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Review Paper

ANALYSIS OF THE IMPACT OF REPORTING ON ENVIRONMENTAL PERFORMANCE INDICATORS ON THE PROFITABILITY OF EUROPEAN COMPANIES

UDC 657.375: 658.1]:502.131.1(4)

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Abstract. *The research in this paper is focused on the analysis of the environmental performance indicators reporting impact in the context of sustainable development on the profitability of companies. The research focuses on 60 companies in the energy sector in Europe in the period 2012-2020. Reports on sustainable development of companies available in the database of the Global Reporting Initiative (GRI) were used for the collection of data. The independent variables in this study are nine indicators of the environmental performance of sustainable development. The dependent variable is the profitability of the company, which is measured by the rate of return on total assets (ROA). The method of multiple linear regression will be used to analyze the impact of reporting on environmental performance indicators of sustainable development on the profitability of energy companies in Europe. Empirical results of this research have shown that reporting on environmental performance indicators of sustainable development has a positive effect on company profitability indicators.*

Key words: *reporting, sustainable development, environmental performance and profitability.*

JEL Classification: Q57

1. INTRODUCTION

The primary goal of any company is to make as much profit as possible. Companies are often on the wrong path to profit maximization, as they try to reduce the cost of managing environmental performance and thus increase profits. However, ecological performance is important from the aspect of the living community, because it affects the environment and natural resources. Environmental performance is important to consider at the company level, as it gains public trust. Environmental performance reporting is one of the Sustainable Development activities carried out by companies in order to become more responsible and transparent. Reporting on the performance of sustainable development is important for many parties, from ordinary people, stakeholders, government and others.

Sustainable development today is a term that is already well known and is used not only in the contextof environmental protection, but also in other spheres of human society. It is a prerequisite for the development of a society that takes care of maintaining the quality of life of future generations (Ali, Arafin, Moktadir, Rahman & Zahan, 2018; Carter & Rogers, 2008; Dubey et al., 2017). The European Commission (2017) emphasizes the essence of sustainable development in a dignified life for all within the boundaries of the planet and economic performance, social sphere and environmental protection. Sustainable development is based primarily on the balance between the three basic areas of life - economic development, social development and environmental protection.

It is known that employees have a negative impact on the company's ability to increase its profits at the expense of the environment (e.g. air pollution, increase in the quantity of polluted waters, etc.). The emergence of this negative awareness requires the company not only to be profit oriented, but to manage and report on the environmental performance of sustainable development. Companies must take care to prevent and reduce negative impacts on the environment through corporate environmental practices (Albertini, 2013; King & Lenox, 2001). Minimizing environmental damage caused by business activity and protecting the natural environment are the signals of a company's environmental performance and are receiving increasing attention from society, which requires companies to reduce negative impacts on the environment, contributing to sustainable development (Féres & Reynaud, 2012). Various sustainability reporting initiatives are gaining increasing attention from stakeholders (Escrig-Olmedo, Munoz-Torres, Fernandez-Izquierdo, & Rivera-Lirio, 2017; Lai, Melloni, & Stacchezzini, 2016; Mervelskemper & Streit, 2017; Perez-Lopez, Moreno-Romero & Barkemayer, 2015). The assessment that a company receives for reporting on the environmental performance of sustainable development is considered to be one of the factors influencing its profitability.

The profitability of the company is an indicator worth the attention of stakeholders. The profitability of a company can be measured by a number of indicators that can be based on the concept of: a) accounting result, b) economic result or c) cash flow (Krstić & Bonić, 2017, 136-157). In this paper, the rate of return on total assets (ROA) will be used to measure the profitability of companies. The value of this indicator indicates the profitability and earning power of the company, which is important for managers and investors. (Gautama & Harjati, 2014). Weston and Copeland (1992) define profitability to the extent that companies make a profit from sales and investment companies. If the company's profitability is good, then stakeholders consisting of creditors, suppliers and investors will also see the extent to which the company can operate from the company's sales and investments. The higher the level of profitability, the higher the market price of

the company's shares, and the higher the value of the company. Each company definitely wants the value of the company to continue to grow, because that means that the prosperity of shareholders is high. In addition to being seen by the growing prosperity of shareholders, a company can also be measured by how well it can make a profit. In addition to being an indicator of a company's ability to meet its obligations to investors, the company's profit is also an important component in creating corporate value that shows the company's capabilities in the future.

Due to the lack of literature on the environmental performance of sustainable development in Europe, this research aims to examine the extent of the impact of reporting on environmental performance indicators of sustainable development on company profitability by applying multiple linear regression to data collected from the Sustainable Development Report of European companies in the energy sector available in the Organizations for standardization (Global Reporting Initiative) database. The choice of ecological performance of sustainable development in this research is of a particular importance, because it opens the possibility for their measurement, comparison and examination in relation to other suitable variables. The analysis of this research includes data for a time period of 8 years (2012-2020), in order to provide some certainty that the results of the research are not influenced by events from a short period of time. The results of the research show that responsible, transparent and timely reporting on the environmental performance of sustainable development and regularly informing stakeholders about them positively affects the profitability of companies in Europe. The results also indicate that the European companies are heterogeneous in terms of reporting on environmental performance and that there is room for improvement for individual companies in terms of reporting on non-financial sustainable development performance.

In the context of achieving the set goal, the work starts from the theoretical consideration of previous research related to reporting on environmental performance on profitability, followed by a description of the methodology and a discussion of the research results, with an indication of potential opportunities for future research directions.

2. LITERATURE REVIEW

There are numerous studies on the impact of environmental behavior and company performance on profitability indicators, using different samples and methodologies (Horváthová, 2010; Dixon-Fowler et al., 2013; Endrikat et al., 2014; Friede et al., 2015). Unfortunately, reaching a consensus on this topic is far away, since the previous research has obtained contradictory results regarding positive, negative or neutral nature of the relationship between environmental performance and profitability indicators (Chavez et al., 2016; Geng et al., 2017; Wong et al., 2017; Zhu et al., 2013).

According to Kuldove (2011), environmental protection can have a positive effect on economic performance if taken strategically. Duque-Grisales & Aguilera-Caracuel (2019) point out that innovative investments in the environment create new market opportunities for the company through new ecological technologies and processes and the development of ecological products and services. If we look at the problem from a purely financial point of view, then the basic strategic goal of the business is to provide the necessary profitability and increase the value of the company. Thus, the application of the corporate strategy tailored to meet the principles of environmental performance of sustainable development should lead to the increased profitability of companies and create value for shareholders.

Could the entrepreneurship that meets the principles of environmental performance of sustainable development meet this goal? There is a debate on this issue in which we meet different views on the relationship between environmental performance of sustainable development and meeting business goals, where the dominant position is occupied by the company's ownership needs. The relationship between the environmental and financial performance of companies and the extent to which reporting on environmental performance indicators of sustainable development contributes to the growth of company profitability have become the subject of interest of many authors.

Some studies confirm a positive relationship (Ameer & Othman, 2012; Barnett, 2007; Kuldova, 2011; Orliztki, Schmidt & Rines, 2003; Porter & Van der Linde, 2011; Tang et al., 2018), some confirm a negative relationship (Barnett, 2007; Kuldova, 2011; Orliztki, Schmidt & Rines, 2003; Driessen et al., 2013; Liu, Dai, & Cheng, 2011; Lee, Cin, & Lee, 2016), while others provide ambiguous results (Lee & Min, 2015; Tang et al., 2018). One of the most important critics of the concept of socially responsible business in relation to the fulfillment of business goals is undoubtedly Milton Friedman (2009), according to whom the company is interested in the activity and the activity of the profession.

Ameer & Othman (2012) point to a two-way link between reporting on the environmental performance of sustainable development and financial indicators. In their study, they have found significantly higher sales growth, higher property returns, pre-tax profits and cash flows from operating activities in a sample of 100 global companies performing environmental activities in selected industries compared to the companies that do not report these activities.

Equally, the issue of the impact of environmental management in the company and activities leading to environmental protection is given considerable attention. According to Schaltegger & Sinnestvedt (2002), there is no general automatic link that combines environmental performance with the economic performance of companies. This relationship is applied only in certain specific cases, when the environmental protection measures are a very significant motivation for the company to lead to continuous improvement of business activities. Their main finding includes the fact that the relationship between environmental and economic performance varies depending on the level of achieved economic performance.

Wagner & Schaltegger (2004) show the importance of formulating business strategy by the top management of the company in the analysis, in which they have dealt with the impact of business strategy on environmental protection and economic relations of the economy. Companies with a formulated strategy in terms of creating value for owners show a positive relationship between environmental performance and company profitability.

In their research, Green et al. (2012) state that improving the overall financial performance of a company comes from investing in operational resource efficiency and marketing environmental benefits. In their study, environmental performance means reducing the level of environmental pollutants, such as reducing air, water and solid waste, reducing the consumption of hazardous, harmful and toxic materials and reducing the frequency of environmental accidents, which leads to improved operational performance and higher profitability (Zhu et al, 2015). Better operational performance reflects the ability to satisfy customers in terms of timely and fast delivery of high-quality products and services, business flexibility and elimination of waste in production processes (Wong et al., 2017).

Tarmuji et al. (2016) point out that the higher the level of environmental performance reporting, the greater the possibility for companies to maximize their profits. Purbawangsa &

Suprasto (2019) have investigated how a non-financial performance affects the rate of return on total assets employed (ROA). They have showed that the annual variation of non-financial performance reporting improves the company's image and subsequently the financial performance as measured by ROA. They have also proved that there is a strong relationship between a company's rating and its social responsibility ratings. The impact of non-financial performance reporting appears to be more significant for companies where clients are individuals rather than groups. They have found that a company's profitability affects its value. In accordance with this research, Wardhany, Hermuningsih & Wiyono (2019) state that profitability has a positive impact on the value of companies. This is supported by the research results of Sulistyo & Yuliana (2019) who have found that there is a positive influence between profitability and company value.

According to Pasquini-Descomps & Sahut (2015), if a company approaches environmental policy, the measures it implements in this regard in accordance with the concept of sustainable development are closely related to economic performance. This policy may provoke different reactions from stakeholders. The viewpoint is that the application of environmental protection measures increases environmental performance, and that their impact on the company's business results leads to a drop in profitability. This decline is expected mainly due to rising costs. It is about:

- increasing investment costs in the field of environmental protection and minimizing the impact of business activities on the environment,
- increasing operating costs related to new production processes and environmentally friendly technologies,
- increasing the cost of acquiring inputs (limited material and energy resources, together with increasing environmental requirements for these inputs will lead to an increase in their price),
- increase costs at risk, because in connection with investing in the field of environmental protection, the company may lose income from other potential investment projects.

Furthermore, the impact of the implemented measures in the field of environment on productivity, product quality, sales development and company revenues is considered.

On the other hand, measures and implemented investment activities in the field of environmental protection can also bring cost savings (savings in material and energy consumption, savings in waste management and savings in environmental protection). These measures can improve the efficiency of business processes, and at the same time, more environmentally friendly production processes can increase the value of the products. This opens up new market opportunities, as well as increased sales prices due to the increased product image and increased customer preference. Therefore, all of the above positively affects the profitability and economic performance of the companies.

3. Sample Description and Research Methodology

The subject of the paper is the research of indicators of environmental performance of sustainable development and the analysis of their impact on the profitability of companies.

The starting point is made of the following research questions:

Are companies heterogeneous in terms of the degree of reporting on environmental performance indicators of sustainable development?

Do the environmental performance indicators of sustainable development affect the profitability indicators of companies?

The research aims to determine the degree of impact of reporting on environmental performance indicators of sustainable development on the profitability of companies.

In accordance with the aim of the research, the following hypotheses were formulated:

H 1. Companies are heterogeneous in terms of reporting on environmental performance indicators of sustainable development.

H 2. Environmental performance indicators of sustainable development significantly affect the profitability indicators of the companies.

The research used the secondary data collected in the available Sustainable Development Reports available in the database of the Organization for Standardization (Global Reporting Initiative) in the period from 2012 to 2020. (https://www.globalreporting.org/database).

This research uses a type of descriptive study because researchers want to prove that reporting on the environmental performance of sustainable development affects the profitability of companies. The level of intervention in this study, in which the researcher has not just collected data from two different time periods, is moderate. The horizon of this research is longitudinal, i.e. the data were collected in two or more different time frames and requirements. Research can be conducted if the data from dependent and independent variables are collected in two or more time constraints to answer a research question (Scott, 2010). The data collection uses dedicated sampling with certain criteria. Dedicated sampling is the determination of samples by characteristics and criteria (Sekaran, 2011). The criteria for sample selection in this study are as follows:

Reports on sustainable development of companies are available in the database of the Organization for Standardization (Global Reporting Initiative) in the period from 2012 to 2020.

The registered office of the company is located in Europe

Companies operate within the energy sector

Sustainability reports of the companies contain financial data for the calculation of the dependent variable.

The final sample consists of 60 energy sector companies presented in Table 1.

The independent variables in this study are indicators of nonfinancial performance of sustainable development (Table 2). They were selected in accordance with:

- G4 guidelines for reporting on the sustainable development of the Global Reporting Initiative (GRI, 2016),
- OECD guidelines for the application of transfer pricing rules for multinational companies and tax administrations (OECD website),
- ten principles of the Global Compact in the field of human rights, labor rights, environment and anti-corruption policy (UN Global Compact website),
- available database of sustainable development report of the company Organization for Standardization (Global Reporting Initiative)
- data from the official websites of the companies,
- selected indicators of sustainable development proposed in the habilitation paper "The impact of the concept of sustainability on the financial performance of enterprises", author Michael Krechovska, professor at the Faculty of Economics, Technical University of Liberka (2017).

Table 1 Energy sector companies in Europe that participated in the survey

No	Company	Country	No	Company	Country
1	AEM	Russia	31	LM Group	Denmark
2	AREVA	France	32	Lukoil	Russia
3	BG Group	England	33	Lundin Pet.	Sweden
4	BP	England	34	Marquard	Germany
5	Cairn Energy	England	35	Maurel	France
6	Calor Gas Ltd	England	36	MOESK	Russia
7	CEPSA	Spain	37	MOL Gro.	Hungary
8	CGG	France	38	Motor Oil	Greece
9	e2i Energie Sp	Italy	39	Nexans	France
10	EDF Polska	Poland	40	NIS	Serbia
11	Eesti Energia	Estonia	41	Nordex	Germany
12	Enagas S.A	Spain	42	NOVATEK	Russia
13	EPH	Czech	43	Oekostrom	Austria
14	ENGIE	France	44	OKQ8 Scand.	Sweden
15	Eni	Italy	45	OMV	Austria
16	Equinor ASA	Norway	46	Oulun Ener.	Finland
17	ERG Gruppo	Italy	47	Petrol Slov.	Slovenia
18	FGC UES	Russia	48	Petrom	Romania
19	Fingrid Oyj	Finland	49	Prysmian Gr.	Italy
20	Fortum	Finland	50	Rauman Ene.	Finland
21	Galp Energia	Portugal	51	Repsol	Spain
22	Gasum	Finland	52	Royal Dutch	Netherlands
23	Gazprom	Russia	53	Saipem	Italy
24	Gazprom Neft	Russia	54	Siemens	Spain
25	Ina Group	Croatia	55	SSE	England
26	INTER RAO	Russia	56	State Atomic	Russia
27	Jyväskylä En.	Finland	57	TAURON	Poland
28	KMG Inter.	Romania	58	TERNA EN.	Greece
29	KONCAR	Croatia	59	VERBUND	Austria
30	Landi Renzo	Italy	60	ZSE	Slovakia

Table 2 Environmental performance indicators of sustainable development

Label	Indicator
E1	Indirect energy consumption (in thousands of GJ)
E2	Energy efficiency (in thousands of GJ)
E3	Total water abstraction by source (in thousands of m ^ 3)
E4	Direct greenhouse gas emissions (in thousands of kg)
E5	Ozone depleting emissions (in thousands of kg - kilogram)
E6	Other indirect greenhouse gas emissions (in thousands of kg)
E7	Measured amount of wastewater (in thousands of m ^ 3)
E8	Total weight of waste by type and method of disposal (in thousands of kg - kilograms)
E9	Total number of significant pollution

The dependent variable in this research is the profitability of the company. Profitability is the company's ability to make a profit. The indicator of profitability in this paper is the Rate of Return on total assets (ROA), which is defined as the ratio of EBIT[1] and total assets.

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[1] EBIT (Earnings Before Interest and Takes) or earnings before interest and taxes. This is actually the operating profit (Operating profit = EBITDA - depreciation) adjusted for possible non-operating items (± non-operating,

$$\text{ROA} = \frac{\text{EBIT}}{\text{TOTAL ASSETS}} \qquad (1)$$

This indicator provides an answer to the question of whether the company has used its funds efficiently (Lee & Faff, 2009). Many recent studies have used ROA to examine the link between sustainable development reporting and company profitability (Duque-Grisales & Aguilera-Caracuel, 2019; Deng & Cheng, 2019; Lins et al., 2017).

In order to process data, we have used measures of descriptive statistics (arithmetic mean, standard deviation, minimum and maximum) and measures of inferential statistics (correlation analysis and multiple linear regression method). Data processing has been performed using the package for statistical data processing in social sciences SPSS (SPSS, version 21.0).

The results are tabulated.

4. RESEARCH RESULTS

Descriptive measures of the indicators of environmental performance of sustainable development are shown in Table 3, in order to see the minimum and maximum values, arithmetic mean and standard deviation.

The average indirect energy consumption (E1) in the analyzed sample is 67,622.35 thousand GJ, the lowest energy consumption of 9.80 thousand GJ has been recorded in the ERG (Gruppo ERG) company, Italy, in 2012 and 2013, while the highest consumption of 692,455.00 thousand GJ recorded in the Lundin Petroleum company, Sweden, in 2020.

The average energy efficiency (E2) is 2,419.24 thousand GJ, the lowest energy efficiency of 0.02 thousand GJ has been registered in the ERG (Gruppo ERG) company, Italy, in 2012, while the highest energy efficiency of 31,623.00 thousand GJ has been registered in Gazprom Neft, Russia, in 2013.

On average, the energy sector companies in Europe capture 190,310.37 thousand m^3 of water by source (E3), with the least affected water by source at Cairn Energy United Kingdom in 2012 being 2.98 thousand m^3, and the highest in the Fortum company, Finland, in 2020 being 2,160,020.00 thousand m^3.

The average value of direct emissions of greenhouse gases (E4) is 3,471,035.83 thousand kg, while the lowest value of 156.40 thousand kg has been recorded in Landi Renzo, Italy, in 2015, and the highest of 89,801,520.00 thousand kg in INTER RAO UES, Russia.

The average value of emissions that deplete the ozone layer (E5) is 2.33 thousand kg, while the lowest value of 0.00 thousand kg has been registered in the company FGC UES (Federal Grid Company of the United Energy System), Russia, in the period 2012-2014. and the highest of 37.37 thousand kg in the Cairn Energy company, United Kingdom.

The average value of other indirect greenhouse gas emissions (E6) is 38,853.37 thousand kg, while the lowest value of 5.90 thousand kg is in the Eesti Energia company, Estonia, in 2015, and the highest of 460,160.00 thousand kg in the INTER RAO UES company, Russia.

The average measured amount of wastewater (E7) in the companies of the energy sector in Europe is 14,056.84 thousand m^3, with the lowest measured amount of

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i.e. extraordinary items): EBIT = Operating profit ± non-operating items. This type of profit excludes the effects of financial transactions and income tax and other taxes payable on profits

wastewater recorded in the Eesti Energia company, Estonia, 0.60 thousand m^3, and the highest in OMV Austria, 256,225.00 thousand m^3.

The average weight of waste by type and method of disposal (E8) is 921,069.78 thousand kg, with the lowest weight of waste by type and method of disposal recorded in the KONCAR - Electrical Engineering Institute, Croatia, 7.10 thousand kg, and the highest of 14,800,000.00 thousand kg in the Jyväskylä Energy company, Finland.

The average number of significant pollution (E9) is 4.29, with the lowest number recorded in Enagas SA, Spain, 0, and the highest in Gazprom, Russia, 8.

In Table 3, we can see that the average value of indicators of environmental performance of sustainable development of companies is relatively declining and that the value of the standard deviation, i.e. deviations between companies are relatively reduced, leading to the conclusion that the companies are working on development of management and reporting on environmental performance indicators of sustainable development, but not to a sufficient extent.

Table 3 Descriptive measures of indicators of environmental performance of sustainable development

Indicators		2012.	2013.	2014.	2015.	2016.	2017.	2018.	2019.	2020.
E1	Min	9.80	9.80	10.00	10.90	11.43	11.47	12.01	12.88	12.90
	Max	678,181.00	507,851.00	532,784.00	473,156.00	657,900.00	660,053.00	687,511.00	690,888.00	692,455.00
	M	75,177.95	63,506.40	61,282.29	54,670.94	65,509.69	65,742.31	73,271.36	74,361.85	75,078.32
	SD	161,762.18	134,405.35	131,271.44	111,691.95	135,018.85	135,112.16	154,014.79	155,778.88	156,575.26
E2	Min	0.02	0.05	0.05	0.06	0.03	0.07	0.08	0.10	0.12
	Max	29,152.00	31,623.00	28,384.00	22,858.00	26,700.00	27,020.00	27,460.00	27,504.00	27,540.00
	M	2,318.27	2,385.50	2,385.73	2,343.00	2,509.09	2,456.20	2,438.61	2,458.53	2,478.26
	SD	5,871.33	6,113.81	5,969.87	5,686.11	5,970.49	5,834.07	5,808.68	5,844.16	5,888.48
E3	Min	2.98	11.86	35.78	8.82	9.16	9.12	9.13	9.42	9.58
	Max	2,125,500.0	2,126,000.0	2,120,000.0	2,145,000.0	2,075,000.0	2,090,000.0	2,140,000.0	2,148,900.0	2,160,020.0
	M	196,179.98	194,344.70	194,632.34	189,561.37	190,219.18	188,684.66	186,056.18	186,306.96	186,807.92
	SD	451,159.91	450,483.99	448,958.13	435,871.92	431,907.88	426,775.97	426,144.47	428,065.35	429,533.61
E4	Min	165.12	160.12	158.66	156.84	158.14	162.36	160.08	165.12	160.12
	Max	89,777,205.0	89,801,520.0	89,706,102.0	89,534,858.0	88,238,279.0	84,558,776.0	81,256,217.0	89,777,205.0	89,801,520.0
	M	3,588,523.5	3,533,265.9	3,428,474.6	3,462,106.6	3,397,381.3	3,386,247.6	3,321,533.1	3,588,523.5	3,533,265.9
	SD	13,448,245.8	13,185,827.3	12,869,750.4	12,856,368.9	12,617,800.4	12,252,343.8	11,905,500.3	13,448,245.8	13,185,827.3
E5	Min	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00
	Max	18.17	20.05	37.37	35.20	37.20	37.04	36.87	18.17	20.05
	M	2.00	2.32	2.67	2.42	2.43	2.40	2.40	2.00	2.32
	SD	3.21	3.86	5.88	5.21	5.43	5.40	5.38	3.21	3.86
E6	Min	9.70	8.80	8.50	5.90	6.40	6.45	6.55	6.58	7.05
	Max	460,160.00	448,902.00	452,000.00	401,253.00	443,700.00	356,800.00	335,800.00	335,961.00	336,008.00
	M	42,083.47	41,206.57	41,137.22	38,878.18	40,958.43	37,116.13	35,932.14	36,100.24	36,267.94
	SD	90,769.08	89,607.24	91,423.67	82,604.71	91,537.20	82,306.13	78,451.46	78,719.86	79,028.17
E7	Min	1.10	0.80	0.80	0.60	1.00	1.01	1.20	1.25	1.28
	Max	180,025.00	175,950.00	198,200.00	215,200.00	256,225.00	236,400.00	241,700.00	246,352.00	246,500.00
	M	12,502.39	12,329.71	12,839.24	13,031.31	15,046.49	14,905.51	15,200.91	15,289.33	15,366.70
	SD	37,335.50	37,142.44	39,511.19	40,096.70	48,814.35	46,752.20	47,158.89	47,321.80	47,556.52
E8	Min	9.10	9.90	8.60	7.10	7.50	8.90	8.70	9.10	9.90
	Max	13,500,000.0	14,800,000.0	14,800,000.0	13,000,000.0	13,600,000.0	13,700,000.0	13,800,000.0	13,500,000.0	14,800,000.0
	M	883,739.16	913,842.58	925,504.10	919,533.13	918,400.65	952,729.06	978,297.58	883,739.16	913,842.58
	SD	2,405,677.6	2,535,374.6	2,589,780.8	2,517,964.0	2,518,329.4	2,662,261.0	2,795,825.3	2,405,677.6	2,535,374.6
E9	Min	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
	Max	8.00	7.00	7.00	8.00	8.00	8.00	8.00	8.00	7.00
	M	3.70	3.77	4.20	4.62	4.75	4.97	5.18	3.70	3.77
	SD	1.68	1.64	1.76	1.66	1.56	1.67	1.71	1.68	1.64

Based on the conducted analysis, it has been determined that the companies are heterogeneous in terms of reporting on environmental performance indicators of sustainable development, which confirms Hypothesis 1.

The results obtained by the research have been statistically processed with an adequate selection of statistical methods, in order to provide an optimal model of perceiving the dependence and differences between the analyzed data obtained in the research. Descriptive and inferential statistical analyses have been used in statistical processing. Statistical data processing has been performed using the package for statistical data processing in the social sciences SPSS (SPSS, version 21.0). In order to test the second research hypothesis which predicts that reporting on environmental performance indicators of sustainable development significantly affects the indicators of profitability (rate of return on total assets - ROA), multiple linear regression has been applied.

Before applying multiple linear regression, it is important to determine the degree of agreement between the environmental performances in the sustainable development report. The results of the correlation analysis of environmental performance are shown in Table 4.

Table 4 Results of correlation analysis of environmental performance

	E1	E2	E3	E4	E5	E6	E7	E8	E9
E1	1	0.431	-0.062	-0.103	-0.067	-0.037	0.391	0.480	-0.050
		(0.000)	(0.049)	(0.016)	(0.021)	(0.094)	(0.000)	(0.000)	(0.012)
E2	0.431	1	0.057	-0.068	0.022	0.200	0.568	0.920	0.155
	(0.000)		(0.087)	(0.012)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)
E3	-0.062	0.057	1	0.251	-0.066	-0.033	0.168	0.042	0.886
	(0.049)	(0.087)		(0.000)	(0.026)	(0.048)	(0.000)	(0.034)	(0.000)
E4	-0.103	-0.068	0.251	1	-0.076	0.496	-0.041	-0.071	-0.210
	(0.016)	(0.112)	(0.000)		(0.079)	(0.000)	(0.040)	(0.099)	(0.000)
E5	-0.067	0.022	-0.066	-0.076	1	0.327	0.141	0.011	-0.056
	(0.021)	(0.005)	(0.026)	(0.079)		(0.000)	(0.001)	(0.001)	(0.091)
E6	-0.037	0.200	-0.033	0.496	0.327	1	0.338	0.174	0.045
	(0.094)	(0.000)	(0.048)	(0.000)	(0.000)		(0.000)	(0.000)	(0.023)
E7	0.391	0.586	0.168	-0.041	0.141	0.338	1	0.556	0.215
	(0.000)	(0.000)	(0.000)	(0.040)	(0.001)	(0.000)		(0.000)	(0.000)
E8	0.480	0.920	0.042	-0.071	0.011	0.174	0.556	1	0.102
	(0.000)	(0.000)	(0.034)	(0.099)	(0.001)	(0.000)	(0.000)		(0.017)
E9	-0.050	0.155	0.886	0.210	-0.056	0.045	0.215	0.102	1
	(0.012)	(0.000)	(0.000)	(0.000)	(0.091)	(0.023)	(0.000)	(0.017)	

Based on the results of the correlation analysis, it can be concluded that the highest degree of correlation exists between energy efficiency (E2) and the weight of waste by type and method of disposal (E8), followed by the correlation between the total water abstraction by source (E3) and the total number of significant pollutions (E9). A high degree of correlation exists between energy efficiency (E2) and the measured amount of wastewater (E7), as well as between the measured amount of wastewater (E7) and the weight of waste by type and method of disposal (E8). Through the correlation analysis, it has been observed that there is an individual dependence between environmental performances in the sustainable development reports of the European companies, which means that the improvement of one environmental performance affects the improvement of other environmental performances.

Table 5 presents the values of the following indicators: - Pearson's coefficient of simple linear regression (R). It is 0.406 which shows a linear relationship between dependent and independent variables. Since the correlation coefficient is positive, the relationship is

positive, i.e. with the improvement of the environmental performance indicators of sustainable development, there is an improvement in the rate of return on total assets - ROA. The coefficient of determination (R2), which determines the percentage of variability of the dependent variable "ROA - rate of return on total assets", is explained by a model that includes independent variables "indicators of environmental performance of sustainable development". In this case, that percentage is 65%. - F test (31.629) and p (0.000) represent the achieved significance level. As p <0.0005, which is less than the standard significance level of 0.05, we may conclude that the regression model is statistically significant.

Table 5 Results of the impact of environmental performance indicators of sustainable development on the rate of return on total assets (ROA)

R	R^2	F-тест	p
0.406	0.650	31.629	0.000

Table 6 presents the values of the Beta coefficients of the independent variable. The highest Beta coefficient of the independent variable has the indicator "E4" (0.237), which means that the variable "E4" contributes the most to the prediction of the dependent variable "ROA - rate of return on total assets". This means that with greater control and informing stakeholders about the indicator of the value of direct greenhouse gas emissions, the company's profitability increases. After indicator "E4", the contribution of predicting the dependent variable "ROA" is as follows: indicator "E3" (0.217), "E5" (0.128), "E7" (0.102), "E1" (-0.076), "E2" (- 0.070), "E8" (-0.053), "E9" (-0.042) and "E6" (0.027). In column p, we have estimated the statistical significance of each independent variable in the regression equation separately. We can see that for all independent variables $p < 0.05$ and that they are statistically significant in the model, except for the independent variable "E7" (0.067), which has no statistically significant contribution to the model, because $p > 0.05$. Reporting on all environmental performance of sustainable development creates a good image of the company, which leads to greater interest of stakeholders and support of the surrounding community. Community support is realized in a form of business licenses and provision of necessary resources to the company.

Table 6 Results of the impact of individual indicators of environmental performance of sustainable development on the rate of return on total assets (ROA)

Indicators	Unstadardized B	Beta	P
(Constant)	0.364		0.088
E1	-1.162	-0.076	0.013
E2	-1.152	-0.070	0.017
E3	3.748	0.217	0.016
E4	5.752	0.237	0.000
E5	2.710	0.128	0.004
E6	0.438	0.027	0.043
E7	1.839	0.102	0.067
E8	-0.870	-0.053	0.017
E9	-0.715	-0.042	0.040

The analysis has found that the indicators of environmental performance of sustainable development individually significantly affect the rate of return on total assets - ROA, except for the indicator "E7", which has no statistical significance. Based on the conducted analysis, it can be concluded that Hypothesis 2 is partially confirmed. This leads to the following statement: If the company is constantly working on implementing and expanding the environmental performance reporting system for the purpose of sustainable development, its profitability is not questioned, but significant profit growth is measured. With profit growth, the company is theoretically considered to be able to distribute higher dividends, which positively affects stock returns and increases in their value. Relatively speaking, higher profitability means higher company value. High profitability is also one way for a company to achieve prosperity for its shareholders, as it leads to a high rate of return for investors. Investors therefore constantly monitor the growth of profits, the growth of the company's value and its environmental performance, in order to make an investment decision.

The results of this research are in accordance with Purbawangsa & Suprasto (2019), Wardhany, Hermuningsih & Wiyono (2019) and Sulistyo & Yuliana (2019), who state that environmental performance positively affects the company's profitability, which positively affects its value. A high rate of return on total assets employed - ROA is one of the things that investors look at before providing equity funds to a company. If a company has high profitability, the company is considered to have good future prospects because it is considered capable of providing returns to its shareholders.

5. CONCLUSION

This study analyzes the impact of reporting on environmental performance indicators of sustainable development on the profitability of companies. Analyzing the average values of indicators of environmental performance of sustainable development of companies, it can be concluded that due to the transience of time, the value has decreased relatively. However, the discrepancies between the values of environmental performance indicators have relatively decreased, leading to the conclusion that companies are working on the development of management and reporting on environmental performance indicators of sustainable development, but not to a sufficient extent. The analysis has found that the companies are heterogeneous in terms of reporting on environmental performance indicators of sustainable development.

Multiple linear regression has been used to examine the impact of reporting on sustainable development environmental performance indicators on profitability indicators (rate of return on total assets - ROA). Since the Pearson's coefficient of simple linear regression is 0,406, it can be said that with the improvement of the environmental performance indicators of sustainable development, there is an improvement in the rate of return on total assets - ROA. Based on the results of the analysis of collected and processed data, it can be concluded that the indicators of environmental performance of sustainable development individually significantly affect the rate of return on total assets - ROA, except for indicators "Measured wastewater (E7)", which has no statistical significance.

The data sources used in this study are secondary data collected in the available Sustainable Development Reports available in the database of the Organization for Standardization (Global Reporting Initiative) in the period from 2012 to 2020. (https://www.globalreporting.org/database). The lack of a sample in this survey is limited

to energy sector companies, so the companies from other industries were not covered by this survey.

The research showed that the reporting of the European energy sector companies on environmental performance indicators in the report on sustainable development contributes not only to socially responsible behavior, but also to increasing profitability. This is important for both managers and investors. With this reporting, managers can contribute to a more responsible impact of the company on the environment and increase profits. Investors are interested in the company's ability to make a profit even before investing capital, because that will provide higher dividends. Since the reporting on environmental performance indicators affects the company's profitability, it is important for investors to know whether the company's image is based on good environmental performance indicators and thus contribute to the community and the well-being of investors.

Future research on this topic can be extended to other geographical areas, and even conducted on a global scale, and other activities may be included in the research. Also, the impact of other non-financial performance (e.g. social, economic, corporate governance performance, etc.) reported in the Sustainability Report on the profitability of companies can be observed. The independent variables in this study explain only the 65% dependent variable, and there are still 35% of variables outside the model that can explain the company's profitability. In addition, it is possible to use other indicators of profitability, especially those based on the cash flow concept (e.g. CFROI, present value of future cash flows, CVA) or economic profit (EVA), which opens the possibility of research in volatile, crisis conditions or allows binding for certain capital markets.

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ANALIZA UTICAJA IZVEŠTAVANJA O POKAZATELJIMA EKOLOŠKIH PERFORMANSI NA PROFITABILNOST EVROPSKIH KOMPANIJA

Istraživanje u ovom radu je usmereno na analizu uticaja izveštavanja o pokazateljima ekoloških performansi u kontekstu održivog razvoja na profitabilnost kompanija. Istraživanje se fokusira na 60 kompanija energetskog sektora u Evropi u periodu 2012-2020. godine. Za prikupljanje podataka koristili su se izveštaji o održivom razvoju kompanija dostupnih u bazi podataka Globalne inicijative za izveštavanje (Global Reporting Intiative – GRI). Nezavisne varbijable u ovom istraživanju su devet pokazatelja ekoloških performansi održivog razvoja. Zavisna varijabla je profitabilnost kompanija, koja se meri stopom prinosa na ukupno angažovana sredstva (ROA). U analizi uticaja izveštavanja o pokazateljima ekoloških performansi u kontekstu održivog razvoja na profitabilnost kompanija energetskog sektora u Evropi primenjena je metoda višestruke linearne regresije. Empirijski rezultati ovog istraživanja su pokazali da izveštavanje o pokazateljima ekoloških performansi u cilju ostvarivanja održivog razvoja pozitivno utiče na pokazatelje profitabilnosti kompanija.

Ključne reči: izveštavanje, održivi razvoj, ekološke performanse i profitabilnost.

Original Scientific Paper

TESTING THE APPLICABILITY OF THE CAPM MODEL USING SELECTED SHARES LISTED ON THE BELGRADE STOCK EXCHANGE

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Abstract. *One of the basic types of portfolio valuation as well as valuation of individual company shares is the CAPM (Capital Asset Pricing) model, which uses a well-known measure of systemic risk in its analysis, which is beta. The CAPM model in its analysis uses the link between the systemic risk measure (beta) and the expected market return. Guided by this model, the analysis of monthly returns of selected shares on the Belgrade Stock Exchange in the period from 2011 to 2021 was performed in this research. In the research, the beta coefficient of selected shares was calculated with the help of the covariance of market return and stock return. The results and their statistical value were confirmed by the linear regression test. The rest of the research tests the applicability of the CAPM model to selected actions and in the same way, the SML (security market line) is devised, which is a graphical representation of the model. The research indicated that the basic assumptions of the CAPM model are not applicable as a predictor of future expected returns of selected shares on the Belgrade Stock Exchange due to various other elements that affect price movements and returns of selected shares not covered by the model.*

Keywords: *CAPM model, Beta coefficient, Belgrade Stock exchange, BelexLine*

JEL Classification: G17, G12

1. INTRODUCTION

The Capital Asset Pricing Model makes a significant contribution to our understanding of asset price determinants. According to the CAPM, diversified investors' ownership of assets lowers expected returns and raises prices. Furthermore, investors with undiversified portfolios are more inclined to take risks for which they will not be compensated (Perold, 2004, p 3-24). The CAPM's attractiveness stems from its ability to make powerful and appealing predictions about how to evaluate risk and the connection between expected returns and risk. The model is a simplified representation of how financial markets determine prices of securities and, as a result, also determine predicted capital investment returns. The CAPM model is a mechanism used to evaluate risk and convert it into expected return on equity projections (ROE). The main benefit of the Capital Asset Pricing Model is the objectivity of the predicted costs of equity that the model may produce. To generate an accurate and meaningful cost of equity calculations, financial managers might utilize it to enhance other methodologies and their judgment (Rossi, 2015, p. 604-617). The Capital Asset Pricing Model is undoubtedly the most important and commonly utilized contribution to finance (Ross, Westerfield, and Jordan, 1996). It is necessary to describe the company's business purpose while discussing the financial market and individual stocks of specific corporations. In today's business world, a company's ability to adapt to increasingly unstable business conditions is critical to its survival. Companies analyze the success of their management decisions against a predetermined aim, hence they require a goal. Companies develop metrics and operational goals that they wish to attain in their business to reach the defined goal. (Mirović, Mijić, Andrašić & Kalaš, 2019, p. 5). The CAPM model's assumptions for proper implementation are concerned with investor behavior and capital market conditions. According to these assumptions, the market should be made up of risk-averse investors, risk should be measured by the standard deviation of portfolio income, investors should have a common period for making investment decisions, and investors should have similar expectations about future income and security risks. Finally, the capital market must be perfect. Regardless of the CAPM model's broad application, the model's fundamental flaw is the anticipated investor expectation, not the achieved return (Vunjak, 2008, p. 251). In the continuation of the research, we review the literature related to the application of the CAPM model. After reviewing the literature, we review the methodology of the paper and finally present the results of the research and discuss the results obtained. In the conclusion, we express our concluding remarks and give suggestions for further research.

2. LITERATURE REVIEW

The model itself assumes the existence of perfect market conditions, which is not the case in practice. The model itself was developed by William F. Sharpe (1964) and John Lintner (1965) as a reaction to the modern portfolio theory developed by Markowitz (1952). Portfolios are classified into two types, according to Markowitz: efficient and inefficient. The efficient frontier is the boundary between an efficient and an inefficient portfolio. The efficiency frontier is made up of a set of portfolios that have a good balance of expected return and risk. According to the frontier, the higher the return dispersion around the predicted returns, the more uncertain future returns, as well as the risk, which increases exponentially. (Brealy & Myers, 2016). Additionally, the cautious long-term investor will

stay away from such overweights to protect themselves from two types of declines in investing opportunities: declining anticipated returns on stocks and rising volatility (Cambell, Giglio, Polk & Turley, 2018).

Modern portfolio theory served as a common foundation for the creation of many financial ideas and concepts that are still frequently employed today but are also subject to ongoing critique. The introduction of new financial instruments, as well as various sorts of investors, has necessitated the inclusion of severe risk effects in portfolio optimization models. Investors will choose to put their funds in financial assets whose return distribution is favorably asymmetrical, while they will avoid financial assets whose return distribution is long-tailed, based on statistical features of return distributions. (Stanković, Petrović & Denčić - Mihajlov, 2020, p. 17-26).

Some researchers employed a variety of techniques to forecast market movement. The Box-Jenkins (ARIMA) test was used by Jakšić, Milanović, and Stojković (2020) to perform an empirical study that found that the share market in the Republic of Serbia will not have any noteworthy trends in 2019. Forecasting, on the other hand, cannot accurately predict future movements, thus the analysis and interpretation of the gathered data should be viewed as potentially erroneous. Because uncertainty and potential errors are proportional to the length of the forecast period, the prediction should be focused on a short time frame (Jakšić, Milanović & Stojković, 2020, p. 87-96). In this example, we can see the breadth of predictable research on the results of stock market actions. The CAPM model is one of the first widely recognized models for determining future expected results of actions concerning the market. There is also minimal support for the theory's basic concept that increased risk (beta) is associated with higher returns, according to some research. To alleviate the statistical issues that occur from measurement errors in individual beta estimations, the securities are merged into portfolios to diversify away from the majority of the company's elements of returns, hence increasing the precision of estimates of the beta coefficient (Fama and French, 2004, p. 25-46). The generalized CAPM with IIAPD errors has beneficial qualities, according to Bao, Diks, and Li's research findings. In terms of commonly used performance measures, portfolios produced with IIAPD errors beat portfolios constructed with normally distributed errors, according to the testing. (Bao, Diks & Li, 2018, p. 611-621). On the other hand, in one study, the author employed the Capital Asset Pricing model approach of financial asset evaluation to estimate future yields on both the titles in the portfolio and the return on the portfolio. They discovered an increase in both the beta and the coefficient of market risk, with the latter being substantially connected with capital market development. (Anghel & Paschia, 2013, p. 541). Also according to Baltes, Dragoe & Ardelean (2014), the C.A.P.M. model continues to be the most often utilized one for both portfolio selection and company evaluation, particularly those aspects linked to the beta coefficient variability over time and the potential for mere approximation.

Focusing on the applicability of the CAPM model in similar financial markets as the market of the Republic of Serbia, we can see the following: Using monthly stock returns from nine countries, spanning the period from January 2006 to December 2010, one of the research articles looked at whether the model is adequate for capital asset assessment in the Central and South-East European emerging securities markets. It was determined that the CAPM model is not appropriate for appraising capital assets in the Central and Southeastern European emerging economies, according to a cross-sectional study of the test data. It was discovered that stock market indices do not lie on the efficient frontier, do not reflect an efficient portfolio, and thus cannot be considered a market portfolio of

models, as was previously supposed (Džaja & Alijanović, 2013, p. 164-175). Therefore we can see the use of other predictive models in addition to the CAPM model. According to research, variations in stock prices on the Croatian capital market indicate that certain undiscovered elements influence share valuation. It was found that the fundamental analysis of shares is insufficient for determining the true value of a share in light of different invisible variables and all available information that affects its value (Odobašić, Tolušić & Tolušić, 2014, p. 297-311).

The extension of the CAPM model is precisely APT (Arbitrage pricing theory) which includes much larger macroeconomic predictable variables compared to the CAPM model. The key difference is that APT takes many more components in its model instead. Its primary limitation is the precise measurement of the values of all its variables. In the period 2008-2010, Kisman and Restiyanita investigated whether there was an effect of market excess return on LQ45 company stock returns (using the CAPM model), as well as whether there was an effect of variable/factor (such as gross domestic product and interest rates) Arbitrage Pricing Model (APT) on stock returns. The findings of multiple regression demonstrated that CAPM and APT are highly significant, as evidenced by the t-test and F-test results. APT model outperformed the CAPM model in predicting stock returns based on the coefficient of determination. The model's drawback is that it is dependent on whether or not the capital market is efficient (Kisman & Restiyanita, 2015, p. 184-189). Some studies favor the Arbitrage Model while on the other hand there are studies that support the CAPM model. One of the examples of support for the APT model is the findings of Kisman & Restiyanita (2015), who claim that the coefficient of APT is more accurate than CAPM at forecasting stock returns. On the other hand, the Suroso et. al (2018) study states, analyzing the application of the model to different periods, that the CAPM model is a better predictor of stock values in the short, medium, and long periods than the APT model. Also in the study by French (2017), researching the effects of macroeconomic variables on the stock returns of stock markets of Singapore, Thailand, Indonesia, Malaysia, and the Philippines, the capital asset pricing model was proven to be a more reliable pricing tool for the six countries studied than the arbitrage pricing theory. The main basis of different sites is the analysis of returns of certain types of markets. Kisman & Restiyanita (2015) based their research on the return of shares of companies listed on the Indonesian Stock Exchange, while Suroso et. al (2018) focused more on the return of banking stocks also in the Indonesian market.

In addition to the previously mentioned research, there are other papers related to the practical application of the APT model, but in this paper, we focus on the CAPM (Capital asset pricing model).

3. RESEARCH METHODOLOGY

This research paper consists of five parts. In the beginning, we dealt with the introduction of the concept of the CAPM model and then a review of the literature related to the application of the model itself. In this chapter, we present the main mathematical formulas on which the CAPM model itself is based and which were used in the calculation of the obtained results. Also in this chapter, we present the basic hypotheses of the research itself. In the next section, we present the obtained calculated results using linear regression and covariance. In the last chapter, we make concluding remarks and give suggestions for

future research. The paper itself covers the period from 2011 to 2021 of selected shares of the Belgrade Stock Exchange as shown in Table 1 below. Due to the accuracy of the data, the data from January 2011 to December 2021 were used to calculate the beta coefficient, while the annual returns of selected shares of companies calculated based on monthly data were used to calculate the application of the CAPM model.

The main hypotheses derived in this research are the following:

H0: A higher return on stocks is expected at a higher level of risk

H1: The CAPM model is a valid predictor of stock returns

As mentioned earlier, we deal with the presentation of the main formulas and graphs that represent the assumptions and components of the CAPM model. A market portfolio is more of a theoretical concept than a real-world application. It is a value-weighted portfolio that includes all risk assets in the global economy, resulting in a percentage equal share of the market value of all capital investments around the world. Given the unpredictability of the number and market value of the world's risk activity, it is evident that calculating a value-weighted entirely comprehensive market index, especially for everyday use, is extremely difficult. Instead, several estimates are utilized, the most common of which are larger stock market indices (Šoškić, 2010, p. 105). Graphically, the market portfolio can be presented with the help of the so-called CML (Capital market line), which is a set of efficient solutions equal for all investors. For the investor, in theory, it is ideal for the portfolio to be on this line because CML is an efficient frontier. In theory, a portfolio gathered from certain stocks closer to the x-axis represents a portfolio that contains more secure securities (mostly bonds) while a portfolio further than the x-axis and along the line represents a risky portfolio, and the main assumption of the modern portfolio theory is that the higher the amount of risk (standard deviation) the higher the profit is expected.
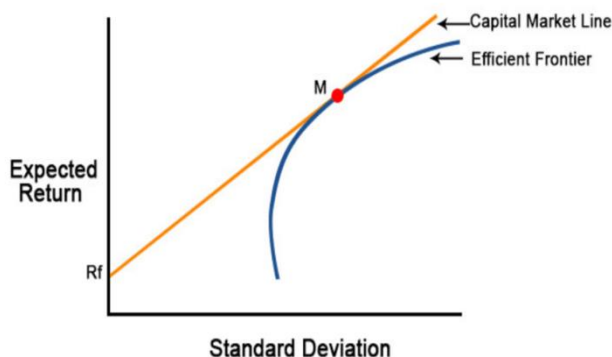
Fig. 1 Capital market line (CML)
Source: Schoenmaker & Schramade (2020)

One of the foundations of the model is the understanding of the beta coefficient. The beta coefficient is usually calculated by reviewing historical data. Because investment and financial decision-making are future-oriented, the argument for employing a beta coefficient whose value is based on historical data can be questioned, especially since we know that financial market occurrences are not a straightforward extrapolation of past events (Krneta, 2006, p. 65). The basic idea of the beta coefficient or beta index is that if

β> 1 the stock price moves more aggressively concerning the market portfolio. When β <1 represents a slower movement of stock prices but in the same direction while β = 1 represents the beta coefficient of the market portfolio itself. One of the basic assumptions of the CAPM model is the existence of a market portfolio, but in practice, it is quite difficult to determine the real representation of the market portfolio, which is one of the limitations of the CAPM model. In practice, the stock exchange index of the country that is the subject of the research is mostly used, namely the index that includes the largest number of shares, so that its movements most accurately represent market movements. The most comprehensive index on the Belgrade Stock Exchange is the BelexLine index, which we used in this research as a representative of the market portfolio. For calculating the beta coefficient we use the covariance/variance method.

$$Cov(Rm, Rs) = \frac{\in (Rmi - \mu) * (Rsj - v)}{n} \tag{1}$$

Cov(*Rm*, *Rs*) – represents the covariance of variables Rm and Rs.
Σ – represents the sum of other parts of the formula.
(*Rmi*) – represents all values of the *Rm*-variable.
μ – represents the average value of the *Rm*-variable.
Rsj – represents all values of the *Rs*-variable.
v – represents the average value of the *Rs*-variable.
Σ – represents the sum of the values for both *Rmi − μ*) and (*Rsj − v*).
n – represents the total number of data points across both variables.

$$\beta = \frac{Cov(Rm, Rs)}{Var(Rm)} \tag{2}$$

β – beta coefficient
Rm – the return of the market
Rs – the return of the stock
Cov – covariance
Var – variance

As we can see, the beta coefficient is calculated as the quotient of the stock return and market return, and the return variance. Based on that, we get a beta coefficient that represents the representative of systemic risk, i.e. risks that cannot be eliminated by diversification. However, according to other research, the beta coefficient as the only risk component in the CAPM may also require the addition of dividend yield, company size, and skewness, that are a few other risk factors that can be used to explain asset returns. Additionally, contrary to one of the CAPM assumptions, there are real-world restrictions on investor borrowing, such as those regarding short selling (Fernandez, 2019). In this research, as mentioned, we use selected shares listed on the Belgrade Stock Exchange, which are included in the BelexLine index. In the table below we can see which companies were taken for analysis and which their symbols will be used in the rest of the research.

Table 1 Stocks listed on the Belgrade stock exchange

Aerodrom Nikola Tesla a.d.	AERO
Nis a.d.	NIS
Enegroprojekt holding a.d.	EHNL
Impol Seval a.d.	IMPL
Dunav osiguranje a.d.	DNOS
Komercijalna banka a.d.	KMBN
Messer Tehnogas a.d.	TGAS
Jedinstvo a.d.	JESV
AMS Osiguranje a.d.	AMSO
Lasta a.d.	LSTA

Source: Belgrade Stock exchange

As we can see in the paper, we used ten companies listed on the Belgrade Stock Exchange, where we used data on the return of shares in the period from January 2011 to December 2021 to calculate the exposure to systemic risk according to the CAPM model. Expected stock returns are determined by their matching amount of systematic risk, or ß, according to the model. To put it another way, the market does not reward risk that is taken unnecessarily. The model can be used to calculate the cost of capital, conduct event studies, and manage and appraise portfolios, among other things. Economists have been able to quantify risk and the payoff for taking it on (Ansari, 2000, p. 55-64). Divide the final index or stock value by the beginning value and remove one to get the returns. Subtracting the beginning value from the finishing value and dividing it by the beginning value is another way to calculate the return (Gardner, McGowan & Moeller, 2010). The second way is used in this research. Since we are testing the CAPM model itself, we need to present the model itself in the following formula.

$$CAPM\,(Ers) = Rf + \beta(E(Rm) - Rf)\qquad\qquad(3)$$

CAPM (*Ers*) – expected returns of the stock (security) using the model
Rf – risk-free rate
β – beta coefficient
Rm – return of the market
(*E*(*Rm*) – *Rf*)– market premium

SML (Security market line) is the graphic depiction of the CAPM model. According to the SML, the desired rate of return on an asset is determined by its beta, or market risk (systematic), risk-free rate of return (*Rf*), and market risk premium (*E*(*Rm*) − *Rf*). As a result of changing the desired rate of return under the effect of changes in the nominal rate of return without risk, beta, or market risk premium, the SML equation indicates that the share price can vary even if the company's cash flows do not change.
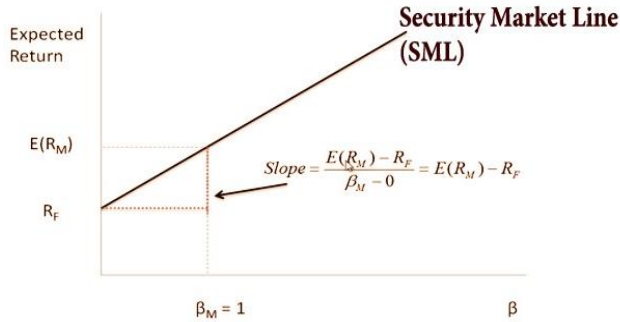
Fig. 2 Security market line (SML)
Source: https://assignmentpoint.com/security-market-line-sml/

4. FINDINGS AND DISCUSSION

In this part of the research, we present the obtained results and discussthem. The PSPP statistical program was used in the calculation of the obtained results. In the first part of this chapter, we present descriptive statistics of the shares used in the research as well as the market index.

Table 2 Descriptive statistics

	Mean	Standard Error	Median	Standard Deviation	Minimum	Maximum	Count
Belex line	1375.882	21.11682	1434.37	242.6138	858.41	1733.14	132
AERO	909.7204	32.63811	907.6091	374.9833	386.381	1801.65	132
NIS	694.2481	9.468468	683.4762	108.3716	482.2632	966.36364	132
EHNL	775.1323	26.59373	705.1579	304.3791	326.1905	1489.8889	132
IMPL	2090.748	107.2683	1736.1	1227.742	584.95	4012.7391	132
DNOS	1546.611	84.17999	1164.834	967.1545	538.1	3936.2105	132
KMNB	2160.63	64.27649	1889.297	738.4806	994.7391	4368.0909	132
TGAS	9044.952	335.7279	8746.1	3857.22	3132.45	16566.818	132
JESV	5385.555	98.49262	5074.601	1131.594	3826.696	8863.6364	132
AMSO	542.3225	33.9663	420.0000	390.2433	114.0000	1886.0909	132
LSTA	462.6345	18.22758	420.445	209.419	200	1147.1053	132

Source: Belgrade Stock exchange

In the table above we see data on the prices of selected shares. The subject of the analysis was the share prices in the period from 2011 to 2021 (monthly data). We notice looking at the level of standard deviation as a representative of the risk that the shares of IMPL, JESV, and TGAS show the highest level of standard deviation, which means that these shares have a large class of movement between the maximum and minimum price in the observation period. We notice the lowest level of variation at NIS because the amount of standard deviation is 108.37, which is the lowest amount in the sample.

Table 3 Risk-free rate, market return, and market risk premium

10- year international bonds - Serbia	Market return (BelexLine)	Market risk premium
6.813%	**3.426%**	**-5.068%**

Source: author's calculation

As we want to calculate the return on shares according to the CAPM model, we need certain variables such as risk-free rate and market return. The rate of return on 10-year bonds was taken as a representative of the risk-free rate. Serbian 10-year bonds experienced a maximum rate of 7.071% while the minimum rate was 2.264%. In addition, the return rate of the BelexLine stock index is shown, which is 3.426% per year on average, based on monthly data used to more accurately determine the actual return. Here we notice a violation of the concept of the CAPM model, which immediately gives us an indication of the impossibility of applying, in the form of predictability, this model on the Belgrade Stock Exchange. We notice that the premium market is negative, which means that in our market it pays more for investors to invest in bonds because the expected return from them is higher than from investing in the stock exchange index itself. This problem was later presented graphically with the help of SML (security market line).

Table 4 Risk-free rate, market return, and market risk premium

	Market	AERO	NIS	EHNL	IMPL	DNOS	KMBN	TGAS	JESV	AMSO	LSTA
Market	0,0012515										
AERO	0,0010588	0,014053									
NIS	0,0006772	0,000329	0,0029321								
EHNL	0,0012405	0,001208	0,000759	0,0050265							
IMPL	0,000529	0,000659	6,822E-5	0,0010009	0,008422						
DNOS	0,0009408	-0,000449	0,0003273	0,0008577	0,0016251	0,0126168					
KMBN	0,001297	0,000532	0,0008446	0,0014182	0,0009601	0,0011263	0,0051577				
TGAS	0,0009756	0,001015	0,0005959	0,0015253	0,0011636	0,0002633	0,0012259	0,0035905			
JESV	0,000582	0,00063	-0,000182	0,0010567	0,0014391	0,0006473	0,0007161	0,0007841	0,002585		
AMSO	4,257E-5	-0,001694	-0,000585	-0,001616	0,0005096	0,0006096	0,0013337	-0,000394	0,000916	0,0183287	
LSTA	0,0011164	0,000709	7,421E-5	0,0014069	0,0021323	0,0046685	0,0019706	0,000567	0,001109	-0,0004926	0,0187351
Calculated Beta		**0,846**	**0,540**	**0,991**	**0,423**	**0,752**	**1,036**	**0,780**	**0,465**	**0,034**	**0,892**
VARIANCE (STOCK) / COVARIANCE (MARKET;STOCK)											

Source: author's calculation

Using the previously mentioned formula for calculating the beta coefficient as a representative of the systemic risk to which an individual stock company is exposed, with the help of covariance performed using monthly return data, we obtained the following results which can be seen in the table above. We can notice that KBMN has the maximum amount of beta coefficient in the amount of 1.03, which means that the return on KBMN shares is moving a little stronger than the market itself. Also, the results affirm the statement of Baltes, Dragoe & Ardelean (2014) that said that the majority of cases have positive ß coefficient values and that the cases with ß0 are extremely uncommon. The volatility value suggests that the stock will evolve differently from the market. Accordingly, the research by Duangjan & Amporn (2019) examined the application of the CAPM model to the valuation of five stocks of highly profitable companies in the American market and discovered that the beta of all five sampling companies is positive, meaning that bigger the increase in the value of the stock, the

beta of all five sampling companies will increase. As the market grows, so will the returns of the sampling companies, and vice versa. The rest of the shares in the sample are bets below 1, which means that they are more defensive and less volatile. The average value of the beta coefficient of the observed stock is 0.729 which tells us that the hypothetical portfolio including these stocks is not as volatile as the market. This coincides with the results of Hundal, Eskola & Tulan (2019) who, observing 90 stocks on the Finnish stock market, discovered that the average beta was 0.64 which means that the market change of 10% implies that the hypothetical portfolio changes by 6.4% in the same direction. For a more precise calculation of the beta coefficient, monthly data were used concerning the annual ones, used mainly due to the statistical significance of the sample itself. In the following table, with the help of linear regression (which is another way of obtaining the beta coefficient), we also calculated the amounts of the beta coefficient but checked their statistical significance using p-values. In theory, if the P-value does not exceed 0.05, the sample is statistically significant. The only sample that we can say does not fit the required parameters is the p-value of the beta coefficient of the company IMPL. Linear regression shows us the average change of the dependent variable (return on shares) when changing the independent variable (return on the market) by one.

Table 5 Results of linear regression

Companies	Beta	p-value	Observations
AERO	**0.8460**	0.0036	131
NIS	**0.5401**	0.0000	131
EHNL	**0.9912**	0.0000	131
IMPL	**0.4227**	0.0629	131
DNOS	**0.7518**	0.0065	131
KMBN	**1.0364**	0.0000	131
TGAS	**0.7795**	0.0000	131
JESV	**0.4650**	0.0002	131
	0.7291		

Source: author's calculation

In the last part of the research, we come to the calculation of the expected returns on shares with the help of the CAPM model. We apply the formula given in the chapter on methodology of calculation work. As the CAPM model uses the annual return on shares in its assumptions, we calculated the average annual returns of each share in the sample for the period from 2011 to 2021 using monthly data. The table below shows the results obtained. We note that the basic assumptions of the CAPM model do not apply to the Belgrade Stock Exchange. An additional component of the alpha coefficient was introduced, which represents the deviation of the actual yields from the expected yields or the so-called abnormal yield.

As we can see, the results produced using the CAPM model's assumptions do not demonstrate the predicted relationship between risk and expected returns. The results obtained are the outcome of a negative risk premium. A greater beta index value reduces the return as long as the risk premium is negative which is contradictory to the basis of the model. The average return of selected shares under the CAPM assumptions is 4.34% but actual returns differ.

Table 6 Calculation of CAPM expected returns

	Beta	CAPM return	Annual return	Alpha
Rf	0	**8.49%**		
AERO	**0.8460**	4.21%	7.08%	2.87%
NIS	**0.5401**	5.76%	1.12%	-4.64%
EHNL	**0.9912**	3.47%	-2.43%	-5.90%
IMPL	**0.4227**	6.35%	20.54%	14.19%
DNOS	**0.7518**	4.68%	13.41%	8.72%
KMBN	**1.0364**	3.24%	7.24%	4.00%
TGAS	**0.7795**	4.54%	11.94%	7.40%
JESV	**0.4650**	6.14%	3.84%	-2.30%
AMSO	**0.0340**	8.32%	19.03%	10.71%
LSTA	**0.8920**	3.97%	12.49%	8.52%

Source: author's calculation
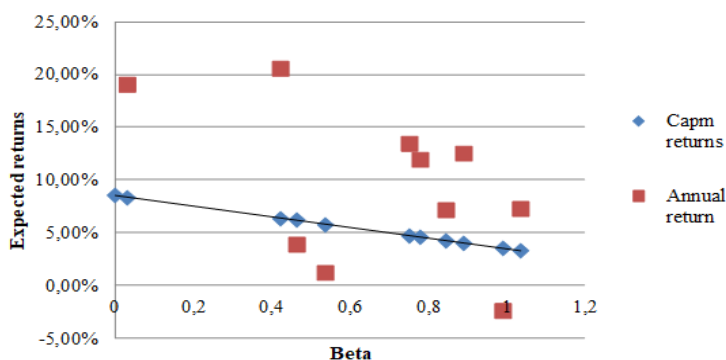
Fig. 3 Security market line of selected shares
Source: author's calculation

The negative slope of the SML line is the result of the negative market premium present in the financial market of Serbia. On the chart, we can see the actual returns of selected stocks and their deviation from expected returns using the CAPM model. Based on this line, we can determine which shares are overvalued and which are undervalued. In theory, if the return is above the SML line then it means the stock is undervalued but if the return is below the line it means the stock is overvalued. This statement coincides with the findings of Baltes, Dragoe & Ardelean (2014) who, using the assumptions of the CAPM model on the Bucharest stock exchange, found that the shares were overvalued because their price was positioned under the Security market line of the market. This represents one of the useful ways to check the real value of shares in the financial market.

After applying the CAPM model to the example of selected shares listed on the Belgrade Stock Exchange, we established that, mainly due to the negative market premium, the CAPM model itself is not applicable as a valid model for valuing shares on the financial market of Serbia which coincides with the findings of Odobasic, Tolusic & Tolusic (2014) which also stated that the assumptions of the CAPM model, because of the negative market premium and the high risk-free rate, cannot be applied to the Croatian market. Also, similar results were obtained by Khudoykulov, Khamidov, & Aktamov (2015) whose findings,

analyzing the Czech Republic, Portugal, Greece, Poland, and Italy, claim that after CAPM model testing it was determined that high returns did not equal high beta. For that reason, the model was not adequate for the five countries' stock exchange markets. Other studies employing the sample of 33,301 US stock observations using data from 1991 to 2012 found that the Fama and French model (ex-ante FF3M) offers a better explanation of the dispersion of the implied cost of equity observations than the Capital Asset Pricing Model (CAPM) and that there was a significant average absolute difference between the cost of equity estimates of the two models (Mishra, Thomas, and O'Brien, 2018). The actual application of the ex-ante FFM model on the capital market of Serbia can be the subject of future research in addition to the APT model as a potential predictor of future share prices.

In addition to the CAPM model, the so-called Arbitrage model (APT) is widely used in the valuation of shares, which, unlike the CAPM model, takes into account various other variables in the analysis of the value of shares. The underlying premise of CAPM is fairly difficult to accept when taken literally. Contrarily, APT is slightly less demanding than CAPM in terms of fundamental presuppositions, but it is significantly less precise in its outcomes because it does not identify the model's input variables (Brandimarte, 2017). In the basic assumptions of the CAPM model, we noticed the application of the beta coefficient, which is a measure of systemic risk, or that risk that cannot be eliminated by diversification, which, together with the market premium, is used to value shares. An alternative to this model is the APT model, which in its application takes more dependent variables that can have an impact on price formation. The APT model mainly takes into account macroeconomic factors such as GDP (Gross domestic product), unemployment rate, inflation rate or CPI (Consumer price index), external debt as well as certain internal factors such as trading volume on the stock exchange itself.

Table 7 Correlation model

	BelexLine
BelexLine	1
Trading Volume	**0.70383886**
GDP	0.462281296
GDP per capita	0.526415086
Unemployment (%)	**-0.916047487**
Gross external dept	0.557048549
CPI	**0.797684042**

Source: author's calculation

In the analysis, we take exactly these factors collected for the period from 2011 to 2021, and, using correlation methods, we establish the connection of certain variables with the price movement of the BelexLine stock market index. In Table no. 7 we observe a significant correlation between the CPI index and the unemployment rate with index price movements. In the case of the CPI index, there is a positive correlation, while there is a negative but strong correlation with the unemployment rate. There is also a noticeable positive correlation between trading volume and share price growth. With the help of the analysis, we notice that the prices of shares on the Belgrade Stock Exchange are influenced by other factors. Since the analysis of these factors does not represent a problem of this research, we suggest that future deeper analysis of the effects of these factors can contribute to the establishment of a more precise model of the predictability of stock valuation on the Belgrade Stock Exchange.

5. CONCLUSION

Using the assumptions of the CAPM model, in this study we tried to test its actual applicability on the example of selected shares listed on the Belgrade Stock Exchange. Using a long time series, we aimed for the greatest possible precision of the model itself. It was determined that there is a negative market premium on the financial market of the Republic of Serbia, which means that it pays more for investors to invest money in bonds (as a representative of risk-free return) than in shares listed on the stock exchange. Due to the violation of this assumption of the CAPM model, which states that the market premium represents the market return above the risk-free market, we must conclude that the applicability of the CAPM model as a predictor of future stock returns is not valid. The Serbian financial capital market is still an emerging market with a small number of shares in circulation and a small volume of total transactions. We noticed that the actual stock returns in the sample differed significantly from those assumed by the CAPM model. Also, based on the obtained results, we could conclude that the biggest limitation of this research is the examination of the variable covered by the CAPM model. The significance of the research is reflected in the knowledge that the basic assumptions of the CAPM model cannot be applied in the process of predicting future returns of shares in the Serbian capital market. Research is primarily intended for potential investors in shares on the Belgrade Stock Exchange, firstly to understand the application of the CAPM model, and secondly to recognize the incompleteness of the model itself in the valuation of shares on the Serbian capital market. As it was discovered in the study that the CAPM model has certain limitations mentioned earlier in the research, for future research it is suggested to apply the APT (arbitrage pricing theory) model in the assessment of the movement of stock returns, as well as the research of the ex-ante FF3M (Fama & French) model, which was shown in previous studies to be more precise.

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ISPITIVANJE PRIMENLJIVOST CAPM MODELA KORIŠĆENJEM ODABRANIH AKCIJA KOJE SE KOTIRAJU NA BEOGRADSKOJ BERZI

Jedan od osnovnih vidova procene portfolija kao i vrednovanja pojedinačnih akcija preduzeća je CAPM (Capital Asset Pricing) model, koji u svojoj analizi koristi dobro poznatu meru sistemskog rizika, a to je beta. CAPM model u svojoj analizi koristi vezu između mere sistemskog rizika (beta) i očekivanog tržišnog prinosa. Rukovodeći se ovim modelom, u ovom istraživanju izvršena je analiza mesečnih prinosa odabranih akcija na Beogradskoj berzi u periodu od 2011. do 2021. godine. U istraživanju je beta koeficijent odabranih akcija izračunat uz pomoć kovarijanse tržišnog prinosa i prinosa akcija. Rezultati i njihova statistička vrednost potvrđeni su testom linearne regresije. Ostatak istraživanja testira primennjivost CAPM modela na odabrane radnje i na isti način se izvodi SML (linija tržišta bezbednosti), koja predstavlja grafički prikaz modela. Istraživanje je pokazalo da osnovne pretpostavke CAPM modela nisu primenljive kao prediktor budućih očekivanih prinosa odabranih akcija na Beogradskoj berzi zbog raznih drugih elemenata koji utiču na kretanje cena i prinose odabranih akcija koje nisu obuhvaćene modelom.

Ključne reči: CAPM model, Beta koeficijent, Beogradska berza, BelexLine

Original Scientific Paper

CONSUMERS' KNOWLEDGE OF PRODUCTS WITH GEOGRAPHICAL INDICATIONS IN SERBIA

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Abstract. *The main purpose of this study is to shed light on consumers' knowledge of geographical indications in Serbia. We therefore present the results obtained from a consumer survey on a sample of 806 respondents in the territory of Serbia. Differences in consumers' knowledge of geographical indications as well as in the self-perceived level of knowledge of GI food were tested according to several socio-demographic criteria. The results showed that there are significant statistical differences in gender, age, and level of education regarding consumer knowledge of GIs. In addition, the respondents indicated a low level of knowledge about the GIs, qualities, benefits, and method of production of these products, as well as the existence of an adequate control system. As consumers consider themselves insufficiently informed, this finding suggests that it is necessary to undertake actions that will contribute to the consumers' education and information. Based on the obtained results, recommendations useful for marketing managers, decision-makers, agricultural producers as well as future research are given in the paper.*

Key words: *geographical indications, consumers' knowledge, food marketing*

1. INTRODUCTION

In recent years, the concept of marketing traditional and geographically labeled products has gained importance due to the increasing consumers' desire to consume high-quality food, preserve the cultural and historical heritage and support the local economy (Caputo et al., 2018). From the consumer's point of view, this growing demand for local and regional food can be seen as a counter-trend against the globalization of industrially

produced food trade (Teuber, 2011). The generated growing demand is reflected in an increasing number of products registered in accordance with EU Regulation no. 510/2006 and efforts at the national and international level to encourage product protection either as a Protected Designation of Origin (PDO) or a Protected Geographical Indication (PGI).

In order to preserve diversity, authenticity, and local identity, regional products have been supported by European protection since 1992 (EU Regulation 2081/92, EU Regulation 1151/2012). Geographical indications reflect the link between the product and the territory, preventing misleading or imitation of the registered name and ensuring consumers that the product is authentic (Török et al., 2022) and has the quality inherent to the origin. GIs have been recognized as a tool to encourage rural development, supporting localized agri-food systems and family farming in the context of globalized food markets (Van Caenegem & Cleary, 2017). Geographical indications can increase producer incomes and contribute to local economic development, but the extent to which they do so depends on the nature of consumer demand. Additionally, the information provided by labels gives consumers the opportunity to make an informed choice if they are familiar with the meaning of the label itself (Hartman et al., 2019). Thus, geographical indications have become one of the most commonly used tools for product valorization with limited geographical origin (Vandecandelare, et al., 2009), as well as strengthening the commercialization and promotion of domestic agricultural and food products.

European consumers largely support the principles on which GIs are based. This is supported by the information that more than half of EU citizens choose food that originates from the appropriate geographical area and that has a special label that guarantees the product quality (European Commission, 2020). Today, the sales value of these products has achieved 74.8 billion euros (Török et al., 2018).

The provision of new production alternatives in the economic development in rural areas of Serbia is of particular importance. In Serbia, in areas that are not suitable for industrial development, but are open to the improvement of agriculture, increasing the production of traditional food represents a good opportunity for the local economy. The production of traditional products by small enterprises without extensive technology has been shown to be extremely effective in promoting sustainable agriculture and responding to consumers' growing interest in healthy natural food products (Lambarraa-Lehnhardt et al., 2021).

Consumer knowledge about food products is an important determinant of choice in the purchasing process. Knowledge of geographical indications is considered one of the drivers for consumers to engage in the intended behavior (Mitić & Gligorijević, 2015). When it comes to special categories of products, such as food with geographical indications, consumers will not buy them if they consider them to be of poor quality or unsafe for health (Sääksjärvi et al., 2009). Consumers can only be expected to purchase GI food over conventional ones if they have awareness and knowledge about these products and believe that the specific characteristics justify the higher prices. Without specific knowledge, a consumer is likely to buy food only occasionally, which reflects random fluctuations in his buying behavior rather than a consistent food preference (Sääksjärvi et al., 2009). A relatively low level of knowledge and acceptance of geographically labeled products among consumers represents a special market challenge. Therefore, the preferences and knowledge of consumers according to established labels are decisive components in determining the success of these products on the market (Lambarraa-Lehnhardt et al., 2021).

In the case of labeled products, previous research has shown that consumers have unclear and inadequate knowledge about their definition and characteristics, although an

increasing number of these products are available to consumers (Sääksjärvi et al., 2009). Also, research has shown that Greek consumers have inadequate knowledge about the labels of certified products, which affects their intention to purchase them (Fotopoulos & Kristallis, 2001). Additionally, EU certification labels are the main motive in the purchasing process for Italian consumers with excellent knowledge, according to Vecchio and Annunziata (2011), whereas consumers with insufficient knowledge base their decisions on the product's low price and attractive appearance. According to the research of Wilson (2002), Italian, Greek and French respondents are more familiar with the system of designations of geographical origin compared to respondents in Northern European countries. Consumers from Northern European countries have less knowledge about the protection of traditional regional food products and are less interested in specific product attributes related to the local environment and origin.

The aim of this research is to determine the perceived knowledge of consumers regarding geographical origin labels in order to consider the possibilities of creating appropriate channels of marketing communications and increasing the offer of these products on the market. Furthermore, the aim is to provide a better understanding of consumer knowledge regarding the existence of significant differences between the socio-demographic characteristics of respondents. The research is of great importance for agriculture producers and managers in order to identify what consumers know about food with GIs and how to identify customers who have different predispositions to purchase this group of products. Given that no empirical research has been conducted to examine the relationship between the multidimensional construct of consumer knowledge of origin-labeled products and labeling systems and other important constructs in marketing, this study aims to fill in this gap in the literature by specifying the extent of consumer knowledge of geographically labeled food.

2. LITERATURE REVIEW

2.1. Products with geographical indications in Serbia

In Serbia, the protection of the geographical origin of agricultural and food products is regulated by law, and a unique database of products and registered producers has been defined. The procedure for labeling products and obtaining legal protection is defined by the Law on the Indications of Geographical Origin (Official Gazette RS, no. 18/2010; 44/2018). This Law is harmonized with the Lisbon Agreement on the Protection of Names of Origin, to a large extent with EU regulations, GATT (General Agreement on Tariffs and Trade), WTO (World Trade Organization), World Intellectual Property Organization (WIPO) standards and requirements of the Stabilization and Association Agreement between the European Communities and their member states, on the one hand, and the Republic of Serbia, on the other hand. The Law on the Indications of Geographical Origin regulates the method of acquiring and protecting the rights of the label, the protection procedure and the procedure for registering the mark of geographical origin, the method of acquiring the status of an authorized user of labels, the content, and scope of the rights of the authorized user, as well as termination of the status of the authorized user of the mark. According to the official definition of the Intellectual Property Office, the designation of geographical origin combines two similar terms: protected designation of origin and geographical indication. The label of traditional specialty guaranteed is not regulated by this Law, so a registration of this type of label is not even possible at the national level.

The protected designation of origin refers to agricultural and food products that are produced, processed, and prepared entirely in a certain geographical area, a certain place or country, whose quality or characteristics are essentially or exclusively attributed to a certain geographical environment with its inherent natural and human factors (ZIS, 2022). On the other hand, a protected geographical indication describes agricultural and food products closely related to the territory of a certain country, region, or locality from that territory, where certain quality, reputation or other characteristics of the product can essentially be attributed to its geographical origin (ZIS, 2022). According to the European Commission, designations of geographical origin contribute to the sustainable use of local resources, the protection of natural and social heritage, tradition, and culture, the stabilization of living standards, the regeneration of villages, the increase of income of local producers, the development of gastro tourism and rural diversity (European Commission, 2020).

In our country, the acquisition of intellectual property rights is carried out in interaction with the competent institutions for protection and certification, namely the Institute for Intellectual Property and the Ministry of Agriculture, as well as institutions at the local level that use labels as a tool to encourage rural development. In addition, the Rulebook on the form and content of the designation of geographical origin, as well as on the method of controlling the labeling of agricultural and food products with the designation of geographical origin ("Official Gazette RS", no. 92/2012; 19/2013) defined the form and content of two types of control stamp, ensuring that agricultural and food products with GIs are recognizable on the market. Products marked with a control stamp are subject to official control carried out in accordance with the Law regulating food safety. Control stamps are a guarantee to consumers that the product originates from a certain area and has a specific quality or characteristics associated with the geographical origin.

2.2. Awareness of geographical indications in Serbia

The Republic of Serbia has a great variety of traditional and autochthonous products, but there is a small number of registered and protected products at the national level. According to the data of the Institute for Intellectual Property in the Republic of Serbia, 79 products are currently protected, of which 53 products have a protected designation of origin, and 26 products have a protected geographical indication (ZIS, 2022). During the last decade, there has been an increasing demand for traditional and handmade products, strictly linked to their geographical origin, and distinguished by specific characteristics making them worthy of protection and differentiating them from similar products created in the industrial process of production (Aquilanti et al., 2013). Autochthonous products in Serbia have a great reputation among consumers due to their geographical and climatic factors, local production practices, as well as cultural and historical heritage. The current state of the domestic market for products with GIs is characterized by rather difficult development with slow tendencies due to the lack of organizational structure in production, promotional activities, and the selection of appropriate channels of marketing communications. In order to increase the consumption of these products, it is necessary to highlight the importance of labels in terms of local community development, the income of small producers, contribution to the rural economy, and overall sustainable development.

Scare studies (Giraud et al., 2013) on consumer preferences in the territory of the Western Balkans indicate that the majority of consumers from these territories do not share preferences of their colleagues in Western countries directing their preferences to industrial products sold

in supermarkets. Although according to Alboi and Voicilas (2014), consumers in Serbia have a positive attitude towards the production and commercialization of traditional food products, only a small percentage of the population values traditionally produced food. Due to insufficient promotion of GI products and lack of knowledge (Pinna et al., 2017), the consumers' ability to identify traditional and locally produced food is very weak (Filipović, 2019). On the other hand, from the consumer's point of view, the question arises of the readiness of the domestic market to use this market potential, as well as whether, despite motivation to consume these products, there is the purchasing power of the population that can realize higher consumption.

A literature review (Stojanović & Barjolle, 2012; Likoudis et al., 2015; Vecchio & Annunziata, 2015) found that the socio-demographic characteristics (gender, age, income, education level and household size) of respondents influence the perception of consumer knowledge as well as higher consumption of these products. Therefore, previous studies have shown that gender influences the behavior of purchasing GI products. The results of the research by Stojanović and Barjolla (2012) and Amuquandoh and Asafo-Adjei, (2013) point out that members of the male gender are more inclined to consume traditional food. On the other hand, women tend to be more open and interested in information about GI foods (Vecchio & Annunziata, 2015). Women are more attached to labeled products because such products give them a guarantee of verified quality and safety (Skubic et al., 2018). Such outcomes may result from the fact that women purchase groceries and food products for their families before men. As a result, the hypothesis was defined as follows:

H_1: There are statistically significant differences between gender and respondents' knowledge about products with a geographical indication

The age of the respondents is a statistically significant characteristic for consumers regarding products with GIs (Goudis & Skuras, 2020). According to research by Fotopoulos and Krystallis (2003), older and highly educated consumers, as well as those with high incomes, have a greater preference for these products. Regarding knowledge of PDO/PGI labels, the most knowledgeable age group of respondents belongs to the group between 25-50 years old (Wilson, 2002). Additionally, Velčovská (2018) points out that the recognition of at least one label is slightly higher among younger respondents who belong to the 15-39 age group. On the other hand, the research of Stojanović and Barjolle (2012) confirms the existence of a significant statistical difference in the age of respondents according to the consumption of traditional food, and that this group of consumers includes respondents who are slightly less than 50 years old. As a result, the following hypothesis was proposed:

H_2: There are statistically significant differences between age and respondents' knowledge about products with a geographical indication

Households with higher incomes tend to buy more products with GI products, which is confirmed by the research of Fotopoulus and Krystallis (2003) who found that Greek consumers with higher incomes prefer quality schemes in the case of buying cheese, ham, and honey. This study supports the findings of Stojanović et al. (2013), who points out that consumers with a higher level of income purchase more GI products. However, given that GI foods are more expensive than conventional food products, it would seem likely that higher-income consumers would be more knowledgeable about traditional food products since they are able to purchase them with fewer financial barriers than low-income consumers. As a result, the following hypothesis was proposed:

H_3: There are statistically significant differences between income and respondents' knowledge about products with a geographical indication

Education is another socio-demographic characteristic of consumers that is considered important when purchasing products with GIs. Previous research has shown that socio-economic groups with a higher level of education scored better knowledge about nutrition and traditional products compared to socio-economic groups with a lower level of education (Bogue et al., 2005). The importance of education as a consumer characteristic also indicated that highly educated respondents tend to buy locally produced food (Skubic et al., 2018). Previous research is confirmed by the research of Sanchez-Villegas et al., (2003) confirming a statistically significant connection between a higher level of education and higher consumption of these products. In accordance with the above, the following hypothesis was proposed:

H_4: There are statistically significant differences between education and respondents' knowledge about products with a geographical indication

3. METHODOLOGY

3.1. Sample

The research was conducted in the period from the beginning of April to the beginning of June 2021 based on a structured questionnaire. The research used a convenient (quota) sample of selected respondents across the country. Based on the administrative division of Serbia into 4 regions, and based on the data of the Statistical Office of Republic of Serbia on the number of adult citizens the required sample size within each region was defined. The data was collected through an online questionnaire and distributed to respondents via social networks (Facebook groups and LinkedIn) directly on e-mail or by personal interviewing of selected respondents. Questionnaires were distributed to adult respondents using the snowball sampling method; respondents were given a questionnaire along with a cover letter asking them to forward it to their friends and family members of various demographic profiles. A total of 806 valid and complete fulfilled questionnaires were collected.

By analyzing the sample, it was determined that 315 (39.1%) male persons, 486 (60.3%) female persons and 6 (0.6%) persons who did not want to identify themselves participated in the research. The majority of respondents (36.8%) belong to the age category between 25 and 44 years old, while regarding the level of education, the highest percentage of respondents has a secondary vocational education, that is, completed a four-year high school (44.7% of respondents). The majority of respondents earn monthly income between 90,001 and 120,000 RSD (20.1%) (table 1).

3.2. Research instrument

In the research, a structured online questionnaire was used as an instrument. The questionnaire covered a large number of questions, among which the following were singled out for the purposes of this research: respondents' perceptions regarding the determination, characteristics and advantages of geographical origin designations and perceived consumer knowledge about the labeling system, the method of production of products with designation of origin and the existence of a certification body responsible for the control process of these products. The scales for measuring consumer knowledge about products with a geographical origin label were defined on the basis of scales from previous research in this area. Respondents were asked to express their degree of agreement with regard to perceived knowledge using a Likert scale of 1 to 5 (where 1 indicates "strongly disagree" and 5 "strongly agree").

Table 1 Socio-demographic characteristics of the respondents

Variables		%	SV*	SD*
Gender	Female	60.3	1.615	-
	Male	39.1		
	I can't identify myself	0.6		
Age	18-24	10.3	3.628	1.599
	25-44	36.8		
	45-64	35.3		
	> 65	17.6		
Level of education	Unfinished elementary school	1.1	4.476	1.053
	Completed elementary school	4.2		
	Completed high school	44.7		
	Completed high school or college	33.5		
	Completed master's or doctoral studies	16.5		
Income (RSD)	< 30000	8.2	3.832	1.599
	From 30001 to 50000	17.7		
	From50001 to 70000	15.8		
	From 70001 to 90000	18.7		
	From 90001 to 120000	20.1		
	> 120001	19.5		

n=806; *SV=Mean value; SD=Standard Deviation

Source: Authors' calculation

Additionally, respondents were asked to assess their level of familiarity with the designation of geographical origin (measured by the question: In your opinion, are you familiar with the concept of designation of geographical origin?). Additionally, the socio-demographic features that are important for this research are gender, age, level of education, and monthly income of the respondents.

3.3. Data processing

In the data analysis, descriptive statistics and analysis of variance (ANOVA) were used in order to test the difference in consumer knowledge according to labels on food products according to socio-demographic features. Data were analyzed using the Statistical Package for Social Sciences software (IBM SPSS Statistics 21.0).

4. RESEARCH RESULTS WITH DISCUSSION

Consumer awareness of products with GIs is an important antecedent of food products knowledge. It is necessary to examine whether consumers are aware of the labels of origin and whether they understand their meaning. In the first phase of the research, the familiarity of consumers with products with a geographical origin label was examined, i.e the percentage of potential and existing consumers who were aware of the existence of this label. It was found that the majority of the respondents (85.1%) has developed awareness and are familiar with the concept of designation of origin, which is considered a very good indicator in comparison with previous research in this area.

Although it has been established that consumers are aware of labeling, the next step is to determine consumers' actual knowledge of label meaning, certification, and labeling procedures.

Table 2 presents the results regarding the characteristics of labels that consumers consider important and the extent to which these labels in the domestic market fulfill those characteristics. According to the respondents, the guarantee of the region of origin is the most important feature of the geographical indication (SV=3.84), while the statement that products with GIs have more nutritional value than other products received the lowest average score (SV=2.55). The expressed views on the labels' validity and benefits were evaluated differently. Respondents are uncertain whether products with a label of origin contain more nutrients than conventional foods, but the guarantee of origin and place of production is highly ranked and can be considered a significant characteristic when purchasing these products with added value.

Table 2 Distribution of general consumer perceptions of the importance of GI characteristics

Characteristics and meaning of the GIs	SV	SD	Frequency (%)				
			1	2	3	4	5
The label is an indication of a more expensive product	2.76	1.298	21.2	22.1	28.5	15.3	12.9
The label guarantees compliance with regulations and standards	3.57	1.245	6.9	14.1	24.2	24.6	30.1
The label has a clear logo, easy to recognize	3.57	1.181	6.5	11.5	27.4	28.2	26.4
The label indicates the attractiveness of the product	3.26	1.232	10.9	14.6	30.6	25.1	18.7
The label is part of the producers marketing activity	3.72	1.183	5.3	11.0	22.5	28.3	32.9
The label is self-explanatory	3.59	1.134	5.3	10.5	29.7	28.9	25.6
The label is a guarantee of product quality	3.43	1.300	10.5	13.9	24.4	24.4	26.7
The label is a guarantee of tradition and production methods	3.61	1.277	8.6	11.8	21.5	26.1	32.1
The label is a guarantee of the region of origin	3.84	1.256	6.1	10.9	18.7	21.3	42.9
The label is a guarantee of the place of production	3.79	1.243	6.6	10.3	19.2	24.9	39.0
The label is an indicator of reliability	3.43	1.248	8.8	14.3	26.3	25.8	24.8
Labeled products have more nutrients	2.55	1.298	27.4	24.2	25.4	12.3	10.7
Labeled products are better looking	2.74	1.292	22.2	21.7	28.2	16.1	11.8

N =806; 1-I completely disagree; 5-I completely agree;
SV=Mean value; SD=Standard Deviation; Kronbah α= 0,905
Source: Authors' calculation

In addition to consumer attitudes toward the characteristics of GI products, respondents were asked to rate their level of knowledge about the labeling system. In terms of knowledge self-assessment about the method of food production, their quality and the possibility of recognition, the analysis of the answers has shown a low level of respondents' knowledge (table 3). Respondents completely or partially disagree (63.5%) that they have the skills and knowledge about the production method, the benefits of these products (60.3%), the quality (58.1%), and the ability to distinguish products from geographical origin of organic and other products (55.2 %).

Table 3 Distribution of respondents' knowledge responses

	SV	SD	Frequency (%)				
			1	2	3	4	5
I consider myself to have enough knowledge about the production methods of products with GIs	2.11	1.1381	38.6	27.9	21.8	6.9	4.7
I consider myself to have sufficient knowledge about the benefits of GI products	2.28	1.1782	32.8	27.5	23.4	11.2	5.1
I consider myself to have sufficient knowledge about the qualities of GI products	2.31	1.1886	32.8	25.6	25.4	10.8	5.5
I consider that I can distinguish GI products from organic and traditional ones	2.44	1.2856	31.4	23.8	22.8	13.5	8.4

N =806; 1-I completely disagree; 5-I completely agree;
SV=Mean value; SD=Standard Deviation; Kronbah α=0,932
Source: Authors' calculation

Control and certification of products with GIs are crucial to consumer trust in the protection system, given that they guarantee control and confirmation of quality by competent institutions. Respondents were asked about the existence of a special certification body for the certification and control of labeling processes and labeled products. The interpretation of the results indicates that consumers have a low level of knowledge, as more than half of the respondents (55.1 percent) responded that it is not certain that our country has a special regulatory body responsible for the implementation of control and certification of products with GIs. Another group of respondents recognize the existence of the control system, but consider they do not have sufficient knowledge of how these institutions function (37.6 percent), while only 3.7 percent stated that they were informed about the competencies and activities of the control and certification authorities. A small percentage (3.6 percent) of all respondents believe that competent authorities, as well as the labeling control and certification system, do not exist.

The research hypotheses were then tested, specifically the presence of statistical significance between the selected socio-demographic characteristics and consumers' perceived knowledge of the quality, benefits, and production method of the labeled products. Based on the F-test, gender ($p \leq 0.05$), age ($p \leq 0.01$) and education ($p \leq 0.01$) had a statistically significant influence on consumer knowledge (table 4).

Table 4 ANOVA at the 95% significance level for consumer knowledge of products with GIs

Variables	Type III sum of squares	Degrees of freedom	The middle of the square	F	Sig.	Partial Eta Square
Model	74.855[a]	17	4.403	3.914	.000	.078
	148.260	1	148.260	131.773	.000	.143
Gender	8.727	2	4.364	3.878	.021	.010
Age	29.027	5	5.805	5.160	.000	.032
Education	30.347	5	6.069	5.394	.000	.033
Income	6.815	5	1.363	1.211	.302	.008
Error	886.592	788	1.125			
Total	5169.938	806				
Corrected Total	961.447	805				

Source: Authors' calculation

As the previous table shows, there are significant differences in the knowledge of male, female consumers and those who can not identify themselves regarding labels on food products, supporting hypothesis H_1. Based on the LSD test, it was determined that males have statistically more knowledge and are better informed about the method of production and preparation of products with GIs and their quality ($p \leq 0.05$) compared to females and those who can not identify themselves. Furthermore, age, as a selected characteristic of the respondents, has a positive influence on consumer knowledge about products with GIs, supporting hypothesis H_2. Older consumers in the 55-64 age category have more knowledge about products with a label of origin compared to younger consumers. More precisely, younger consumers who belong to the age categories of 18-24 and 25-34 years, have less knowledge about products GIs compared to other age groups. A significant statistical difference was identified between the level of education of the respondents and the level of knowledge, supporting hypothesis H_3. The results of the LSD test show that respondents who have completed high school or college have more positive attitudes and more knowledge than respondents who have not completed primary school, but also than those who have completed secondary school. Additionally, respondents with completed primary school have a statistically higher level of knowledge of the marking system compared to the group of respondents with incomplete primary school. Monthly income had no statistically significant effect, indicating that there are no differences in income and perceived consumer knowledge, thus rejecting hypothesis H_4.

The obtained results suggest that consumers have difficulties in recognizing and identifying the characteristics and quality of products that are in the system of geographical indications, as well as the benefits that these products provide. The identified lack of knowledge is due to a lack of information and/or its unavailability to consumers.

5. CONCLUSIONS AND RECOMMENDATIONS

Profiling consumers with a desire to consume food with an origin label can be the first step toward increasing consumption. Product knowledge and trust are regarded as the most important marketing factors influencing consumer behavior because they reduce complexity and uncertainty when making a purchase decision. The research provided insight into the level of perceived consumer knowledge about the characteristics of the geographical origin designation, the method of production, the labeling system and the existence of a certification body. According to the findings of the study, consumers have relatively little knowledge of geographical indications, but they are aware of their existence. If consumers do not understand what the labels represent and the quality of these products, the label cannot assist them in making an informed decision.

The knowledge gap shown by consumers is increased by the difficulty in defining the link between labels and products: the consumer is not able to identify products with a geographical indication and those without. Furthermore, undeveloped product certification and labeling schemes contribute to a lack of market knowledge of these products.

The obtained results confirm the importance of defining appropriate actions and strategies for the rationalization of methods of conveying information about product quality marks and marking processes. The recommendation to policymakers is to envisage effective interventions aimed at guaranteeing an adequate transfer of information to the final consumers and to develop campaigns to educate them on the differences between food

products with and without GIs and other characteristics. It is essential that the schemes and standards are transparent enough to allow consumers to understand what they are purchasing, while also simplifying and understanding all information so that they are confident of the benefits they receive for the appropriate quality.

From a managerial perspective, gaining insight into consumer knowledge about traditional foods allows companies to achieve better market segmentation. Given the existence of differences in socio-demographic characteristics, targeting consumers with a high level of knowledge ensures a positive response to promotional offers. The research can also help food producers to identify their target consumers and to provide appropriate information in order to increase their knowledge, and consequently the demand in the market. What is certainly positive for agricultural producers is the fact that the majority of consumers expressed positive views that geographical indications are a guarantee of the region of origin and the place of production. Therefore, the producers' primary aim should be to educate consumers and present their products, i.e. their benefits and distinctive characteristics. The greater consumer preferences are recognized, the higher the benefits for small local manufacturers.

The major findings given in this work have various limitations that should be considered before conducting further research. One of the limitations of the research is the lack of influence of perceived knowledge on the intended behavior of consumers, therefore future research should be focused in this direction. In further research, it is necessary to look at the statistically significant influence between the mentioned socio-demographic characteristics of the respondents and the actual purchase of products with GIs. Another idea is to analyze the differences between defined characteristics and consumer knowledge about traditional food compared to conventional food. Therefore, this research is necessary as a first and more comprehensive step towards synthesizing the attention of researchers to the importance of food labeling problems and the need for further focus on this group of products.

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PERCEPCIJA ZNANJA POTROŠAČA O PROIZVODIMA SA OZNAKOM GEOGRAFSKOG POREKLA U SRBIJI

Cilj istraživanja jeste analiza percipiranog znanja potrošača o oznakama geografskog porekla u Srbiji. U tu svrhu, prezentovani su rezultati istraživanja spovedenog na uzorku od 806 ispitanika na teritoriji Srbije. Statistička analiza obuhvatila je analizu percipiranog znanja o proizvodima sa oznakom geografskog porekla kao i testiranje razlika u znanju ispitanika prema oznakama na hrani, uzevši u obzir socio-demografska obeležja. Rezultati su ukazali da postoje značajne statističke razlike pola, godina starosti i nivoa obrazovanja u pogledu znanja potrošača o oznakama porekla. Dodatno, ispitanici su pokazali nizak nivo znanja o oznakama geografskog porekla, kvalitetu, koristima i načinu proizvodnje ovih proizvoda, kao i postojanju adekvatnog sistema kontrole i sertifikacije. Kako potrošači sebe smatraju nedovoljno informisanim ovakav nalaz sugeriše da je potrebno preduzeti akcije koje će doprineti edukaciji i informisanju potrošača. Na osnovu dobijenih rezultata, u radu su date preporuke korisne za marketing menadžere, donosioce odluka, poljoprivredne proizvođače kao i buduća istraživanja.

Ključne reči: oznake geografskog porekla, znanje potrošača, marketing prehrambenih proizvoda

Review Paper

CHANGES IN FISCAL DEFICIT AND PUBLIC DEBT OF THE REPUBLIC OF SERBIA DURING THE COVID-19 PANDEMIC PERIOD

UDC 336.02:[616.98:578.834

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Abstract. *The aim of this paper is to consider the nature of changes in the fiscal deficit and public debt of the Republic of Serbia and propose measures to reduce them, based on the analysis of selected statistical and academic sources. The fiscal deficit and the public debt of the Republic of Serbia constitute the subject determination of the paper. After presenting certain effects of the COVID-19 pandemic, the authors investigate: the causes of the change in the fiscal deficit and public debt of the Republic of Serbia; the impact of the COVID-19 crisis on the fiscal deficit and public debt of the Republic of Serbia; and the activity of the government in terms of reducing the fiscal deficit and public debt of the Republic of Serbia. The knowledge that is the result of this research should: contribute to the improvement of fiscal discipline; enable the determination of factors that make public debt and GDP growth sustainable taking into account fiscal constraints and risks.*

Key words: *GDP, fiscal deficit, public debt, COVID-19 pandemic, fiscal consolidation.*

JEL Classification: H61, H62, H63

INTRODUCTION

From the global economic crisis to the COVID-19 pandemic, weak fiscal sustainability has been demonstrated by both the European Union (EU) and the Western Balkans. Problems such as an increase in the fiscal deficit and public debt, which were generated by the COVID-19 pandemic, have not been completely solved by these countries. During the COVID-19 pandemic, the EU member states did not manage to comply with the rules of the Maastricht Agreement regarding public finances within their national framework, and these rules were constantly revised. In addition, this pandemic has reduced the ability of the Government of the Republic of Serbia to maintain the required level of fiscal deficit and public debt.

In order to reduce the fiscal deficit and the public debt caused by the deficit, it is necessary to identify the causes of its increase and adjust the conduct of fiscal policy accordingly. In addition to internal factors, the impact of external shocks is also important. For example, the COVID-19 pandemic affected all aspects of economic activity, both at the level of individual countries and globally. According to the COVID-19 Index of Economic Vulnerability, the Republic of Serbia belongs to the group of countries with medium risk exposure, due to its high dependence on remittances, but also its inability to respond to shocks due to the reduced potential of the fiscal and banking sectors (Davradakis et al., 2020). Therefore, this pandemic also affected the budget of the Republic of Serbia. The trend of a surplus was interrupted by the COVID-19 pandemic in 2020. A strong fiscal stimulus, along with an expansive monetary policy, mitigated the decline in GDP in 2020 due to the COVID-19 pandemic and declining revenues associated with lower economic activity.

The aim of this research is to provide a deeper insight into: the global effects of the COVID-19 pandemic; the movement of the fiscal deficit and public debt of the Republic of Serbia, before and during the COVID-19 pandemic; measures that have affected their reduction. Getting to know the extent of the impact of this pandemic will be based on showing the dynamics of the fiscal deficit and public debt, both in the Republic of Serbia and in the EU and eurozone countries. The research questions posed in this paper are:

R1. What are the global effects of the COVID-19 pandemic?

R2. What are the causes of the change in the volume of fiscal deficit and public debt of the Republic of Serbia?

R3. How does the COVID-19 pandemic affect the volume of fiscal deficit and public debt of the Republic of Serbia?

R4. What measures contribute to reducing the values of fiscal deficit and public debt of the Republic of Serbia?

The structure of the paper consists of three parts, in addition to the introduction and conclusion. The introduction is a brief overview of the content of the paper. The first part of the paper presents some of the global effects of the COVID-19 pandemic. The second part discusses the causes and changes in the fiscal deficit and public debt of the Republic of Serbia, as well as the impact of the COVID-19 pandemic on their change. The third part analyses some of the measures taken to reduce the deficit and public debt. At the end of the paper, conclusions based on previously analysed quantitative data and academic sources are presented.

1. COVID-19 PANDEMIC – ECONOMIC EFFECTS

By the end of the first week of December 2021, COVID-19 had caused the deaths of nearly 5.3 million people (Wordlometer, 2021a) and the emergence of hundreds of millions of poor people. About 813,000 people died in the United States alone, and about 1.44 million in Europe (Wordlometer, 2021b). Due to this disease, in 2020 the decline of the global economy was 4.3%. The return of global GDP to the level before the COVID-19 crisis is not expected before 2022 (Radisavljević, Milovanović & Đukić, 2021).

Highly developed countries are the most financially capable of enduring the COVID-19 crisis. However, due to the high share of services in the structure of GDP, the economies of these countries showed a relatively low level of resistance to the COVID-19 crisis in 2020. For example, US GDP fell by 3.5% in 2020, its biggest drop since 1946, when it reached 11.6%. The consequences of the spread of this disease in 2020 were especially pronounced in the EU and Eurozone countries. This year, the GDP of EU countries fell by 6.2% while the GDP of Eurozone countries fell by 6.6% (Eurostat, 2021a).

The COVID-19 crisis has not bypassed China, the world's second-largest economy. The closure of this country in the first quarter of 2020, due to the spread of COVID-19 disease, led to a historic decline in its economy of 8.7%. In the second quarter of 2020, China's GDP growth rate had a positive sign of 10% compared to the previous year. However, a significant increase in China's GDP occurred in the second half of 2020. In the third quarter of 2020, China's GDP growth was 2.8%, while in the fourth it was 3%. China is the only major world economy to grow in 2020 by 2.8% (Congressional Research Service, 2021). In 2021, China will successfully prove to the world that it has enough knowledge, money, resilience, and self-confidence to overcome the global consequences of the COVID-19 pandemic.

Despite the measures of national governments, the COVID-19 pandemic spread rapidly not only in 2020 but also in 2021. The end of the first year of the COVID-19 crisis was met by the Republic of Serbia with a 1.1% drop in GDP (Government of the Republic of Serbia, 2021). Only four countries (Ireland, Turkey, Norway and Lithuania) achieved better results in Europe (European Commission. 2021a). Such a small decline in GDP is partly the result of government measures as well as the structure of the economy of the Republic of Serbia. Almost all countries with a large share of agriculture in GDP, which produce less sophisticated products, whose GDP has a small share of services (especially tourism), and which are less integrated into the global economy, feel fewer negative effects of COVID-19 crisis on their GDP.

As governments intensified measures to curb the COVID-19 pandemic, the global economy grew at the fastest pace in four decades in 2021, according to IMF experts - as much as 5.9% (IMF, 2022). However, these experts are aware of the fact that due to the unpredictability of the pandemic, their forecasts are quite uncertain. Despite the measures of governments around the world, it is difficult to expect complete prevention of the spread of COVID-19 disease in 2021 and even in 2022. It is certain that the global economy will recover from this disease in 2021, but it is not certain that its recovery will be complete.

2. FISCAL DEFICIT AND PUBLIC DEBT OF THE REPUBLIC OF SERBIA -
KEY GENERATORS AND THE NATURE OF DYNAMICS

In the period from 2006 to 2022, the fiscal policy of the Republic of Serbia changed its direction from pro-cyclical to counter-cyclical or from expansive to restrictive, and vice versa according to the production gap and fiscal impulse changes (Government of the Republic of Serbia, 2021). Concerning COVID-19 pandemic period, in 2019, fiscal policy was pro-cyclical and expansive, while in 2020 it changed to counter-cyclical and expansive. Since 2021, fiscal impulse is counter-cyclical but restrictive and it is planned to withhold that trend until 2025. On the other hand, by 2017, the fiscal deficit was realized, which was accompanied by an increase in public debt. Public debt reached a record level of 71.2% of GDP in 2015, followed by a declining trend, and only in 2017 did the successful conduct of fiscal policy enable the realization of a budget surplus (Ministry of Finance, Republic of Serbia, 2021).

In addition to the fiscal deficit, GDP growth rates, real interest rates, changes in the real exchange rate and the level of guarantees given significantly affect the projections of the public debt-to-GDP ratio. Such projections, along with a comparative analysis of other factors influencing the occurrence of the debt crisis, can serve as indicative estimates of the probability of a debt crisis in the Republic of Serbia (Arsić et al., 2012, p. 115). In the next part, the causes and dynamics of the fiscal deficit as a predictor of the public debt of the Republic of Serbia will be analysed.

2.1. Causes and dynamics of the fiscal deficit of the Republic of Serbia

Miroljub Labus compares the movement of the fiscal deficit of the Republic of Serbia with the phases of conducting neoliberal, populistic and interventionist policies. During the neoliberal policy phase, which lasted from the fourth quarter of 2000 to mid-2006, a deficit of 1.8% of GDP was inherited and by the end of this phase a surplus of 2.7% of GDP was achieved (Labus, 2020, p. 84). During the populistic policy phase, which lasted from the third quarter of 2006 to mid-2012, there was a significant increase in the deficit. In the phase of interventionist policy, which lasted from the third quarter of 2012 to the fourth quarter of 2018, measures were implemented that led to a reduction in the deficit.

In the period from 2006 to 2008, the Republic of Serbia applied an expansive fiscal policy (Government of the Republic of Serbia, 2021), which was justified by economic reasons, such as encouraging employment and economic activities, as well as combating grey economy. An important lesson about the implementation of such a fiscal policy is that it has had favourable effects in the short term, but has led to an unsustainable fiscal deficit and public debt in the long run.

The Republic of Serbia entered 2008 with a relatively low fiscal deficit, amounting to 2.5% of GDP (Table 1). The situation in the public finances of the Republic of Serbia was quite unfavourable even before the world economic crisis if we take into account the impact of cyclical economic oscillations (production gap) on the fiscal deficit. Growth has slowed, and the share of gross investment in GDP has fallen from 25% in 2008 to 18% in early 2016 (Bartlett, 2019, pp. 147-163). At the beginning of the global economic crisis, GDP and domestic demand fell sharply, leading to a decline in tax revenues and an increase in the fiscal deficit. The two-year freeze on wages and pensions, amid relatively high inflation, increased taxes and reduced transfers to local communities, kept the fiscal deficit relatively low at around 4.5% of GDP during the first two years of the global

economic crisis and was among the lowest in Central and Eastern Europe (CEE) (Arsić, & Randjelović, 2014).

In the period from 2008 to 2012, the fiscal deficit in the Republic of Serbia showed constant growth (Table 1), which led to an increase in public debt and the possibility of jeopardizing macroeconomic stability. Since mid-2011, the government has re-enacted decisions that have resulted in a permanent increase in the fiscal deficit and the pursuit of counter-cyclical expansionary fiscal policies (fiscal decentralization, wage increases) (World Bank, 2020). As a result of these decisions, the fiscal deficit in 2012 reached 6.4% of GDP.

Table 1 Fiscal result of the general government of the Republic of Serbia from 2008 to 2024

Year	Primary deficit/surplus (% of GDP)	Consolidated deficit/surplus (% of GDP)
2008	-1.9	-2.5
2009	-3.6	-4.2
2010	-3.4	-4.3
2011	-3.4	-4.5
2012	-4.7	-6.4
2013	-3.0	-5.1
2014	-3.5	-6.2
2015	-0.5	-3.5
2016	1.7	-1.2
2017	3.6	1.1
2018	2.7	0.6
2019	1.8	-0.2
2020	-6.0	**-8.0**
2021	-2.4	-4.1
estimate for 2022	-1.3	-3.0
estimate for 2023	0.1	-1.5
estimate for 2024	0.6	-1.0
estimate for 2025	1.1	-0.5

Source: Ministry of Finance (2021). *Basic indicators of macroeconomic trends, November 4th , 2021*; Government of the Republic of Serbia (2022). *Fiscal strategy for 2023 with projections for 2024 and 2025* (p. 67).

In order to successfully respond to extremely unfavourable fiscal trends and the growing possibility of a public debt crisis, the Government of the Republic of Serbia began implementing a three-year program of sharp consolidation of public finances at the end of 2014 (Bartlett, 2019, pp. 147-163). The implementation of the measures of this program (temporary reduction of pensions, ban on employment in the public sector and payments to the budget of funds from the reduction of salaries in public companies) enabled the fiscal deficit of 6.2% of GDP in 2014 to be reduced to 1.2% GDP in 2016. Although these measures had positive effects, the problems of public enterprises remained unresolved (Fiscal Council, 2016). In 2017, the fiscal surplus of 1.1% of GDP was realized, for the first time since 2005, thanks to the growth of investments and personal consumption. However, net exports in 2017 remained negative (Jakopin, 2020, pp. 191-208). In 2018, the fiscal surplus was maintained at the level of 0.6% of GDP. In 2019, a deficit of 0.2% of GDP was recorded again, while public debt remained on a

downward trajectory (Table 1 and Table 3). Since 2020, various measures had non-structural and structural effects on fiscal deficit. For example, postponed tax revenues will be collected in 2021 and 2022, but expenses connected with infrastructure projects will be increased due to materials' prices disorders (Fiscal Council, 2022).

2.2. Pandemic COVID-19 as a cause of increasing the fiscal deficit of the Republic of Serbia

At the end of 2020, the fiscal deficit of 8.0% of GDP was achieved at the general government level (Table 1), which is below the rebalance of the planned fiscal deficit of 8.9% of GDP (Fiscal Council, 2020a). In the same year, the primary fiscal deficit was 6.0% of GDP.

For a more complete understanding of the effects of the COVID-19 pandemic on the fiscal deficit of the Republic of Serbia, it is important to identify its movement in the EU and Eurozone countries. According to published Eurostat data, in the Eurozone, the fiscal deficit against GDP increased from 0.6% in 2019 to 7.1% in 2020, and in the EU from 0.6% to 6.8% (Table 2). In all Member States, the share of the fiscal deficit in GDP increased in 2020, with Spain (10.3%), Greece (10.2%), Malta (9.5%) and Italy (9.6%) having the highest rates. It is noticeable that all 27 EU member states, except Denmark, had a deficit of more than 3% of GDP in the state treasury.

The fiscal deficits of the Eurozone and the EU increased significantly in 2020 compared to 2019. This was mainly due to the measures taken in response to the COVID-19 pandemic and the decline in tourism revenues. In 2021, deficit in EU member states decreased and that trend is expected to continue in 2022 and 2023 as COVID-19 measures continue to fade and economic expansion takes over even during future energy crisis (European Commission, 2022a). According to projections for 2022, the deficits in the EU and the Eurozone are expected to halve to around 3.7% of GDP and 3.8% of GDP (respectively), thanks to the continued economic recovery and the gradual abolition of pandemic support measures.

When it comes to the Republic of Serbia, the original budget for 2021 envisaged a general government fiscal deficit of 3% of GDP, while its rebalances planned for this year amount to 4.9% of GDP (Fiscal Council, 2021a). The fiscal deficit of 4.9% of GDP was assessed by the Fiscal Council as anti-crisis. Most of the expenses were incurred due to the elimination of the consequences of the COVID-19 pandemic and the implementation of measures to mitigate them. In case of successful elimination of the consequences of the COVID-19 crisis in 2021, the planned deficit level of 3% of GDP for 2022 (around 1.7 billion euros) can be revised downwards.

The increase in the fiscal deficit in 2020 was primarily due to the health crisis caused by the COVID-19 pandemic, but also due to structural weaknesses in the economy and inadequate economic policy measures. Indicators of economic growth point to the conclusion that the Republic of Serbia is less affected by the health crisis than the CEE countries. Its 0.9% decline in GDP is far less than the average 3.8% decline in GDP in CEE countries (Fiscal Council, 2021a). Due to the smaller decline in economic activity, the Republic of Serbia should have had a significantly smaller fiscal deficit than the CEE countries. However, quite the opposite happened. There are several reasons for such a high deficit. First of all, "helicopter money ", inadequate investment in the health system and irrational management of state-owned enterprises (Air Serbia and EPS) have led to the expenditure side of the 2020 budget of about 2.5 percentage points (Fiscal Council, 2020a).

Table 2 General government deficit/surplus in EU countries from 2019 to 2022, % of GDP

Country	Deficit/Surplus (% of GDP)			
	2019	2020	2021	2022 (estimation)
EU – 27	-0.6	-6.8	-4.7	-3.6
Euro area - 19	-0.7	-7.1	-5.1	-3.7
Belgium	-2.0	-9.0	-5.5	-5.0
Bulgaria	2.1	-4.0	-4.1	-3.7
Czech Republic	0.3	-5.8	-5.9	-4.3
Denmark	4.1	-0.2	2.3	-0.9
Germany	1.5	-4.3	-3.7	-2.5
Estonia	0.1	-5.6	-2.4	-4.4
Ireland	0.5	-5.1	-1.9	-0.5
Greece	1.1	-10.2	-7.4	-4.3
Spain	-3.1	-10.3	-6.9	-4.9
France	-3.1	-8.9	-6.5	-4.6
Croatia	0.2	-7.3	-2.9	-2.3
Italy	-1.5	-9.6	-7.2	-5.5
Cyprus	1.3	-5.8	-1.7	-0.3
Latvia	-0.6	-4.5	-7.3	-7.2
Lithuania	0.5	-7.3	-1.0	-4.6
Luxembourg	2.3	-3.4	0.9	-0.1
Hungary	-2.1	-7.8	-6.8	-6.0
Malta	0.6	-9.5	-8.0	-5.6
Netherlands	1.7	-3.7	-2.5	-2.7
Austria	0.6	-8.0	-5.9	-3.1
Poland	-0.7	-6.9	-1.9	-4.0
Portugal	0.1	-5.8	-2.8	-1.9
Romania	-4.3	-9.3	-7.1	-7.5
Slovenia	0.4	-7.8	-5.2	-4.3
Slovakia	-1.3	-5.5	-6.2	-3.6
Finland	-0.9	-5.5	-2.6	-2.2
Sweden	1.7	-3.7	-2.5	-0.5

Source: Eurostat (2022a); European Commission (2022a).

2.3. Causes and dynamics of the public debt of the Republic of Serbia

Before the world economic crisis, the Republic of Serbia had the lowest public debt in 2008, when it amounted to 28.7% of GDP (Government of the Republic of Serbia, 2021). From 2008 to the end of 2015, public debt was constantly increasing, so in 2015, it reached a record 71.2% of GDP, i.e., it was higher by 42.5 p.p. compared to 2008 (Table 3). An even worse indicator of the state of the public debt of the Republic of Serbia is reflected in the fact that three-fifths of the public debt was of external nature and was exposed to the risk of constant changes in the exchange rate (Bartlett, 2019, pp. 147-163).

Fiscal consolidation measures adopted at the end of 2014 led to a reduction in the primary deficit and a slowdown in public debt growth already in 2015. The reduction of public debt occurred in 2016, a year earlier than envisaged by the arrangement with the International Monetary Fund (IMF). In 2016, a primary surplus of 1.7% of GDP was

achieved, which finally created the conditions for a decline in the share of public debt in GDP (Table 3). This trend continued during 2017, so the primary fiscal surplus of 3.6% of GDP led to a significant reduction in public debt of 10 p.p. of GDP, to 58.6% of GDP. Although restrictive fiscal policy measures were eased in 2019, this did not negatively affect the decline in public debt, which was 52.8% of GDP at the end of this year. From 2015 to 2019, the public debt of the Republic of Serbia was reduced by 18.4 p.p.

Table 3 Public debt of the general government of the Republic of Serbia from 2008 to 2024

Year	GDP growth rate (in %)	The public debt of the Republic of Serbia (% of GDP)
2008	5.7	28.7
2009	-2.7	32.8
2010	0.7	41.4
2011	2.0	44.7
2012	-0.7	54.6
2013	2.9	57.5
2014	-1.6	67.5
2015	1.8	71.2
2016	3.3	68.7
2017	2.1	58.6
2018	4.5	54.4
2019	4.3	52.8
2020	-0.9	57.8
2021	7.4	57.1
estimate for 2022	3.5	54.6
estimate for 2023	4.0	53.1
estimate for 2024	4.0	52.0
estimate for 2025	4.5	50.7

Source: Government of the Republic of Serbia (2022). *Fiscal strategy for 2023 with projections for 2024 and 2025* (p. 67). Public Debt Administration (2021). *Quarterly report on the state and structure of public debt on 30th September 2021.*

The public debt in 2021 decreased but it is still close to the breaking point of 60%. In 2022 it is expected to be 54.6% (Government of the Republic of Serbia, 2022). On the other hand, after overcoming the negative effects of the COVID-19 crisis and implementing fiscal relaxation measures, a period of reduction of the public debt of the Republic of Serbia will follow. The fiscal strategy for the next medium-term period envisages the stabilization of public finances and significantly lower levels of deficits that will return the public debt to the zone of a declining trend. In this regard, the Public Debt Administration will define a medium-term strategy for public debt management based on a transparent lending process in the domestic and foreign markets, reviving the government securities market and reducing risk exposure (especially foreign exchange risk, because it is the higher part of the debt that is denominated in foreign currencies, as much as 70.5%) (Ministry of Finance, 2021). The reduction of the deficit will be accompanied by the GDP growth rate projected for the end of 2022 in the amount of 3.5%, while in the following years it will be around 4%. On the other hand, previous prognosis of economic growth for 2022 was 4.5% and in the following years 5.0%. Due to contemporary trends on the global market, less optimistic prognosis of economic growth is envisaged.

2.4. The COVID-19 pandemic as the cause of the increase in the public debt of the Republic of Serbia

Public debt of the Republic of Serbia in 2020 and 2021 was close to the maximum level defined by the Maastricht Treaty. This is an unsustainably high debt in relation to the level of development of the Republic of Serbia. The most important factors that influenced the development of public debt during 2020 and 2021 are: the level of the total and primary fiscal deficit, additional financing needs and repayment of the due part of the debt. The realized fiscal deficit of 8.0% of GDP (primary deficit of 6.0% of GDP) in 2020 and the fiscal deficit of 4.1% of GDP in the 2021, have influenced the fact that, so far, the declining path of public debt participation reversed (Fiscal Council, 2021a).

It is expected that after two crisis years, public debt control will be established and measures to reduce it will be implemented. Most of the budget deficit in 2020 was financed by borrowing and increasing public debt by issuing Eurobonds and green bonds. If we look at the structure of public debt, the debt denominated in euros dominates, while the rest is in dinars and US dollars. The money from the sale of Komercijalna banka was used to service the debt that was taken at a high-interest rate. In that way, the average interest rate on the debts of the Republic of Serbia was reduced (Government of the Republic of Serbia, 2021). The problem of the relatively high public debt appeared also in 2021. Because of an increasement of interest rates in the world, future growth of public debt is not recommended. In that case, the costs of new borrowing of the Republic of Serbia and refinancing of public debt would be higher, especially because of high borrowing interest rates that are even higher than average interest rates for CEE countries. Therefore, it is envisaged to decrease public spending and consequently debt until 2025 (Fiscal Council, 2022).

The COVID-19 pandemic also affected the dynamics of public debt in the EU and Eurozone countries (Table 4). The share of public debt in GDP in Euro area countries increased from 83.8% in 2019 to 97.2% in 2020, and in EU countries from 77.5% of GDP in 2019 to 90.0% GDP in 2020. Greece and Italy had the highest percentages of public debt in GDP (206.3% and 155.3%, respectively). During the 2021, public debt increased in several EU countries compared to the previous year (Germany, Bulgaria, Czech Republic, Latvia, Malta, Romania and Slovakia). On the other hand, reductions in public debt were recorded in all other member states and future prospects are inclined to further reductions in public debt due to higher interest rates and "snowball effect" caused by it (Eurostat, 2022b).

According to certain forecasts, public debt will reach 87% of GDP in the EU in 2022, while in the Eurozone it will be around 95% of GDP. The reduction of public debt is expected in the next two years. In 2023, public debt would account for 85% of GDP in the EU and 93% in the Euro area (European Commission, 2022b).

Sapir (2020) proved in his research that the low level of public debt before the COVID-19 crisis did not significantly affect the number of losses that EU countries suffered due to this crisis. It should be borne in mind that the Maastricht Agreement defines two criteria relating to the fiscal deficit and public debt of EU countries: 1) that the eligible deficit does not exceed 3% of GDP and 2) that public debt is less than 60% of GDP (Savage, 2001). Nevertheless, the data indicate a completely different state of public finances in the EU, i.e., noticeable non-compliance with these criteria. It is paradoxical that some members of the EU do not respect these criteria, but that all countries that want to become members of the EU are uncompromisingly required to do so. The justification that the COVID-19 crisis is to blame for such behaviour of some EU members does not sound logical. However, the COVID-19 crisis has disrupted the process of managing public

finances in the EU. Namely, in order to improve this process, the EU adopted the architecture of fiscal management (the so-called European Semester) in the period from 2011 to 2013. The objectives of this public finance control mechanism are: 1) to define medium-term plans and bear the consequences of inadequate management of their public finances and macroeconomic instability, and 2) not to repeat the cases of over-indebtedness of Italy and Greece, following the example of Germany and northern European countries in managing their public finances (Greer, & Brooks, 2021). The COVID-19 crisis led to the suspension of this control mechanism, but planning and oversight remained in place.

Table 4 Public debt and GDP growth rate in EU countries from 2019 to 2022

Country	Public debt (% of GDP)				GDP growth rate (%)			
	2019	2020	2021	2022 (estimation)	2019	2020	2021	2022 (estimation)
EU – 27	77.5	90.0	88.1	**87.1**	1.8	-5.9	5.4	2.7
Euro area - 19	83.8	97.2	95.6	**94.7**	1.6	-6.3	5.3	2.7
Belgium	97.7	112.8	108.2	107.5	2.1	-5.7	6.2	2.0
Bulgaria	20.0	24.7	25.1	25.3	4.0	-4.4	4.2	2.1
Czech Republic	30.1	37.7	41.9	42.8	3.0	-5.5	3.5	1.9
Denmark	33.6	42.1	36.7	34.9	1.5	-2.0	4.9	2.6
Germany	58.9	68.7	69.3	66.4	1.1	-3.7	2.6	1.9
Estonia	8.6	19.0	18.1	20.9	3.7	-0.6	8.0	1.0
Ireland	57.2	58.4	56.0	50.3	5.4	6.2	13.6	5.4
Greece	180.7	206.3	193.3	185.7	1.8	-9.0	8.3	3.5
Spain	98.3	120.0	118.4	115.1	2.1	-10.8	5.1	4.0
France	97.4	114.6	112.9	111.2	1.8	-7.8	6.8	3.1
Croatia	71.1	87.3	79.8	75.3	3.5	-8.1	10.2	3.4
Italy	134.1	155.3	150.8	147.9	0.5	-9.0	6.6	2.4
Cyprus	91.1	115.0	103.6	93.9	5.3	-5.0	5.5	2.3
Latvia	36.7	43.3	44.8	47.0	2.5	-3.8	4.5	2.0
Lithuania	35.9	46.6	44.3	42.7	4.6	-0.1	5.0	1.7
Luxembourg	22.3	24.8	24.4	24.7	3.3	-1.8	6.9	2.2
Hungary	65.5	79.6	76.8	76.4	4.6	-4.5	7.1	3.6
Malta	40.7	53.4	57.0	58.5	5.9	-8.3	10.3	4.2
Netherlands	48.5	54.3	52.1	51.4	2.0	-3.9	4.9	3.3
Austria	70.6	83.3	82.8	80.0	1.5	-6.7	4.6	3.9
Poland	45.6	57.1	53.8	50.8	4.7	-2.2	5.9	3.7
Portugal	116.6	135.2	127.4	119.9	2.7	-8.4	4.9	5.8
Romania	35.3	47.2	48.8	50.9	4.2	-3.7	5.9	2.6
Slovenia	65.6	79.8	74.7	74.1	3.5	-4.3	8.2	3.7
Slovakia	48.1	59.7	63.1	61.7	2.6	-4.4	3.0	2.3
Finland	59.6	69.0	65.8	65.9	1.2	-2.2	3.0	1.6
Sweden	34.9	39.6	36.7	33.8	2.0	-2.2	5.1	2.3

Source: Eurostat (2022a); European Commission (2022a).

In addition to the increase in the fiscal deficit and public debt, the consequence of the COVID-19 crisis in 2020 is a drop in economic activity in the EU of 5.9% of GDP. Recovery after this crisis can be monitored based on projections of GDP growth rates in 2022 (Table 4). On the other hand, Cifuentes-Faura (2021) points out that it is necessary to implement an expansive fiscal policy while increasing public debt and respecting the postulates of Kenyanism on the path to the economic recovery of EU countries from the

COVID-19 crisis. In order to reduce supply-side shocks, an expansive fiscal policy would maintain employment levels and reduce the tax burden on companies (Jalles, 2021).

3. MEASURES TO REDUCE THE FISCAL DEFICIT AND PUBLIC DEBT OF THE REPUBLIC OF SERBIA

The speed of the recovery of the Republic of Serbia from COVID-19 will largely depend on the recovery of the EU countries as well as on the movements on the world capital market. Due to the COVID-19 pandemic, the recovery of the economy of the Republic of Serbia in the first half of 2021 was slow. But at the end of the year, instead of the projected growth of the GDP of the Republic of Serbia in 2021 of 6%, it was 7.4% and the prognosis for the following medium term is less optimistic and around 4%. Public debt in 2021 was on the level of public debt in year before (Government of the Republic of Serbia, 2021). Therefore, it is advisable for the Republic of Serbia to base the recovery of its economy to a greater extent on public debt reduction, especially on expenditure side of debt.

The focus of the activities of the Government of the Republic of Serbia should be on reducing the fiscal deficit and limiting the issuance of guarantees. These two variables crucially affect the dynamics of public debt and are under the control of the Government.

In 2021, the Republic of Serbia submitted the medium-term *Program of Economic Reforms for the period 2021-2023* to the European Commission, as part of the dialogue between the EU and the countries of the Western Balkans and Turkey. Although the contraction of the economic sector in 2020, due to the COVID-19 crisis in the Republic of Serbia, was mild thanks to the previously implemented fiscal and monetary reform, the reduction of private consumption and investment and the increase in government spending conditioned the growth of the budget deficit and public debt (Table 5).

Table 5 Budget projections according to *Program of Economic Reforms for the period 2021-2023 of the Republic of Serbia*

Category	2019	2020	2021	2022	2023	Change: 2020-2023
Revenues	42.1	40.3	40.4	40.5	39.7	-0.6
Taxes and social security contributions	36.8	35.8	36.2	36.3	35.6	-0.3
Other (residual)	5.3	4.5	4.2	4.2	4.2	-0.3
Expenditures	42.3	49.2	43.4	42.1	40.7	-8.5
Primary expenditures:	40.3	47.2	41.5	40.4	39.1	-8.1
Gross fixed capital formation	4.9	5.2	5.5	5.6	5.7	0.5
Consumption	16.5	18.7	17.7	17.2	16.7	-2.0
Transfers and subsidies	16.7	19.4	16.3	15.8	15.3	-4.1
Other (residual)	2.1	3.9	2.0	1.7	1.5	-2.5
Interest payments	2.0	2.0	1.9	1.7	1.6	-0.4
Budget balance	-0.2	-8.9	-3.0	-1.6	-1.0	7.9
Cyclically adjusted	-1.0	-8.1	-3.1	-1.7	-1.2	6.9
Primary balance	1.8	-6.9	-1.1	0.1	0.6	7.5
Cyclically adjusted	1.0	-6.1	-1.2	0.0	0.4	6.5
Gross debt level	52.9	59.0	58.7	57.9	56.0	-3.0

Source: European Commission (2021c). *Economic Reform Programmes of Albania, Montenegro, North Macedonia, Serbia, Turkey, Bosnia and Herzegovina and Kosovo*: The Commission's Overview & Country Assessments (Institutional Paper 158).*

After the exclusion of temporary measures for COVID-19 crises effect mitigation, recovery and return of budget balance are expected in the forthcoming period 2021-2023. Revenues will be stable until 2023. The main change is going to be seen in the social contributions due to a prolonged period of payment from 2020 to 2023. Moreover, tax revenues will decrease due to an increment of non-taxable part of the wage. The most important changes are expected on the expenditure side because no extraordinary expenditures will be expected. Savings will be encountered in subsidies, other current expenditures and consumption (European Commission, 2021c. pp. 158). On the other hand, the Government bases its economic reform mostly on expenditures reduction, while it is continuing with fiscal support for recovery from the COVID-19 crisis. Social transfers are also expected to decrease and supporting reforms of pension and wage indexation are following this prognosis. Precisely, pensions are increased by 5.9% and minimum wage by 6.6%. Bigger budgetary expenses are seen in ad-hoc increasements of wages for public employees. Lastly, capital expenditures are planned to have an upward trend, while investments in road and rail building will make its main part. New events on the global market will cause slowing down in capital investments in following medium term period and decrease in foreign direct investments.

The budget deficit for 2021 and the following years are subject to change due to packages for crisis effects mitigation. So plan for 2021 according to the *Economic Reform Programmes for 2021-2023* has been already changed because subsidies for wages, „helicopter money" for citizens, support for the service sector (hospitality and transport) are introduced. Although the government deficit is increased and debt followed the rise, the reduction of debt is expected from 2021. Debt-to-GDP ratio is planned to gradually decrease, 0.3, 0.8 and 1.9 pp from 2021 to 2023. The positive trajectory of GDP is mostly secured by previous fiscal adjustments before the COVID-19 crisis. But one very threatening fact is the large percentage of debt denominated in foreign currencies and exposed to the exchange rates fluctuations. Therefore, firm fiscal policy will be the main basis of sustainable government finances.

Based on the results of research into the causes (strict closure measures, participation of tourism in GDP and quality of public administration) of economic shock during the COVID-19 crisis (Sapir, 2020), it can be concluded that the recovery of public finances in Serbia depends primarily on improving governance mechanism of the state during the implementation of the recovery policy. Gootjes and Haan (2020) point out that most EU countries in times of crisis implement pro-cyclical fiscal policy instead of counter-cyclical because although fiscal plans are acyclical, the final effects in the budget are pro-cyclical. However, the results of their research showed that if the government is efficient, compliance with fiscal rules contributes to the successful overcoming of the pro-cyclical response of fiscal policy to economic trends. It should be noted that during 2020 and the COVID-19 crisis, a countercyclical fiscal policy was implemented in the Republic of Serbia (Government of the Republic of Serbia, 2021).

The basis for pursuing a policy of reducing the fiscal deficit is to replace expensive debt with the cheaper one. This measure was implemented after the process of sale of Komercijalna banka, but in the next period new borrowing is questioned because of interest rates increase (Government of the Republic of Serbia, 2021). The moderate reduction of the fiscal deficit in the coming years aims to leave the possibility of a timely response to external shocks such as the health crisis (Ministry of Finance, 2021). Also, in the coming years, the deficit reduction is expected to be due rather to the slower growth

of public sector wages than the growth of economic activity. The increase of wages in public sector or employing additional labour force in public sector will significantly increase the state budget imbalance (Fiscal Council, 2022). The Fiscal Council does not expect the medium-term Economic Reform Program for the period 2021-2023 to succeed without the adoption of pay grades (Fiscal Council, 2020b). Based on this program, the EU Council suggests that it is necessary to help households and companies in a planned way that will return the deficit to the planned path by 2022. It also supports the control of salaries as a percentage of GDP through the adoption of fiscal rules that will be followed by fiscal policymakers. In addition to the expenditure side of the budget, it is necessary to increase tax revenues by reducing the grey economy, introducing fiscalization according to the new model, and quantifying and publishing financial reports of public companies that increase fiscal risk of the state budget (Council of European Union, 2021).

The policy of reducing public debt and bringing it closer to the limit of 45% of GDP by 2028 depends on increasing indebtedness and efficient use of previous loans, conversion of expensive for cheap loans and good management of fiscal risks (Government of the Republic of Serbia, 2021). The state must stimulate economic growth by increasing investments in infrastructure, especially in communal infrastructure and environmental protection, which have been at a low level for years (Fiscal Council, 2021b).

Of course, several systemic problems were present in the years before the COVID-19 pandemic, such as weakening the rule of law, growing corruption, inequality of economic entities, the inefficiency of public enterprises, high allocations for subsidies and other assistance to state-owned enterprises (guarantees and budget loans), which were pushed into the background by the COVID-19 pandemic. Potential risks are higher when most of the deficit is financed by the government and private sector borrowing rather than remittances and foreign direct investment. Additional risks of public debt increasement such as high interest rates and public guaranties for state companies occurred at the beginning of 2022 (Fiscal Council, 2022). Therefore, it is equally important to have balanced control measures for both revenues and expenses of the government budget.

CONCLUSION

From 2000 to 2021, the Republic of Serbia pursued a different fiscal policy in accordance with changes in conditions on the domestic and foreign markets. Although there are opinions that fiscal policy was neoliberal, populist or interventionist, it was accompanied by a large number of internal and external shocks (world economic crisis, floods, droughts, COVID-19 crisis, etc.) that affected its end effects.

Macroeconomic stability in the Republic of Serbia was preserved during 2020 and the COVID-19 crisis, but in the coming years, it will be a great challenge to maintain it while stimulating economic recovery. Conditions for recovery and reaching the potential level of development will be more difficult than in the period before the COVID-19 crisis because the recovery of developing countries always goes after the recovery of developed countries.

Fiscal consolidation in the Republic of Serbia in the period before the COVID-19 crisis was a necessary condition for eliminating the immediate danger of state bankruptcy and improving macroeconomic stability. However, fiscal consolidation in the Republic of Serbia is still not complete, as the fiscal deficit and the share of public debt in GDP increased

during 2020. In this context, the 2021 budget strikes a balance between supporting economic recovery and maintaining fiscal discipline. Successful implementation of fiscal policy should:

1) lead to an improvement in the structure of public expenditures and reduce fiscal risks in the future, and

2) enable a permanent recovery of public finances of the Republic of Serbia.

In order to reduce public debt in the coming years, it is necessary to significantly reduce the fiscal deficit. This can be achieved through: 1) moderate indexation of salaries and pensions, 2) reduction of subsidies, 3) more successful tax collection, and 4) high level of public investment. Specifically, corrective measures are needed both on revenue and expense's side of the government budget. On the revenue side, measures for tackling down grey economy on the labour market should be considered. Inspections on the regular basis and subsidies for new employees could have significant effect on this problem. On the expense side of the budget, taking control of the public companies spending and guaranties given is the long-term solution to the problem of public finances in the Republic of Serbia. Lastly, unplanned increases in wages and number of employees in public sector led to greater deficit so these *ad hoc* changes in budget should be avoided.

When it comes to the growth of the economy of the Republic of Serbia in 2021, one can talk more about the recovery from the COVID-19 crisis than about the typical growth of the economy. If significant epidemiological restrictions are not applied in the next period and if European economies start to recover quickly, the Republic of Serbia could count on reducing the fiscal deficit and increasing GDP in the medium term. However, there is still no clear answer to the question of how reliable the forecasts for the recovery of the economy of the Republic of Serbia and the EU are. It is important to keep in mind that forecasts of fiscal deficit and public debt are very sensitive to the political situation in the country and changes in fiscal policy. Probably because of that, the forecasts are sometimes wrong with state institutions, as well as the European Commission and the IMF.

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PROMENE FISKALNOG DEFICITA I JAVNOG DUGA REPUBLIKE SRBIJE U PERIODU PANDEMIJE KOVID-19

Cilj rada je da se, na bazi analize odabranih statističkih i akademskih izvora, sagleda karakter promena fiskalnog deficita i javnog duga Republike Srbije i predloži mere za njihovo smanjenje. Fiskalni deficit i javni dug Republike Srbije čine predmetno određenje rada. Nakon prezentovanja određenih efekata pandemije Kovid-19, autori istražuju: uzroke promene fiskalnog deficita i javnog duga Republike Srbije; uticaj Kovid-19 krize na fiskalni deficit i javni dug Republike Srbije; i aktivnost Vlade na planu smanjenja fiskalnog deficita i javnog duga Republike Srbije. Saznanja koja su rezultat ovog istraživanja treba da: doprinesu unapređenju fiskalne discipline i omoguće utvrđivanje faktora koji javni dug i rast BDP-a čine održivim, uzimajući u obzir fiskalna ograničenja i rizike.

Ključne reči: BDP, fiskalni deficit, javni dug, pandemija Kovid-19, fiskalna konsolidacija