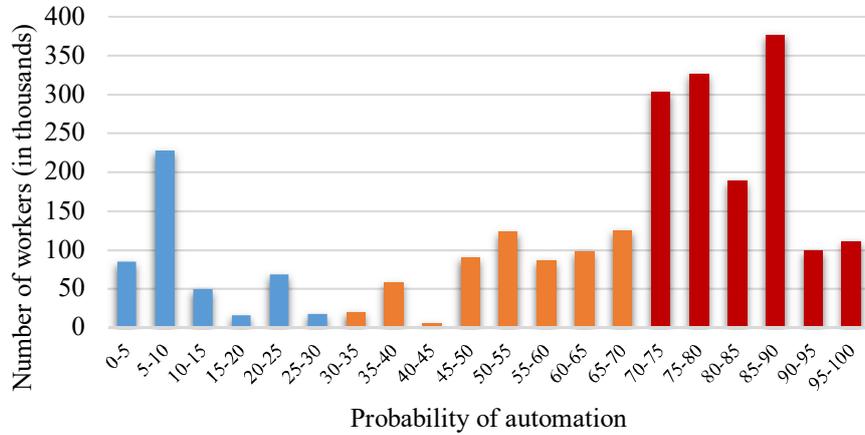


Fig. 1. Slovakia 2018: The distribution of occupational employment over the probability of automation, 5%-point intervals (total).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013).

Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

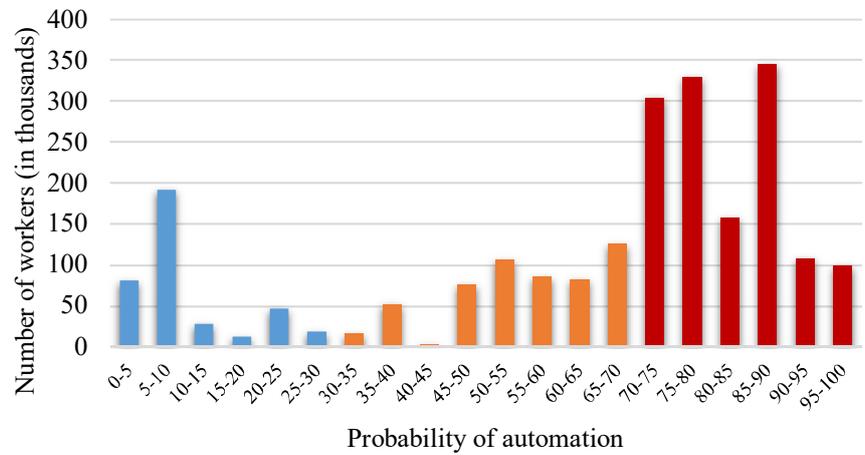


Fig. 19. Slovakia 2013: The distribution of occupational employment over the probability of automation, 5%-point intervals (total).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013). Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

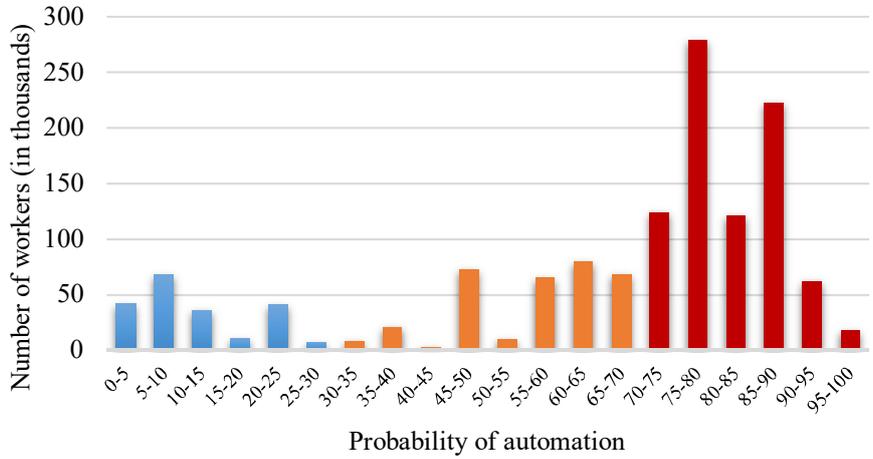


Fig. 20. Slovakia 2018: The distribution of occupational employment over the probability of automation, 5%-point intervals (men).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013).

Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

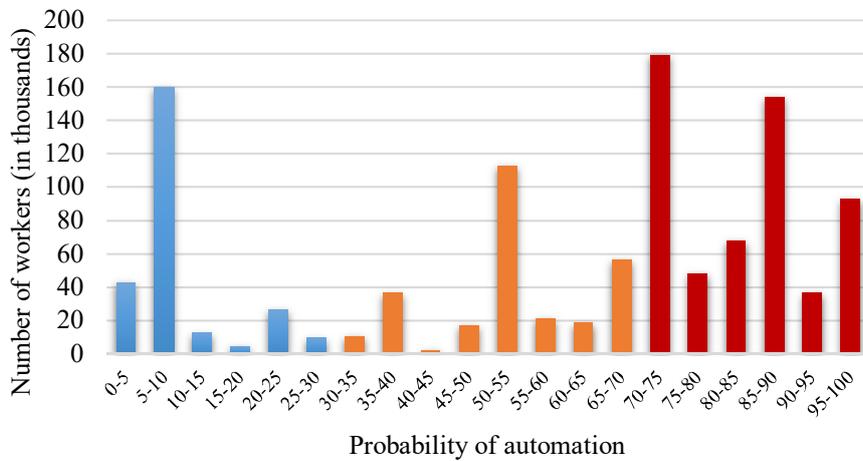


Fig. 21. Slovakia 2018: The distribution of occupational employment over the probability of automation, 5%-point intervals (women).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013).

Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

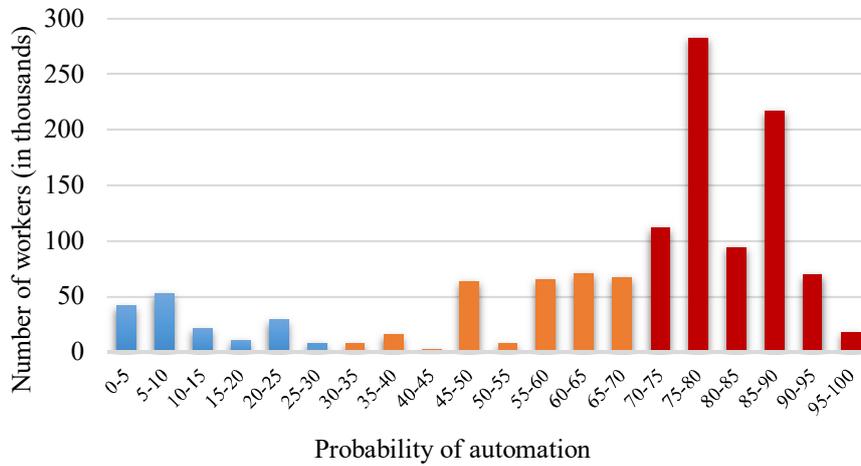


Fig. 22. Slovakia 2013: The distribution of occupational employment over the probability of automation, 5%-point intervals (men).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013).

Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

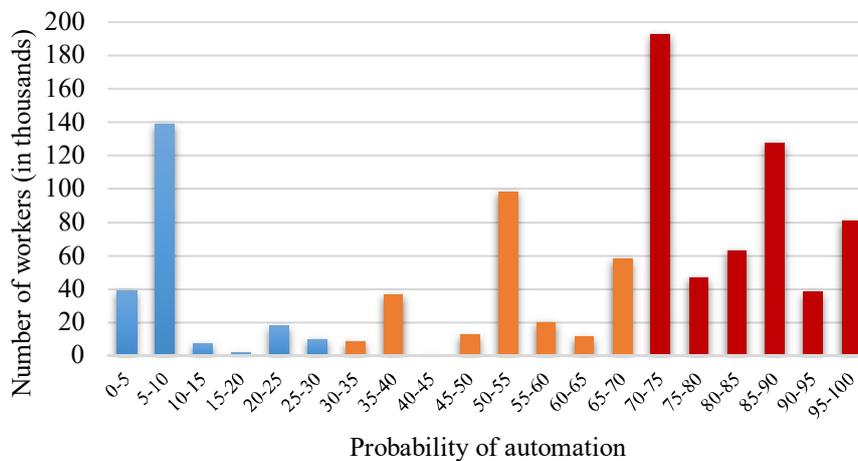


Fig. 23. Slovakia 2013: The distribution of occupational employment over the probability of automation, 5%-point intervals (women).

Data sources: Statistical Office of the Slovak Republic and Frey and Osborne (2013).

Note: blue refers to the low risk category, orange to the medium risk category and red to the high risk category

3 Conclusions and policy implications

In 2018, 56.9% of all workers in Slovakia worked in jobs most at risk of automation, 24.5% in jobs at medium risk of automation and 18,6% in those at low risk of automation. Over the five-year period (2013-2018), the share of employment in the high risk category fell by 2.3 percentage points and rose by 0.3 and 1.9 percentage points in the medium, respectively low risk category.

There are also gender differences in the risk of automation. In general, automation seems to be a greater threat to men than to women. In 2018, compared to 52.1% of all female workers, 60.8% of all male workers were in the high risk category. This difference was the same in 2013 - exactly 63% of men highly threatened by automation compared to 54.3% of women.

It seems that Slovak policy makers are not very successful in preparing the Slovak economy for a period of massive introduction of new technologies. The share of jobs at low risk of automation increases only very slowly. To achieve prosperous and globally competitive economy, it is important to focus on creating an environment that will lead to more successful creation of precisely these types of jobs. Key parts of this process are better quality education system and strong support for R&D. Without high skilled workforce, quality R&D and a link between the education system and the labor market, it will be very difficult to compete in the future global economy.

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ISSUES OF INTERNATIONAL EDUCATIONAL ASSESSMENT A CASE OF SLOVAKIA

Katarína Zamborová

University of Economics in Bratislava
The Faculty of Applied Languages, Department of English Language
Dolnozemska cesta 1
Bratislava, 852 35
The Slovak Republic
katarina.zamborova@euba.sk

Abstract. There has been vibrant discussion regarding international assessment across the world in the last few decades. However, there have been not the best results of the students in the Slovak Republic regarding tests from IEA organizations. Therefore, this article explores three main international educational evaluations – PIRLS, TIMSS and PISA – and examines why Slovakia is not that successful at this type of testing as well as speculates factors influencing educational test results applicable to the Slovak context.

Keywords: international educational assessments, PISA, Slovakia, economy, factors.

JEL classification: I 23, I 25

1 Introduction

What do Wells Fargo (a bank in the States), BMW cars, and Manchester United (a football club in England) have all in common? Their growth is tied to the dramatic and unpredictable global economy – to its ups and downs. Financial giants and small local markets are interconnected and interdependent, but are they also connected to a country's education system and its educational assessments? (Everson, 2011).

Hanushek and Woessmann, two economists, research sponsored by the Organization for Economic Cooperation and Development (OECD) found that the growth in cognitive skills (knowledge and reasoning in mathematics and science as well as basic literacy skills) is interrelated with gains in a country's gross domestic product (GDP). Their findings show that “a modest goal of having all OECD countries boost their average PISA (the Programme for International Student Assessment) scores by 25 points over the next 20 years... [would] imply an aggregate gain of OECD GDP of USA 115 trillion over the lifetime of the generation born in 2010” (Everson, p. 181). The OECD (2010)

research also shows that if the all countries' scores went up to the results of Finland – the OECD's best performing education system in PISA, the gains would equal 260 trillion USD. Another ambitious goal of reaching a level of minimal proficiency for OECD (i.e., reaching a PISA score of 400), the aggregate GDP would increase to 200 trillion USD (OECD, 2010).

Following this premise, Tomas Friedman, a Pulitzer Prize-winning author and journalist, contended that “sustainable economic growth lies in understanding the importance of education for creating new knowledge, and advancing a country's economic growth through innovation and technological advances” (cited in Everson, 2011, p.182).

2 Governance of resources in Slovak schools

According to the Slovak Republic Global Competitiveness Report of 2015-2016, Slovakia ranked in 67th place out of 140 countries. Slovakia has low ratings mainly in its infrastructure, education and market efficiency (UNDP in Habánik et al., 2016). For example, three years ago the member countries of OECD spent an average 5.2% of their GDP on education, whereas Slovakia contributed less than 4% and appeared almost at the end of the ranking scale with Czech Republic, Hungary, Luxemburg and Indonesia (Pravda, 2017). Similarly, for investment in school facilities, Slovakia adds 2.8% of the annual economy performance in comparison to countries such as Denmark, Island, Great Britain that contribute 4.7 % (Pravda, 2017).

Advancement in education is interconnected with demographic development. The number of students at the elementary schools decreased by 23% from 2013 to 2014 because of the low birth rate as a result of different socio-economic conditions. A similar situation occurred at the high schools. As a result, in the last few years, there has been a discrepancy between the course of the educational system and needs of the job market, which leads to barriers in the growth of a competitive economy (Šikulová et al., 2014). For example, the decrease of students at specialized high schools has led to the fact that there are not enough professionals in the job market.

3 Overview of International Educational Assessments

The start of important efforts to implement cross-cultural comparative educational assessment at a relatively large and international scale goes back to the International Association for the Evaluation of Educational Achievement (the IEA). The IEA is an international cooperative of national research institutions, governmental research agencies, scholars, and analysts working to understand and improve education worldwide based on the performance of students (IEA, 2019). It was founded in 1958 and initially included countries such as Belgium, England, Finland, France, the Federal Republic of Germany, Israel, Poland, Scotland, Sweden, Switzerland, the United States, and Yugoslavia. Over the past half-century, it has grown to more than 50 countries and currently it collects data on students' performance in reading literacy, mathematics and science at elementary and secondary school level (Everson, 2011).

3.1 Benefits of international testing

These types of assessment meet the following criteria:

- a. They show where students of a given country stand globally in comparison to other countries as well as how well the education system is developed and what we can learn from other countries. The results bring steps/recommendations that could be taken to reach higher scores when learning from the countries in which students reach their top performance;
- b. They show how factors (school and home context) influence the learning of students and what implications might be applied to see how (dis)satisfied parents are with and what teachers and directors think about educational practices, professional development and the school environment;
- c. The government needs to see what is going on in the educational system it is responsible for. International surveys can provide clearer data for making better decisions. Then leaders can decide where the resources should go according to the highest needs (Cambridge Assessment, 2017). It also can have an impact on the national and international discussion over education and its direction.

3.2 PIRLS (Progress in International Reading Literacy Study)

PIRLS is an international assessment that is sponsored by the IEA and conducted in the United States by the National Center for Education Statistics (NCES), part of the U.S. Department of Education. It is designed to measure reading achievement at the fourth grade level as well as assess teachers and schools' practices related to reading instruction (NCES, 2016). PIRLS asks students to demonstrate reading skills and strategies by retrieving information from text, making connections based on what they have read, interpreting and synthesizing ideas and concepts, and evaluating the features of the text they have been asked to read (Everson, 2011). The project started on a five-year cycle in 2001 (Everson, 2011) and the latest results were in 2016 (NCES, 2016). Slovakia has participated in all cycles, and the results from 2016 show Slovak students reached 535 points, which is comparable to the average 540 points of EU countries, but at the same time lower than the 541 points average of OECD countries (MINEDU, 2017).

3.3 TIMSS (Trends in International Mathematics and Science Study)

TIMSS is a flagship study of the IEA, and its PIRLS International Study Center is situated in the Lynch School of Education at Boston College (Martin et al., 2016). Through the TIMSS assessment, students are evaluated in mathematics and science over a four-year assessment cycle at the end of the fourth and eighth grades and sometimes the final year of the secondary school (Everson, 2011).

Similar to PIRLS, it also collects a rich set of information about two domains: the school and home contexts. Since 1995, the TIMSS has enabled countries around the world to make evidence-based decisions to improve education policies in mathematics

and science learning and teaching (IEA, 2019). In mathematics, the TIMSS concentrates on testing numbers and operations, geometric shapes and measures, and data displays, and in science it focuses on life science, physical science, and earth science in the fourth grade in elementary schools, while in grade eight the students complete tasks in mathematics content regarding number properties, algebra, geometry and probability. In science, students are assessed in biology, chemistry, physics and earth science (Everson, 2011). In 2015, 57 countries and more 580,000 students participated in the TIMSS testing (Martin et al., 2016). Concerning the results of Slovakia in 2015, the country reached 498 points in mathematics at the fourth grade, but there is a high gap when compared to East Asian countries such as Singapore (618 points), Hong Kong (615 points) or Korea (608 points). In relation to the European countries, Northern Ireland reached 570 points, Finland (535 points), Czech Republic (528 points). Countries such as Saudi Arabia (383 points), South Africa (378 points), Morocco (377 points), and Kuwait (337 points) had the lowest results. The Slovak Republic showed the same average achievement in comparison to testing in math in the year 2011 (Mullis et al., 2016). In science, students in grade four in Slovakia had a score of 520, while Singapore had 590 points and Korea 589 points as the top achievers. From European countries, Finland had a result of 554 points and Poland 547 points. On the other side of the scale, at the bottom were countries such as Saudi Arabia (390 points), Morocco (352 points) and Kuwait (337 points). In comparison to 2011, Slovakia decreased its achievement average from 532 points to 520 points (Martin et al., 2016).

3.4 PISA (Programme for International Student Assessment)

PISA is a significant international survey established in 2000; the evaluation cycle repeats every three years. PISA is a project of the OECD that assesses literacy in reading, mathematics and science. In each cycle, it concentrates on one key performance, while the other two are secondary (NÚCEM, 2019). In 2018, tests on financial literacy and global competence were added. PISA tests older students – 15 years old - who are towards the end of their compulsory secondary education. PISA chooses this age group because students at the age of 15 can decide whether they want to continue with their education and if they are ready for real life (OECD, 2018a). The aim of the study is “not to evaluate the performance of given students or schools but to observe the results of the educational system of participating countries and their changes in time and bring ideas for improving educational policy” (as translated from NÚCEM, 2018, p. 1).

The last obtained results are from 2015 when students were tested in three main domains: reading, math, science literacy, with an emphasis on science. The results of the Slovak students were significantly lower than results of the OECD states but are similar to the results in 2012. Results show a new trend in a higher number of students in the risk group (the weakest level of knowledge) and at the same time the number of students with highest level of knowledge was decreasing (MINEDU, 2016). The Slovak Republic reached 461 points in science, while the average score of OECD countries was 493 points, and in comparison to 2012, the score was 8 points lower. The performance of Slovak students in science literacy testing was below the average of the participating OECD countries. In math literacy, the Slovak Republic reached 475 points,

while the average score of OECD countries was 490 points. Regarding reading literacy, Slovakia had 453 points as the average score, but the OECD countries was 493 points. As in all previous cycles, the 2015 performance of the Slovak students in reading literacy was under the average in comparison to OECD countries. In comparison to 2012, the average performance of students declined by 10 points, which does not present a significant change (MINEDU, 2016).

4 Factors/Assumptions contributing to the results of Slovakia

Socioeconomic and cultural background influence the performance of a student, as was confirmed in the 2016 PIRLS assessment (MINEDU, 2017). In all the tested countries, there was a huge difference in students' performance in specific categories of the socioeconomic index (a lot of resources, average resources, few resources). Even though the average performance between 2011 and 2016 cycles remained unchanged (535 points), the performance of the students with few resources significantly decreased from 466 points to 397 points. In this category the students of the Slovak Republic had the lowest performance among the all participating countries of the OECD. The lower value of the socioeconomic index included three countries of the OECD (Chile, Italy, Bulgaria); however, the Italian and Bulgarian students, despite a low socioeconomic index, showed significantly better results in reading than Slovak students (MINEDU, 2017).

One of the key elements for why Slovakia has low scores on international tests is that the students are not trained in this type of testing and are not used to the tasks involved in the tests. In most schools, the traditional type of assessment based on memorization and recitation of the lesson content still prevails (Zamborová, 2015, 2019). Slovak students lack critical thinking skills (Larson, 2015) and do not approach learning as a life skill from which they can draw as life-long learners. Only in international schools and some alternative schools do different types of assessment – written comments, rubrics and self-assessment procedures – exist. Moreover, according to Zelina (2019), the PISA tests are constructed using all six cognitive taxonomies based on Bloom and Anderson. They have a holistic character depicting a complex of cognitive processes, mainly those highest, that is evaluating (critical) thinking and creativity, whereas the Slovak students are only taught to the third level of cognitive processes and the tests do not parallel the Slovak curriculum. Therefore, students do not succeed in these types of tests.

Second, it is known that students are not aware of these kinds of tests they or what they are for. Therefore, they do not put an emphasis on doing their best or do not take it seriously, so their responses are based on guessing. The fact is that according to the MINEDU (2016), the risk group of students (the weakest level of knowledge) can be 30% depending on the type of the literacy tested.

Third, the performance of the students depends on the development in the specific region of Slovakia. The west region is far more developed than any other part of Slovakia. Regardless of government efforts, disparities in regions in Slovakia have not been remarkably reduced, as Haviernikova in Habánik (2016) claims. The OECD (as

cited in Shewbridge, et al., 2014, p. 9) emphasizes that “regional disparities are more often found in the Slovak Republic than any other OECD country, with a specific concentration of poor households in the Eastern region.” According to Shewbridge et al. (2014), there is a significant difference in education between rural areas and cities and on average the Roma minority is particularly low.

The home context is also a variable in students’ outcomes, as shown in the 2015 TIMSS results (Mullis, 2016). According to the OECD (2016), students of parents with a higher level of education and better-paying more prestigious jobs have more financial (e.g., private tutoring, computers, books), cultural (e.g., extended vocabulary, time in active parenting) and social (e.g., role models and networks) resources can benefit more from school in comparison to peers who come from families with lower levels of education or who are impacted by parents having chronic unemployment, low-paying jobs, or poverty.

The last, but a very important, point is the remuneration of teachers in Slovakia, which has an impact on their motivation to teach and get the best for students. In the last few decades, teaching in Slovakia has not been attractive for young adults to start their career (Pravda, 2017), and the salary is very low in comparison to other countries in Europe. According to the OECD (2018b), pay for a starting teacher it is 14,267\$ annually, after 15 years the teacher gets 20,057\$, and at the top of scale they receive 21,625\$. When we compare it to a teacher in Austria (a neighboring country of Slovakia), teachers there annually make 75 to 85,000\$ at the top of the scale. In Denmark, which is a model of education according to the results in international surveys, teachers make around 45 to 50,000\$ annually; in Luxemburg it is from 125 to 140,000\$ annually. America pays teachers around 70,000\$ annually.

5 Conclusion

The more educated citizens are, the better choices they make. Everson (2011, p.181) contends that forward-thinking policymakers and social critics emphasize the importance of education of all citizens in a country and argues that “those who fail will become underdeveloped and relatively poor nations.” We do not want that to be the case of the future of Slovakia education. Therefore, all factors contributing to that not well performance in the test of the Slovak students (such as socioeconomic index, lack of preparedness and importance of tests, regional disparities, etc.) should be limited in the future. One of the ways to reach it to recognize teachers’ jobs as a priority by increasing the budget for the Slovak educational system, which would contribute to better performance of the Slovak students on a global scale.

The relationship between the cognitive skills and economic growth indicates “that relatively small improvements in the skills of a nation’s labour force can have very large impacts on future well-being. Moreover, the gains, in terms of current GDP, far outstrip the value of the short-run business-cycle management” (OECD, 2010, p.3). Therefore, it emphasizes that the effort should be put not only at issues of economic recession, but also at a prediction for the future challenges of this relation.

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