ECONOMIC THEMES (2022) 60(4): 551-565

DOI 10.2478/ethemes-2022-0030

INTERDEPENDENCE OF PUBLIC HEALTH EXPENDITURE EFFICIENCY AND ECONOMIC DEVELOPMENT IN GROWING OECD ECONOMIES AND THE REPUBLIC OF SERBIA

Ljiljana Prole

PhD student, University of Niš, Faculty of Economics, Republic of Serbia

✉ *prole.ljiljana@gmail.com*

Jadranka Đurović-Todorović

University of Niš, Faculty of Economics, Republic of Serbia

✉ *jadranka.djurovic@eknfak.ni.ac.rs*

Dragana Božić

Tourism organization of Niš, Niš, Republic of Serbia

✉ *director@visitnis.org*

UDC 005.336.1: 336.5 (497.11)

Review paper

Received: 04.07.2022
Accepted: 30.12.2022

Abstract: Economic shocks represent a challenge for health systems because they decrease public revenue, and at the same time, increase the need for publicly funded health care. Since health expenditure is rapidly increasing in most countries, its efficiency must be tested. The subject of research in this paper is exactly the interdependence of public health expenditures and their efficiency, expressed through the anticipated life expectancy, as well as their relationship with economic growth. The correlation analysis conveyed in this paper refers to the period 2010-2019 and it is based on OECD countries' data, growing OECD economies data, and the data for the Republic of Serbia..

Keywords: health expenditures, OECD countries, life expectancy, GDP.

JEL classification: F62, H51, I18

1. Introduction

Health expenditures represent a significant topic for the economies in most countries of the world. These expenditures inflict a great pressure on the public budget, considering the fact that they are used in measuring public investments in health care and the welfare of the citizens. The focus of the public atention is mostly directed toward the need for optimal government expenditure policy in many social services,

including health care, including health care. COVID 19 pandemics clearly stated the importance of strong and resilient health systems. However, how much assets should the government allocate to health care is hard to define. Since public resources are limited, the additional health expenditures impose the restrictions to other types of public spending

Related to this, the paper deals with the analysis of rising health expenditures in growing OECD economies etc. Since the indicators measuring health care spending in Serbia are similar to OECD growing economies, etc. is public health expenditures in growing OECD economies and their interdependence with the indicators of economic growth and living standard, the paper presents the comparative analysis of the selected indicators between the growing OECD economies, on the one hand, and the Republic of Serbia, on the other.

The paper is structured in several parts. Theoretical background gives the explanation of health expenditures importance and shows the overview of previous research that focuses on the relationship between health expenditures, life expectancy and economic growth. The next part reflects the sample, variables, hypothesis and the research methodology regarding the used analyses. The part results show the results in selected OECD countries and Republic of Serbia. The last part includes final remarks about the relationship between health expenditures, life expectancy and economic growth in OECD countries and Republic of Serbia.

2. Theoretical background

In recent years, a remarkable rise of health care industry has become evident (noticed) caused by etc.caused by various economic, non-economic, and ecological reasons, which raises a serious concern among the economists in the field of health care, and also among the creators of economic policy and researchers. Global health crises caused by the coronavirus COVID-19 pandemic is recognized as one of the utmost challenge humanity have faced recently (Trajkov et al, 2022). The COVID-19 pandemic caused an economic shock only a decade after the economic shock triggerred by global financial crisis in 2008 (Thompson et al, 2021). Economic shocks represent a challenge for health care systems since they decrease public revenues, and at the same time increase the need for publicly funded health care. Public revenues decrease during the increase in unemployment, along with the decrease in household revenues and economic activity. The need for publicly funded health care increases when people acquire rights to benefits based on the property census; they can no longer afford private financing of health care, or they demand more care since their health condition deteriorated. Health care financing policy can help health care systems to deal with this challenge by making sure that the systems be timely prepared and capable to react efficiently.

In relevant literature, it is possible to distinguish two aspects regarding health care expenditure. One research team (Azam et al., 2019) claimed that health care expenditure is a luxury, as a commodity, so it is necessary to rely on the power of market competition. Another research team (Chaabouni and Saidi 2017; Ie and Zhang 2018; Vang et al., 2019) stated that health care expenditures are necessary and that the state must intervene in this area. However, although health care public expenditures are necessary for the economic development, excessive spending leads to additional pressure on public finance.

Health care expenditure in OECD countries, in the last couple of years, have demonstrated a tremendous rising trend. OECD countries report the highest health care expenditure in the world (https://www.oecd.org/els/health-systems/health-expenditure). From the global point of view, OECD countries spend almost 85% of total world expenditures on health care, while the population from those countries makes less than 20 % of the total world population (Blazkuez-Fernandez et al. 2019).

According to the International Monetary Fund criteria, 6 OECD member countries are defined as growing economies (emerging markets). Those countries are Chile, Colombia, Hungary, Mexico, Poland, and Turkey. Apart from the mentioned, the following countries are also regarded as growing economies: Argentina, Brazil, China, Egypt, India, Indonesia, Iran, Malaysia, Philippines, Russia, Saudi Arabia, South Africa, Thailand, and UAE. Although there is no formal definition, growing economies (emerging markets) can generally be identified according to their performance, such as sustainable market access, progress in attaining the level of median income, and higher global economic relevance. In spite of that, these economies differ from one another, and the difference between the developing market and other developing economies is also not precise. Developing markets have reached significant progress in strengthening their macroeconomic policy since the beginning of the century, which brought to a doubling of GDP per capita, in average. These 20 countries make 34% of the world nominal GDP in USD and 46 % of purchasing power parity (PPP).

Since health expenditure, in most countries, is fast-growing, many of them attempt to reform their health care system in order to improve the efficiency of providing health care to their citizens in a sustainable manner. These reforms cover a wide range of possible scenarios: from the improvement of the quality of health care services to the development of new financing strategies and new technologies, as well as the new capacities of the workforce in health care. One of the general indicators of health expenditure efficiency is life expectancy. This indicator, along with the education index and Gross National Income per capita, represents an integral part of the Human Development Index, created by the United Nations Development Programme – UNDP. Namely, the Human Development Index is a summary measure of average achievement in three dimensions of human development: a long and healthy life, knowledge and decent standard of living, where the life expectancy at birth is an

indicator of health dimension (*Human Development Index (HDI)*, https://hdr.undp.org/data-center/human-development-index).

In OECD countries, life expectancy experienced a significant increase in the last 50 years. The recent OECD analysis (*OECD Beter Life Index*, 2019) shows that the increase in spending on health care contributed to the improvement of life expectancy. Besides that, other determinants, such as the increase in standard of living, environmental improvement, the change in lifestyle and education are, also, very important driving forces. For example, research conducted in five EU accession candidate countries (Macedonia, Serbia, Bosnia and Herzegovina, Montenegro, and Albania) was aimed at effect of the socioeconomic development on life expectancy. Based on aggregate time series pool data, the results of that research showed that higher values of GDP per capita and lower values of infant mortality levels lead to higher life expectancy at birth suggesting that longevity of people in these five countries is increasing (Miladinov, 2020).

In the modern literature, a lot of research is devoted to the efficiency of health expenditures and their relationship with economic growth. Examining relationship between total healt expenditure as percentage of GDP expenditure and GDP, Stepovic et al. have detected a significant correlation between those indicators (Stepovic et al, 2020). Further, the research conducted by group of authors (Lu et al, 2010) showed the significant correlation between higher spending on health in the countries that invest higher percentage of GDP per capita in comparison to the lower-income countries. In that sense, Chen at al proposed a framework of a macro-efficiency score to assess welfare-maximizing aggregate health expenditure. Their framework allows to assess the extent to which selected economies underspend or overspend on health relative to their gross domestic products per capita (Chen, 2021).

3. Data and methodology

The paper examines the relationship between health expenditures, their efficiency and the economic growth on the example of the OECD emerging markets (growing economies) and Serbia. The research hypothesis is as follows: There is positive correlation between public health expenditure, the efficiency of health care system and economic growth. In order to test hypothesis the following variables were used:

- General government expenditure - GGE – as an indicator of government size in various countries. Considerable variations in this indicator underline different approaches of various countries to the financing public goods and services and providing social welfare, and not necessarily the differences in spent resources. This indicator is expressed as a GDP percentage. All OECD countries collect data according to the System of National Accounts (SNA) starting from 2008.
- Total health expenditure as a percentage of gross domestic product (HE) presents a level of total expenditure on health expressed as a GDP percentage. It provides

information on the level of resources channeled into health, depending on the wealth of a country.

- Total health expenditure per capita (HEpc). This indicator is expressed according to an average rate for that year in USD. It shows total health expenditure divided by the country's population and it is expressed in USD, in order to facilitate international comparations.
- Life expectancy at birth - LE - One of the most used indicators of population health condition.
- Gross Domestic Product per capita (PPP based) – GDPpc – GDP converted into international dollars by purchasing power parities and divided by total population size.

The first three variables listed above are indicators of costs of the health care system. Variable Life expectancy at birth is indicator of efficiency of the health care system, wile GDPpc is generaly accepted indicator of economic growth. In order to collect data on selected indicators, the following databases were used: Global Health Expenditure Database (World Health Organization, https://apps.who.int/nha/database/Select/Indicators/en) and World Development Indicators (World Bank, https://databank.worldbank.org/source/world-development-indicators).

The paper presents a dynamic analysis of the research – calculated average annual growth rates of the selected indicators for all OECD countries, then for OECD member countries belonging to growing economies (Chile, Colombia, Mexico, Hungary, Poland, and Turkey), and, finally, for Serbia. The average annual growth rates are calculated for the period 2010-2019. The analysis of the relationship between health expenditure and economic growth will be based on the values of Spearman's rank correlation coefficient and it refers to the period 2000-2019.

In order to convey a comparative analysis, Table 1 presents selected indicators' average values at the OECD level. It can be noticed that, in the observed ten years period, public expenditure's average value, expressed as a GDP percentage gradually declined – from 44,81% in 2010, it declined to 41,41% in 2019. Health expenditures are expressed in two ways: in GDP percentage and *per capita*, recording a constant increase in the observed period. The average life expectancy has been also rising in the observed period. Japan is an OECD country with the highest life expectancy and with an average lifespan of 84 years (*Better Life Index,* 2019).

Countries belonging to the group of growing economies are quite heterogeneous when it comes to general government expenditure, expressed as GDP percentage. Chile and Mexico spend a significantly lower percentage in comparison to other countries. Hungary is the leader in the analyzed group, when this indicator is observed. Poland is the only country in which this indicator has been in continuous decline.

Table 1: Values of selected indicators– OECD average, 2010-2019

Year	GGE[1]	HE[1]	HEpc[1]	LE[2]	GDPpc[2]
2010	44.81	8.67	3,115.30	79.15	34,433.45
2011	43.66	8.63	3,240.46	79.38	35,869.81
2012	43.46	8.68	3,325.04	79.50	36,841.43
2013	43.63	8.70	3,472.87	79.66	38,144.00
2014	42.84	8.69	3,568.60	79.91	39,277.55
2015	42.35	8.70	3,669.49	79.81	40,420.88
2016	41.61	8.78	3,869.94	79.96	41,795.78
2017	40.96	8.73	4,028.67	80.00	43,389.81
2018	41.12	8.74	4,268.21	80.10	45,082.15
2019	41.41	8.88	4,468.96	80.29	46,052.31

Source: Global Health Expenditure Database, World Development Indicators

Table 2: Dynamics of general government expenditure as GDP percentage in growing OECD economies, 2010-2019

Year	Chile	Colombia	Hungary	Mexico	Poland	Turkey
2010	23.33	30.35	48.91	27.67	45.85	35.86
2011	22.79	30.23	49.12	27.72	44.09	33.12
2012	23.09	29.09	49.25	28.21	43.15	34.15
2013	23.06	30.00	50.16	27.78	42.98	33.94
2014	23.75	31.26	50.14	27.96	42.64	33.06
2015	24.88	31.28	50.42	27.50	41.68	33.20
2016	25.25	29.99	46.85	27.35	41.11	34.84
2017	25.43	29.32	46.50	25.70	41.27	33.37
2018	25.41	34.66	45.89	25.66	41.54	34.62
2019	26.27	32.85	45.71	25.96	41.77	35.77

Source: Global Health Expenditure Database

Total health expenditure share of GDP in all the observed countries is lower compared to the OECD average (Table 3). The lowest percentage by far, in the observed period, without some tendency for the increase, is recorded in Turkey (somewhat over 4%). In Hungary, that percentage is in constant decrease since 2011 (from 7,6 % in 2011 to 6,4% in 2019).

Total healthcare expenditure per capita exhibits an obvious rising or positive trend in all growing economies shows a distinguished growing trend (Table 4). Besides, all these expenditures in growing economies are by far below the average level for OECD countries; in 2010 its amount was 3115 international dollars, and in 2019 it reached the number of 4469 (Table 1). The highest expenditure per capita within the group of growing economies has Hungary, followed by Poland and Chile.

Turkey and Colombia are the growing economies which spend a similar amount of assets on health per capita.

Table 3: Healthcare expenditure share of GDP in growing OECD economies, 2010-2019

Year	Chile	Colombia	Hungary	Mexico	Poland	Turkey
2010	6.77	7.07	7.46	5.74	6.41	5.02
2011	6.77	6.78	7.49	5.52	6.24	4.65
2012	7.02	6.75	7.43	5.67	6.22	4.44
2013	7.44	7.02	7.25	5.81	6.41	4.37
2014	7.81	7.19	7.06	5.55	6.39	4.33
2015	8.30	7.52	6.86	5.72	6.39	4.12
2016	8.52	7.53	7.00	5.55	6.53	4.28
2017	9.07	7.68	6.76	5.46	6.56	4.18
2018	9.16	7.63	6.55	5.38	6.33	4.12
2019	9.33	7.71	6.35	5.43	6.45	4.34

Source: Global Health Expenditure Database

Table 4: Health expenditure per capita in growing OECD countries, 2010-2019

Year	Chile	Colombia	Hungary	Mexico	Poland	Turkey
2010	1,230	751	1,618	875	1,353	881
2011	1,378	779	1,720	912	1,424	921
2012	1,510	803	1,722	972	1,478	923
2013	1,671	884	1,773	1,009	1,575	981
2014	1,779	947	1,808	1,003	1,627	1,042
2015	1,885	988	1,834	1,047	1,717	1,060
2016	1,997	1,040	1,949	1,073	1,851	1,136
2017	2,219	1,088	1,989	1,076	1,972	1,167
2018	2,266	1,134	2,083	1,090	2,023	1,152
2019	2,424	1,204	2,156	1,111	2,207	1,187

Source: Global Health Expenditure Database

By nature, life expectancy as an indicator of social development is a variable that cannot show a significant variability year after year. The values of this indicator in growing economies are, also, below OECD countries' average. According to *Better Life Index* data (2019), Mexico is an OECD country with the lowest life expectancy (75 years). Within the OECD growing economies group, Chile is a country with the highest life expectancy (Table 5).

Although one of the criteria for grouping these countries as growing economies was GDP, one can clearly see from Table 6 that these countries are significantly heterogeneous when GDPpc is observed. The poorest country in this group is

Colombia, with a GDPpc of 15,621 international dollars in 2019, while Poland and Mexico more than doubled the Colombian GDPpc in the same year. (Mexico 33,951, and Poland 34,227 international dollars).

Table 5: Life expectancy in OECD growing economies, 2010-2019

Year	Chile	Colombia	Hungary	Mexico	Poland	Turkey
2010	78.78	75.42	74.21	75.07	76.25	74.51
2011	78.99	75.66	74.86	75.01	76.70	74.94
2012	79.18	75.88	75.06	74.97	76.75	75.37
2013	79.35	76.11	75.57	74.93	77.00	75.78
2014	79.50	76.32	75.76	74.91	77.60	76.17
2015	79.65	76.53	75.57	74.90	77.45	76.53
2016	79.78	76.73	76.06	74.92	77.85	76.86
2017	79.91	76.93	75.82	74.95	77.75	77.16
2018	80.04	77.11	76.07	74.99	77.60	77.44
2019	80.18	77.29	76.32	75.05	77.90	77.69

Source: World Development Indicators

Table 6: GDPpc (ppp) in growing OECD economies, 2010-2019

Year	Chile	Colombia	Hungary	Mexico	Poland	Turkey
2010	18,162	10,625	15,261	21,686	21,100	17,556
2011	20,343	11,489	16,520	22,968	22,828	19,799
2012	21,508	11,899	17,163	23,179	23,745	20,772
2013	22,439	12,601	17,374	24,460	24,553	22,439
2014	22,787	13,175	18,057	25,614	25,471	24,090
2015	22,699	13,134	18,301	26,743	26,848	25,753
2016	23,438	13,812	19,324	27,865	28,324	26,512
2017	24,471	14,171	19,721	29,436	30,066	27,914
2018	24,741	14,866	20,258	31,823	31,977	27,943
2019	25,975	15,621	20,448	33,951	34,227	27,318

Source: World Development Indicators

In order to make an adequate comparison, Table 7 shows the values of the selected indicators for the Republic of Serbia. Total government expenditure in Serbia is at OECD average level. Total health expenditures expressed as GDP % in Serbia are above the OECD average but they show a negative trend (from 9,52% in 2011 to 8,67% in 2019).

Life expectancy in the Republic of Serbia is considerably shorter compared to OECD countries' average and it's the closest to the life expectancy in Mexico and

Hungary. GDPpc in Serbia indicates a positive tendency, and in the observed period, it's the closest to the level of Hungary.

Table 7: Values of selected indicators in the Republic of Serbia, 2010-2019

Year	GGE	HE	HEpc	LE	GDPpc
2010	42.83	9.52	1,218	74.34	12,790
2011	41.61	9.11	1,250	74.54	13,723
2012	45.10	9.32	1,297	74.84	13,910
2013	42.28	9.31	1,359	75.19	14,604
2014	44.78	9.24	1,352	75.34	14,637
2015	42.66	8.81	1,312	75.29	14,889
2016	41.81	8.46	1,338	75.69	15,818
2017	40.08	8.22	1,366	75.54	16,618
2018	40.69	8.53	1,557	75.89	18,247
2019	42.06	8.67	1,686	75.94	19,443

Source: Global Health Expenditure Database, World Development Indicators

4. Results

In order to explore the dynamics of the selected indicators in the observed period, the average annual growth rates are calculated for all previously analyzed indicators. Besides, the analysis also includes the variable which represents a share of health expenditure in general government expenditure.

Table 8: Annual growth rates of the selected indicators for period

Country	GGE	HE	HEpc	HE / GGE	LE	GDPpc
OECD	-0.87%	0.27%	1.15%	4.10%	0.16%	3.29%
Chile	1.35%	3.65%	2.29%	7.87%	0.20%	4.40%
Colombia	1.09%	1.00%	0.31%	5.40%	0.27%	3.33%
Hungary	-0.72%	-1.76%	-0.96%	3.26%	0.31%	5.12%
Mexico	-0.68%	-0.56%	0.16%	2.70%	0.00%	5.53%
Poland	-1.02%	0.08%	1.12%	5.60%	0.24%	4.80%
Turkey	0.05%	-1.52%	-1.51%	3.40%	0.47%	5.12%
Serbia	-0.09%	-0.99%	-0.76%	3.78%	0.24%	4.80%

Source: Author's calculations

General government expenditure (Hungary, Mexico, and Poland) in OECD countries and Serbia in the observed period, according to average annual rates recorded a decline. The negative average annual growth rate of total expenditure on health reached the following countries: Hungary, Mexico, Turkey, and Serbia. In the aforementioned period, Chile reached the highest average annual growth rate of total expenditure on health (3,65%). Simultaneously, Chile records the highest increase in health expenditures per capita, (2,29%), while Turkey records the highest average annual decline of these expenditures (-1,51%).

Variable HE/GGE represents the share of health expenditure in general government expenditures. In all analyzed countries this variable shows a rising trend in the observed period, which points to a clear increase of giving value to health expenditure in all analyzed economies. A positive signal is also sent by a positive average growth rate of life expectancy, as an indicator of health expenditure efficiency

Average annual GDPpc growth rates in the analyzed countries are quite consistent. In the observed period, the Republic of Serbia and Poland accomplished an identical average annual GDP pc growth.

Table 9: Correlation matrix for OECD countries

		GGE	HE	HE/ GGE	HEpc	LE	GDPpc
GGE	Correlation Coefficient	1.000	-0.827**	-0.964**	-0.939**	-.927**	-0.939**
	Sig. (2-tailed)	.	0.003	0.000	0.000	.000	0.000
HE	Correlation Coefficient		1.000	0.888**	0.930**	0.912**	0.930**
	Sig. (2-tailed)		.	0.001	0.000	0.000	0.000
HE / GGE	Correlation Coefficient			1.000	0.976**	0.964**	0.976**
	Sig. (2-tailed)			.	0.000	0.000	0.000
HEpc	Correlation Coefficient				1.000	0.988**	0.953**
	Sig. (2-tailed)				.	0.000	0.000
LE	Correlation Coefficient					1.000	0.988**
	Sig. (2-tailed)						0.000
GDP pc	Correlation Coefficient						1.000
	Sig. (2-tailed)						.

**Correlation is siginificant at level 0.05.*

*** Correlation is siginificant at level 0.01.*

Source: Author's calculations

The goal of the paper is to explore the correlation of health expenditures and their efficiency, as well as the interdependence between health expenditures and economic growth, and for that reason, the correlation analysis of the selected indicators was conveyed. Within the analysis, Spearman's rank correlation coefficient was calculated and, also, the significance of the determined values was tested.

If one observes the correlation coefficient values in Table 9, it can be noticed that a negative correlation exists between GGE and all the other indicators can notice that there is an indirect correlation between general government expenditure and all other indicators. On the other hand, health expenditures are positively correlated with life expectancy, as an indicator of their efficiency (0,912, p<0,0001), and with GDPpc (0,930, p<0,0001), as an indicator of economic growth. Simultaneously, in OECD countries, there is a positive correlation between life expectancy and GDPpc (0,988, p<0,0001).

Table 10: Correlation matrix for the growing OECD economies

		GGE	HE	HE/GGE	HEpc	LE	GDPpc
GGE	Correlation Coefficient	1.000	-0.197	-0.738**	0.260*	-0.247	0.278*
	Sig. (2-tailed)	.	0.130	0.000	0.045	0.057	0.032
HE	Correlation Coefficient		1.000	0.737**	0.392**	0.404**	-0.701**
	Sig. (2-tailed)		.	0.000	0.002	0.001	0.000
HE/GGE	Correlation Coefficient			1.000	0.054	0.344**	-0.569**
	Sig. (2-tailed)			.	0.680	0.007	0.000
HEpc	Correlation Coefficient				1.000	0.553**	0.074
	Sig. (2-tailed)				.	0.000	0.574
LE	Correlation Coefficient					1.000	-0.193
	Sig. (2-tailed)					.	0.139
GDPpc	Correlation Coefficient						1.000
	Sig. (2-tailed)						.

**Correlation is siginificant at level 0.05.*

*** Correlation is siginificant at level 0.01.*

Source: Author's calculations

General government expenditures in OECD growing economies (Table 10) are directly correlated with health expenditures per capita (0,260, p=0,045) and GDP per capita (0,278, p=0,032), but with all other indicators are negatively correlated. Health expenditures in these countries are directly correlated with life expectancy (0,404, p<0,001), which is an adequate indicator of their efficiency, and at the same time are negatively correlated with GDP pc, i.e. economic growth (-0,701, p<0,0001). This kind of relationship also resulted in a negative correlation (not statistically important, though) between life expectancy and GDPpc in growing OECD economies (-0,193, p=0,139).

Table 11: Correlation matrix – the Republic of Serbia

		GGE	HE	HE / GGE	HEpc	LE	GDPpc
GGE	Correlation Coefficient	1.000	0.806**	0.261	-0.467	-0.467	-0.527
	Sig. (2-tailed)	.	0.005	0.467	0.174	0.174	0.117
HE	Correlation Coefficient		1.000	0.745*	-0.612	-0.782**	-0.818**
	Sig. (2-tailed)		.	0.013	0.060	0.008	0.004
HE/ GGE	Correlation Coefficient			1.000	-0.455	-0.709*	-0.685*
	Sig. (2-tailed)			.	0.187	0.022	0.029
HEpc	Correlation Coefficient				1.000	0.879**	0.891**
	Sig. (2-tailed)				.	0.001	0.001
LE	Correlation Coefficient					1.000	0.976**
	Sig. (2-tailed)					.	0.000
GDP pc	Correlation Coefficient						1.000
	Sig. (2-tailed)						.

**Correlation is siginificant at level 0.05.*

*** Correlation is siginificant at level 0.01.*

Source: Author's calculations

Regarding Serbia, from Table 11 it can be seen that a positive correlation between GGE and HE is reported, which is not the case in OECD countries (0,806, p=0,005). On the other hand, health expenditures in the Republic of Serbia are negatively correlated with life expectancy (-0,782, p=0,008), which implies the existence of a certain degree of health expenditure inefficiency. Health expenditures in the Republic of Serbia are indirectly correlated with economic growth (-0,818, p<0,004), and the same pattern can be noticed in the growing OECD economies.

5. Conclusion

COVID-19 pandemic emphasized the importance of efficient investment in health care, as well as the creation and maintenance of strong and resilient health systems. The share of expenditures on health care in general expenditures in all countries in the last decade considerably increased, but their effectiveness is questionable.

The research results, presented in this paper, showed that in OECD countries health expenditures are positively correlated with life expectancy, as an indicator of their efficiency and with GDPpc as an indicator of economic growth. Simultaneously, in OECD countries, there is a positive correlation between life expectancy and GDPpc. These results coincide with the research results presented in the first part of the paper. Also, based on these results, it is possible to confirm the research hypothesis.

According to results, health expenditures in growing OECD countries are directly correlated with life expectancy (indicator of their efficiency), and at the same time are negatively correlated with GDP pc, i.e. economic growth. In those countries, negative correlation (not statistically significant) has been reported between life expectancy and GDPpc. It can be concluded that the research hypothesis, when it comes to these countries, is partially confirmed.

According to a majority of indicators, the Republic of Serbia is a very close to the growing OECD but it lags behind when health care expenditure share of GDP is considered, as well as the efficiency of these expenditures. Life expectancy in the Republic of Serbia is considerably shorter compared to OECD countries' average. Research result showed that health expenditures in the Republic of Serbia are indirectly correlated with economic growth which is consistent with the relationship between those indicators in the growing OECD economies. Also, health expenditures in the Republic of Serbia are negatively correlated with life expectancy, which implies the existence of a certain degree of health expenditure inefficiency.

Even before COVID-19 pandemic outbreak, the health system of the Republic of Serbia and the surrounding countries dealt with some serious challenges in the sense of financing and providing health services. The costs of health care system are in the Republic of Serbia are considerably lower compared to the OECD and the EU average, and the manner of spending the limited financial resources is inefficient, which the results of this research confirmed.

The contribution of this paper is reflected in the comparative presentation and analysis of health system costs, their efficiency and relationship with economic growth in OECD countries, the group of growing OECD and Republic of Serbia. The conclusions would be even more representative if it was possible to include the year 2020 in the analysis. Hereof, absence of data on the volume and structure of health expenditure for 2020 in the WHO database is one of the key limitations in this research.

References

Azam, M., Khan, A.Q. & Ozturk, I. (2019). The effects of energy on investment, human health, environment and economic growth: empirical evidence from China. *Environmental Science and Pollution Research***,** 26(11), 10816–10825

Blázquez-Fernández, C., Cantarero-Prieto, D. & Pascual-Sáez, M. (2019). On the nexus of air pollution and health expenditures: new empirical evidence. *Gaceta Sanitaria,* 33(4), 389–394.

Chaabouni, S. & Said,i K. (2017). The dynamic links between carbon dioxide (CO2) emissions, health spending and GDP growth: a case study for 51 countries. *Environmental Research*, 158, 137–144.

Chen, S., Kuhn, M., Prettner, K., Bloom, D. & Wang, C. (2021). Macro-level efficiency of health expenditure: Estimates for 15 major economies. *Social Science & Medicine*, 287, 114-270.

Jakovljevic, M., Sugahara, T., Timofeyev, Y. & Rancic N. (2020). Predictors of (in)efficiencies of Healthcare Expenditure Among the Leading Asian Economies – Comparison of OECD and Non-OECD Nations. *Risk Manag Healthc Policy*. No.13: 2261–2280.

Loizides, J. & Vamvoukas, G. (2005). Government expenditure and economic growth: evidence from trivariate causality testing. *Journal of Applied Economics*, 8(1), 125-152.

Lu, C., Schneider, M.T., Gubbins, P., Leach-Kemon, K., Jamison, D. & Murray, C.J. (2010). Public financing of health in developing countries: a cross-national systematic analysis. *Lancet,* 375, 1375–1387.

Miladinov, G. (2020). Socioeconomic development and life expectancy relationship: evidence from the EU accession candidate countries. *Genus – Journal of Population Science*, No. 2.

Mujtaba, G. & Shahzad, S.J.H. (2021). Air pollutants, economic growth and public health: implications for sustainable development in OECD countries. *Environmental Science and Pollution Research*, 28, 12686–12698.

OECD, *Beter Life Index,* https://www.oecd.org/statistics/OECD-Better-Life-Index-definitions-2019.pdf

Rančić, N., Kovačević, A. & Dragojević-Simić, V. (2015). Long-term health expenditure changes in selected Balkan countries. https://www.frontiersin.org/articles/10.3389/fpubh.2015.00152/full

Stepović, M. et al (2020). Gross Domestic Product and Health Expenditure Growth in Balkan and East European Countries—Three-Decade Horizon. *Public Health*. https://doi.org/10.3389/fpubh.2020.00492

Trajkov, A., Andreeski, C. & Biljan, C. (2022). Measuring the Impact of the COVID-19 Crisis on the Foreign Tourist Receipts. *Economic themes*, 60(1), 1-19.

Thomson, S., García-Ramírez, A.J., Akkazieva, B., Habicht T., Cylus, J. & Tamás, E. (2022). How resilient is health financing policy in Europe to economic shocks? Evidence from the first year of the COVID-19 pandemic and the 2008 global financial crisis. *Health Policy,* 126(1), 7-15.

Wang, Z., Asghar, M. M., Zaidi, S. A. H. & Wang, B. (2019). Dynamic linkages among CO_2 emissions, health expenditures, and economic growth: empirical evidence from Pakistan. *Environmental Science Pollution Research,* 26(15),15285–15299

World Bank, https://databank.worldbank.org/source/world-development-indicators, accessed:06.04.2022.

World Health Organization, https://apps.who.int/nha/database/Select/Indicators/en accessed on: 05.04.2022.

MEĐUZAVISNOST EFIKASNOSTI JAVNIH RASHODA ZA ZDRAVSTVENU ZAŠTITU I PRIVREDNOG RASTA U RASTUĆIM EKONOMIJAMA OECD I REPUBLICI SRBIJI

Apstrakt: Ekonomski šokovi predstavljaju izazov za zdravstvene sisteme, jer smanjuju javne prihode u isto vreme dok povećavaju potrebu za javno finansiranom zdravstvenom zaštitom. Pošto rashodi za zdravstvenu zaštitu u većini zemalja brzo rastu, do izražaja dolazi pitanje njihove efikasnosti. Predmet istraživanja u ovom radu je upravo međuzavisnost javnih rashoda za zdravstvenu zaštitu i njihove efiksnosti, izražene preko očekivanog trajanja života, kao i njihova veza sa privrednim rastom. Analiza međuzavisnosti, koja je sprovedena u ovom radu, bazira se na podacima za zemlje OECD-a koje su svrstane u rastuće ekonomije i podacima za Republiku Srbiju.

Ključne reči: rashodi za zdravstvenu zaštitu, OECD, očekivano trajanje života, BDP

Authors' biographies

Ljiljana Prole graduated from the Faculty of Economics in Niš, majoring in financial management. After completing her basic studies, in 2010 she enrolled in her master's studies at the Faculty of Economics in Niš, and defended her master's thesis on the topic: "The cost of capital of budget institutions in Serbia". She enrolled in doctoral studies at the Faculty of Economics in Niš, majoring in macroeconomics, in 2014. She has been employed since 2010, engaged as an economist in jobs - professional associate in the financial service (budget execution jobs) in the city municipality of Medijana, Niš. From June 2012 until today, he has been working as a senior advisor in auditing at the State Audit Institution in Belgrade.

Jadranka Đurović Todorović has been Full Professor at the Faculty of Economics, University of Niš since 2012. Her fields of interest are monetary economics and public finance. She teaches at all three levels of study. She is a winner of the Silver Sign of University of Niš, as the best graduate student in 1992 and and the October Award of the City of Leskovac for Finance in 2015. She is a reviewer in numerous journals and an author of 4 books and 3 monographs. She has been a participant of many domestic and international projects in field of economics and she is the author of more than 150 scientific articles published in domestic and international journals and thematic collections of papers from international and domestic scientific conferences.

Dragana Božić is currently engaged as a director of Tourism Organisation of Niš and previosly she was director of Students Cultural Center in Niš. She defended her PhD thesis at the Faculty of Economics University of Niš in 2018.