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GOVERNMENT PUBLIC SPENDING EFFICIENCY: A COMPARATIVE ANALYSIS BETWEEN KOSOVO AND EU COUNTRIES, ESPECIALLY WESTERN BALKAN COUNTRIES[3]

Nowadays, it is evident that government public sector activities are one of the significant factors influencing economic and social indicators. The evaluation of public sector performance and efficiency is very important when we evaluate the relationship between public spending and the benefits that society derives from these public resources. The primary objective of this study is to evaluate the efficiency of Kosovo's government public spending in comparison with EU countries and, in particular, Western Balkans countries over the period 2007-2016. The Public Sector Performance Index (PSP) and the Public Sector Efficiency Index (PSE) were used to assess the performance and efficiency of the public sector in Kosovo. Also, this study uses the non-parametric method DEA (Data Envelopment Analysis) to evaluate the input-output efficiency along with the Production Frontier Technique. The study results show that the PSP value ranges from 0.78, the minimum, to 1.39, the maximum. Kosovo ranks 30th out of 35 countries in the sample, with a performance index of 0.86, which is 15 percent below the average of 1.00. In terms of PSE, results vary from 0.76, the minimum to 1.35, the maximum. Kosovo ranks 23th out of 35 countries in this sample with an efficiency index of 0.96, 5 percent below the average, which is 1.00.

Analyzing input-output efficiency results, it is found that the average of the countries included in the study achieves an efficiency of 46.70. This shows that countries are able to reduce total public spending by 54% and maintain the same level of total Public Performance. From the results of the output-oriented efficiency analysis, the countries in the sample achieve an efficiency of 73.64%, which means that the countries in the sample could have increased the level of outputs by 27% if they had used the same level of inputs.

Keywords: Government Public Spending; Public Sector Performance and efficiency Index; Data Envelopment Analysis (DEA)
JEL: H5; D60; D61

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1. Introduction

In the course of life, everyone has come into contact with government activities in one way or another, beginning with registration in the state civil status registers, attended public schools, payment of taxes, employment in the public sector, use of public services, such as highways, electricity, drinking water, garbage collection, environmental regulations, pollution, security, etc. (Stiglitz, 1980). The importance of government public sector activities in economic growth has always been the subject of study by various economists (Tanzi, 2005).

Government activities of the public sector have undergone significant changes during historical development and have adapted to the course of economic development. In the last century, the level of government activities, measured in terms of public spending, has experienced a significant evolution, which can be described as a significant increase. In developing countries, public spending amounted to about 10% of the twentieth and increased so much in the following year that in some countries, it reached 60% of GDP (Tanzi, 2009; Bartik, 1992).

Given this development of the government activities of the public sector, the issue of the relationship between the public sector and economic growth has attracted great interest among economists and policymakers for centuries, and has led to opposing theories that belong to the two main economic schools. Each of these theories attempts to explain the positive or negative role and size of the public sector in economic growth. However, in reality, these schools come to different explanations and conclusions. Some believe that the size of the public sector contributes positively to economic growth, while another group of economists believes that the size of the public sector negatively affects the economy (Buchanan, 1975; Gemmell, Kneller, Sanz, Ismael, 1999; Folster, Henrekson, 1999; Tanzi, Zee, 1997; Kaas, 2003; Ghosh, Gregoriou, 2008; Pula, Elshani, 2017; Angelopoulos, Economides, Kammas, 2007). Nowadays, however, modern theories of public finance no longer focus on the size of public expenditure, but on the efficiency of public spending as a mechanism for better performance of the public sector (Manddl, Dierx, Ilzkovitz, 2008; Zugravu, Sava, 2012).

In recent years the debate over the role of the government has shifted towards the empirical evaluation of public sector performance and efficiency. Therefore, the performance and efficiency of public sector measurement is seen as an important indicator to monitor the public spending efficiency against the set objectives and achieve sustainable economic growth. According to the World Bank[4], good public sector performance improves people's living standards by giving them access to basic services and the opportunity to live and work in peace and security. Therefore, performance measurement is considered an important indicator for monitoring public sector progress in public activities (Barth, Keleher, Russek, 1990; Slemrod, William, Easterly, 1995; Poterba, Hagen, 1999). On the other hand, the concept of efficiency has found a prominent place in the study of public expenditure among many economists, especially in the last decades. Improving the efficiency of public spending not only helps maintain fiscal discipline but also alleviates budgetary constraints by making

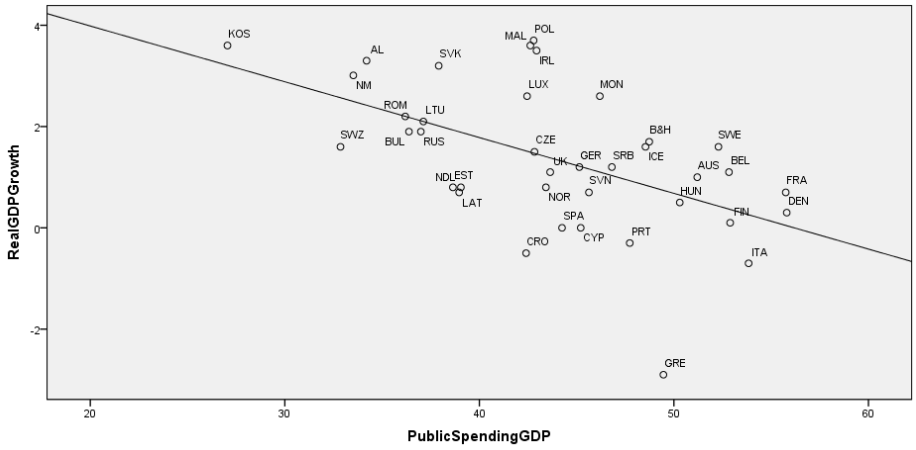
[4] According to the World Bank (2014). See http://data.worldbank.org/topic/public-sector.

it possible to achieve the same results with lower level of spending (Manddl, Dierx, Ilzkovitz, 2008; Pitlik, Schratzenstaller, 2011; Heller, Hauner, 2006).

In 2016, unlike other Western Balkan countries, public spending in Kosovo was below the average, with only 28% of GDP, whereas in Albania and Serbia, public expenditure was 34% and 47%, respectively. While, in EU countries, the average public spending is 44% of GDP. An increase in Kosovo's public spending was prompted by an increase in the social and economic programs used to struggle with poverty, unemployment and improving social welfare and quality of education and health care (Pula, Elshani, 2018). Emphatically, capital investment over the years absorbed most of the public spending by a share of 37.9% or 11% of the GDP (Pula, Elshani, 2018). However, a key hypothesis of this paper is whether large public spending hurting the performance public sector by measuring via public spending. Graph 1 highlights the relationship between public spending and real GDP growth and shows that low public spending is not detrimental to economic growth and meets public interest through government activity.

Graph 1

Economic Growth and Public Spending



Source: Calculation by the author.

Kosovo is a young state and is still in the early stages of consolidating public spending as one of the most important components of the public sector; second, there has been much discussion e recently about the efficiency of public spending as one of the most important determinants of public sector performance; third, public spending in Kosovo is growing. Therefore, the rationale for this study is to assess the relationship between government public spending and social-economic indicators.

Besides the introduction, the study proceeds as follows: In section 2, we describe the empirical evidence of the performance and efficiency of sector public. Section 3 presents the methodology used in the empirical assessment, while section 4 presents the empirical results of the performance and efficiency index. Finally, in section 5 we present the main concluding remarks and recommendations.

2. Literature Review

The most commonly used econometric methods to measure performance and efficiency are parametric and non-parametric methods. Although many studies rely on these methods, the results are quite contradictory. Many different authors and papers have used different methods to measure performance, but the most important tools are socio-economic indicators and it is assumed that the public sector causes desirable changes in socio-economic indicators through public spending (Afonso, Romero, Monsalve, 2013). According to many authors, improving performance depends on changes in the values of these indicators (Afonso, Schuknecht, Tanzi, 2006).

Hauner and Kyobe (2008) used the databases of 114 developed and developing countries for the period 1980-2004 for their empirical analysis. In their analysis, they calculated the PSP, PSE, and DEA methods. The authors focused only on the education and health sectors because they regressed these indicators into potential economic, institutional, and demographic factors. The results of this study show that countries with more developed economies have better public sector performance. However, the most important finding of this study is that higher public sector spending is associated with lower efficiency in the two respective sectors.

Afonso, Schuknecht and Tanzi (2005), in their study, calculated the public sector performance indicators and non-parametric FDH technique for 23 industrialized countries for the years 1990 and 2000. The study finds that countries with a smaller public sector have better performance and efficiency than countries with a larger public sector. According to the authors, this is because countries with a larger public sector experience marginal return to scale. According to the study, public spending by large governments could be about 35% lower to achieve the same level of PSP. Another study by these authors (Tanzi, Afonso, Schuknecht, Veldhuis, 2007) concludes that for the period 1990-2000 (for 23 countries), that countries with a small government are 40% more efficient in achieving higher levels of public sector performance than countries with medium or large governments.

In their study, Gupta, Honjo and Verhoeven (1997) estimated the efficiency of public spending on education and health, using FDH analysis, for 38 African countries for the years 1984-1995. The results of this study show that African countries are inefficient compared to countries in Asia and the West. The main message of this paper is that increasing budgetary allocations to these two sectors (education and health) is not necessarily the only way to improve outcomes in these two sectors, but that the most important thing is to increase the efficiency of public spending. Another paper, compiled by Herrera and Pang (2005) for the same sectors, for 140 countries for the period 1996-2002, using two non-parametric approaches: FDH and DEA, concluded that countries with higher spending level achieve lower efficiency scores. On the other hand, the work of Grigoli (2012) on the efficiency of public spending in the health and education sectors in the Slovak Republic compared to OECD countries, using the method (DEA), concludes that spending in the education sector in the Slovak Republic was used efficiently and achieved desirable results, while public spending in the health sector was unproductive or inefficient, respectively.

In her paper Kazemi (2016) evaluated the efficiency of public spending for 20 OECD countries for the period 2009-2013, using the non-parametric approach (DEA). According to the results, the input-oriented DEA efficiency is 0.732, whereas the output-oriented efficiency is 0.769. In conclusion, countries with a high level of public spending are less efficient than countries with a lower level of public spending.

3. Methodologies

The evaluation of public sector performance and efficiency is very important when we evaluate the relationship between public spending, defined as inputs and the benefits that society derives from these inputs, defined as outputs. In this study, we evaluate the performance and efficiency of the public sector using the indicators and methodology developed by Afonso, Schuknecht and Tanzi (2007). These indicators were developed for public sector performance, defined as an output of public activities and public sector efficiency, defined as the ratio of performance indicators and public spending. These indicators were assessed for all European countries, including the Western Balkan countries. The methodology used in this paper consists of three parts. The first two parts explain how PSP and PSE are constructed, while the third part provides an approach for analyzing input-output efficiency along the production frontier using the non-parametric technique (DEA).

3.1. Public Sector Performance Index (PSP)

Public sector performance is defined as the output generated by public activities and is an important tool to influence quality improvement in public sector management. The estimate of the public sector performance index is based on economic and social indicators that are classified into two groups in terms of evaluating: *Opportunity Indicators* and the *Traditional Musgrave Indicators*.

The opportunity indicators focus on the role of government in ensuring the rule of law and promoting equality for all individuals in a market economy. This indicator consists of four sub-indicators. These sub-indicators reflect the government's performance in four areas: administration, education, health and public infrastructure performance. In other words, a good public administration, with a proper judiciary and a healthy and well-educated population, with a good accompanying infrastructure can be considered a prerequisite for the functioning of a market economy (Afonso, Schuknecht, Tanzi, 2005). The above indicators were more microeconomic in nature and focused on a particular sector. The traditional Musgrave Indicators, on the other hand, are more general indicators that are also well illustrated in the economic literature and are more macroeconomic in nature, focusing more on the impact of public government spending on the economy as a whole. Musgrave indicators measure the outcomes of public sector interactions with market processes and consist of three sub-indicators: revenue distribution, economic stability and economic performance.

Sub-indicators are measured by the composition of the following indices:

Opportunity indicators

Administrative – Corruption, Red Tape, Judicial Independence, size of the informal economy

Education – Primary teacher to student ratio, Primary and Secondary school enrolment

Health – Infant mortality rate, life expectancy

Infrastructure – Infrastructure quality

Musgrave indicators

Distribution – Gini index

Economic Stability – Average inflation rate, Sustainability of economic growth (coefficient of variation)

Economic performance – GDP per capita, GDP growth rate in real terms, Unemployment rate

The table above lists all the sub-indicators that need to be collected to construct the PSP performance index. For the Musgrave sub-indicator, we used the 8-year average (2007-2016), while for the opportunity sub-indicators, we used the only year 2016. Once we have collected all the data, all the measurements are normalized to obtain identical distribution values. This is achieved by dividing the value of one country by the average of the indicator for all countries. This calculation is done to provide a suitable platform for comparing the results. To facilitate comparison, the average for the countries in the sample is set at 1.00 for all indicators. The scores for each country are calculated relative to this average. In summary, after collecting all the data, each indicator (opportunity indicators and traditional Musgrave indicators) is weighted equally, mainly based on the results of Hauner and Kyobe (2008), who found insignificant differences in using different and equal weights to score the PSP index. Then seven sub-indicators contribute 1/7 to the performance index. Assuming that there are *i* states and *j* areas of public activities (indicators) that together determine the overall performance in state *i*, the PSP*i* is calculated (Afonso, Schuknecht, Tanzi, 2005):

$$PSP_i = \sum_{j=1}^{n} PSP_{ij} \ldots\ldots PSP_i = f(I_k),$$

Where $PSP_i = f(I_k)$, where I_k are the *opportunity and Musgrave indicators* on which performance depends. Thus, an improvement in certain values of these indicators affects the public sector performance and is calculated as follows:

$$\Delta PSP_{ij} = \sum_{i=k}^{n} \frac{\partial f}{\partial I_k} \Delta I_k$$

3.2. Public Sector Efficiency Index (PSE)

Public Sector Performance Index does not provide us with any information on the efficient or inefficient use of public spending. Therefore, in order to value the Public Sector Efficiency Index (PSE), it is necessary to consider the cost at which the public sector has achieved a certain level of performance (PSP) (Afonso, Schuknecht, Tanzi, 2005). Therefore, to

determine the value of public sector efficiency (PSE), public sector performance (PSP) is corresponding weighted categories of government public spending (GPS) and calculated as follows:

$$PSE_i = \frac{PSP_i}{GPS_i},\ and\ \frac{PSP_i}{GPS_i} = \sum_{j=1}^{n} \frac{PSP_{ij}}{GPS_{ij}}$$

Table 1

	Input (Public Government Spending)	*Output (performance)*	*Sub-indicators*	*Operationalization*
Opportunity indicators	Public Consumption	Administrative performance	Corruption Index	Number 7 = (low level of corruption), number 1 = (highly corrupt)
			Red Tape	Number 7 = (not burdensome), number 1 = (extremely burdensome)
			Shadow economy index	number 1 = (highly shadow economy), number 9 = (low shadow economy)
			Quality of judiciary index	Number 7 = (entirely independed), number 1 = (heavy influenced)
	Health Expenditure	Health performance	Infant mortality rate	Mortality rate, infant per 1,000 live births
			life expectancy	Life expectancy at birth, total years
	Education Expenditure	Education Performance	Secondary school enrolment	Secondary school enrolment (% of gross). [5]
			Primary teacher to student ratio	Number of primary students divided by the number of teachers in primary school.
	Public Investment	Infrastructure performance	Infrastructure quality	Number 7 = (development), number 1 = (underdevelopment)
Musgrave indicators	transfer and subsidies Expenditure	Gini index distribution	Gini index	Rating scale from 100 (Perfect Inequality) to 0 (perfect equality).
	Total Expenditure	Economic Stabilities	Average inflation rate	Average consumer prices, for the period, 2007-2016.
			Sustainability of economic growth	Sustainability of economic growth (coefficient of variation) average growth of real GDP
	Total Expenditure	Performance Economic	GDP per capita	Average Gross Domestic Product per capita
			GDP growth rate in real terms	Average real GDP rate, for the years 2007-2016.
			Unemployment rate	Average unemployment rate, 2010-2016

Source: Global Competitiveness Report, Transparency International's Corruption Perceptions Index, World Economic Forum, World Development Indicators, World Economic Forum, World Bank, UIS Statistics, European Commission, AMECO, Ourworldindata, IndexMundi, TheGlobalEconomy, OECD database, World Economic Outlook Database, European Commission – Ameco, Eurostat – OECD, WEO Database.

[5] The gross enrollment ratio can exceed 100% due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition.

However, the marginal product implied as output, falls during the increase in government public spending and is presented as follows:

$$\frac{\partial PSP_i j}{\partial GPS_{ij}} > 0, \frac{\partial^2 PSP_{ij}}{\partial GPS^2{}_{ij}} < 0$$

Here GPS_{ij}, shows the public government spending of states *i* in various areas j, which are sub-indicators of economic performance, and thus together determine the overall efficiency in a state i. According to Afonso, Schuknecht and Tanzi (2006), the inputs for the evaluation opportunities and Musgrave indicators are presented on Table 1.

3.3. Non-parametric technique (DEA)

The DEA method has been widely used in the last decade. It was first used by Farrell (1957) and Charnes, Cooper and Rhodes (1978), who wanted to evaluate efficiency. Technically, the DEA assumes the existence of a convex output frontier constructed using linear programming methods that lies between these observations and the higher output-input ratios (Coelho, Watt, 2006). In this paper, this concept is paraphrased as the maximum performance of the public sector that can be achieved by a given level of public spending as a percentage of GDP, given by the following function (Tanzi, Afonso, Schuknecht, Veldhuis, 2007)*:*

$$y_i = f(x_i), I=1,.....n$$

From where we $Y_i -$ units of output measurement; $X_i -$input measurement unit. If $y_i > f(X_i)$, then we conclude that this country uses inputs efficiently and vice versa if $y_i < f(X_i)$ then a country is showing inefficiencies in the use of inputs.

This paper evaluates the two mathematical equations for estimating DEA analysis, the input and input-oriented equation and the output-oriented equation (Charnes, Cooper, & Rhodes, 1978). According to Kazemi (2016), to specify the input and output-oriented equations, it is assumed that there are comparative units; each comparative units use *K* inputs to produce *M* output. If *X* is the input matrix *KxI* and *Y* is the output matrix *MxI* for all comparative units, then X_i i is a vector input column and Y_i is a vector output column for all comparative units.

Table 2

Input- and output-oriented efficiency

Data Envelopment Analysis (DEA)	
Output oriented	Input oriented
$\text{Max } \rho, \lambda^{\delta}$ $\text{Subject i} - \rho y_i + Y\lambda \geq 0$ $X_i - X\lambda \geq 0$ $n1'\lambda = 1$ $\lambda \geq 0$	$\text{Min } \rho, \lambda^{\delta}$ $\text{Subject i} - y_i + Y\lambda \geq 0$ $\rho X_i - X\lambda \geq 0$ $n1'\lambda = 1$ $\lambda \geq 0$

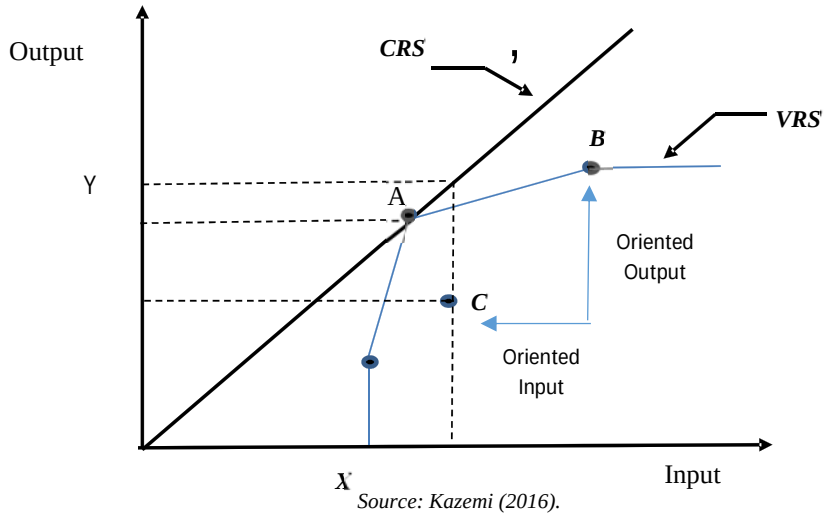
From the above equations, ρ is scalar, while 1/ ρ specifically implies the efficiency outcome and satisfies the assumption $0 < \frac{1}{\rho} \leq 1$. According to (Farrell, 1957), ρ measures the distance from one country to another, in our case, the units of comparison along the efficiency frontier.

If ρ =1, then the comparison unit is efficient, and conversely, if $\frac{1}{\rho} \leq 1$, the comparison unit is inefficient. On the other hand, $\lambda(Ix1)$ is a vector of constants that measures the weight used to estimate the location of an inefficient comparative unit. While the constraint $n1'\lambda = 1$ imposes frontier convexity by calculating the variable return (CRS) in the DEA model, the disappearance of this constraint means accepting that the rate returns are constant (VRS) (Afonso, Schuknecht, Tanzi, 2006).

However, the efficiency model analysis (DEA) evaluates the input-output efficiency analysis assuming that the technology can be with a constant return to scale or variable return to scale (CRS[6] the VRS[7]).

Graph 2

(DEA) Production Frontier Technique



Source: Kazemi (2016).

Therefore, it is important to note that from a modelling point of view, both types of DEA, such as those with input and output orientation, lead to similar identification along the efficiency frontier curve (Afonso, Kazemi, 2016).

[6] Constant return to scale (CRS) and Variable Return to scale (VRS).
[7] Variable return to scale (VRS).

4. Computing PSP Index

The following table shows the summary results of the public sector performance (PSP) for the period 2007-2016. The countries with a better result than the average of the sample countries, which is 1.00 are considered as countries with the best public sector. The countries with a performance index lower than the average 1.00 are considered as countries with lower performance level.

Table 3

Summary Results from Public Sector Performance (PSP)

	Opportunity Indicator				Musgravian Indicatore			
	Administrative	Education	Health	Public Infrastructure	Distribution	Stability	Economic Performance	Total PSP
Max PSP	1.37 (IRL)	1.48 (BL)	1.10 (IS)	1.27 (FRA)	1.27 (NM)	1.57 (IS)	3.05 (LUX)	1.39 (LUX)
Min PSP	0.7 (SVK)	0.43 (SRB)	0.88 (KOS)	0.68 (SRB)	0.80 (SLO)	0.30 (GRE)	0.29 (KOS)	0.78 (GRE)
Kosovo	0.9	0.67	0.88	0.78	0.93	1.39	0.29	0.86
Mean	1	1	1	1	1	1	1	1
Western Balkans	0.94	0.77	0.94	0.77	1.02	1.12	0.39	0.87
EU Countries	0.986	1.053	1.034	1.053	0.991	0.717	1.139	1.026

Source: Calculation by the author.

From the above table, seen that the PSP score range from 0.78, the minimum, to 1.39, the maximum. From the analysis of the results, Luxembourg (1.39), Ireland (1.26) and Iceland (1.21) are ranked as the countries with the best performance, while Greece (0.77), Bosnia & Herzegovina (0.80) and Croatia (0.84) are ranked as the countries with the lowest index of performance from all countries in the sample. Kosovo in this index ranks 30th out of 35 countries in this sample, with a performance index of 0.86, 15 percent below the average of 1.00.

The main contribution to this low level of the performance index is the economic performance sub-indicator which has a score of (0.29), one of the lowest compares to the countries in the sample. This is due to the fact that Kosovo has the lowest level of GDP per capita, with an average of (9,097) euros, and a high unemployment rate. The largest contributor to this level of the performance index is economic stability (1.39). Kosovo performed well in this area, having a stable inflation and a stable coefficient of variation. Among others, Kosovo has low results and sub-indicators in education, this index ranks with a value (0.67), compared to other countries is about 40 percent below the average, which is 1.00. The infrastructure sub-indicator also has very low scores. Although Kosovo has recently invested heavily in road infrastructure, this index has a value of (0.78), 20 percent below average and about 50 percent below the country with the highest level of this sub-indicator, which is the Netherlands (1.31).

In addition, countries such as Ireland and Norway are the best performing in terms of administration, while Slovakia is the country with the lowest administration index, with a score of (0.70). Among the best-performing countries in terms of education is Belgium, with a score of (1.48), while Serbia is considered the worst-performing country on this indicator, with a score of (0.43). The Netherlands (1.31) and France (1.27) are ranked as the countries with the best performing public infrastructure. In the area of public health insurance, Ireland (1.06) and Iceland (1.10) are ranked as the countries with the best performance, while B&H is ranked as the lowest-performing country in this area with an index of (0.97). On the other hand, countries such as Luxembourg (1.68), Ireland (1.30) and Iceland (1.26) achieved the best results in the category of Musgrave indicators. In Particularly, the sub-indicator of economic stability played an important role in the PSP index for countries of the Western Balkan, as these countries were not as affected by recent economic crises compared to the EU countries. In conclusion, this sub-indicator plays an important role in minimizing the differences between the PSP index of the Western Balkans Countries, whose value (0.87), is 20 percent lower than that of the EU Country, whose PSP index is (1.026).

4.1. Computing PSE Index

Table 4 presents the summary results of the public sector efficiency (PSE) for the period 2007-2016.

Table 4

Summary Results from Public Sector Efficiency (PSE)

	Opportunity Indicator					Musgravian Indicatore		
	Administrative	Education	Health	Public Infrastructure	Distribution	Stability	Economic Performance	Total PSP
Max PSE	2.65 (NDL)	1.40 (HUN)	1.82 (NDL)	2.23 (IRL)	3.12 (DEN)	1.31 (LTU)	3.03 (LUX)	1.32 (LUX)
Min PSE	0.65 (GRE)	0.56 (SRB)	0.77 (FRA)	0.68 (ROM)	0.57 (BEL)	0.32 (SPA)	0.30 (B&H)	0.81 (SRB)
Kosova	1.4	0.72	0.99	0.91	1.48	0.72	0.46	0.96
Mean	1	1	1	1	1	1	1	1
Western Balkans	1.06	0.84	1.18	0.85	1.13	0.93	0.43	0.94
EU Countries	0.89	1.03	0.96	1.13	1.07	0.64	1.01	0.96

Source: Calculation by the author.

Table 4 shows that the PSE results range from 0.78, the minimum, to 1.39, the maximum. The analysis of the results shows that Luxembourg (1.39) and Ireland (1.35) are ranked as the countries with the highest efficiency index, while Serbia (0.81), Greece (0.85) and B&H (0.84) are ranked as the countries with the lowest efficiency index. In this sample, Kosovo ranks 23rd out of 35 countries in this sample with an efficiency index of 0.96, which is 5

percent below the average of 1.00. The results also show that there are large differences compared to the results of the public sector performance index.

This is because the cost of achieving this level of performance is higher in some countries than in others. Among others, the efficiency index of the public sector in Kosovo is higher than in some countries that have higher scores in the public sector index compared to Kosovo. For example, Kosovo has a value in the performance index (0.86) that is 10 percent lower compared to Bulgaria (0.95), while it ranks 1 percent higher in the efficiency index. This result shows that Bulgaria has a higher level of average public spending, about 36.6%, compared to Kosovo, which uses about 27% of average public spending. The situation is similar to this in Italy and Cyprus. They have the same values in public sector performance, they have a difference of 20 percent, in the public sector efficiency index. This mean that Italy uses a higher level of public spending (about 53 percent) than Cyprus, which uses almost 43 percent, or 10 percent less to achieve the same results in the performance index. From the data analysis we also conclude that the efficiency of the public sector in Kosovo is lower than average of the countries in sample in all areas except administration (1.40) and revenue distribution (1.48): Education (0.72), Health (0.99), Infrastructure (0.90), Stability (0.72) and Economic Performance (0.46).

4.2. Computing Data Envelopment Analysis (DEA)

The following table shows the results of the data processing using total public expenditure as input, while total public sector performance as output.

Table 5

Summary results of model performed with the DEA method

Input-Public Spending	Input oriented		Output oriented	
Output-TPSP	Assumption CRS	Assumption VRS	Assumption CRS	Assumption VRS
Mean	39.10	46.70	39.10	73.64
DS	12.10	14.88	13.27	14.84
Min	24.92	32.42	24.92	55.52
Max	100	100	100	100
Efficiency Country	NLD	NLD, LUX	NLD	NLD, LUX
Number of efficiency seats out of total	1	2	1	2

Illustration: CRS-Constant Returns to Scale; VRS-Variable Returns to Scale; DS- Standard Deviation; NLD-Holanda; LUX-Luksemburg.

Source: Calculation by the author.

In the analysis of the model evaluation in terms of input-oriented efficiency, it is assumed that countries can achieve the same level of output if they reduce the level of public spending. Based on the results obtained, it can be seen that the average of the countries included in the study achieves an efficiency of 46.70%. This result shows that these countries generally have the potential to reduce total public spending by 54% and keep constant or not reduce the level of total public performance. Output-oriented efficiency assumes that countries can increase the level of output with the same number of resources. Based on the results of the output-

oriented efficiency analysis, it is found that the countries in the sample achieved an efficiency of 73.64%, which means that the countries in the sample could have increased the level of output by 27% if they had used the same level of inputs.

From the analysis of the data on the efficiency of general public expenditure, it can be seen that the countries of the Netherlands and Luxembourg achieved the result of 100% efficiency and are considered the most efficient countries in terms of total public expenditure by all the countries in the sample. The most inefficient country in the input-oriented analysis is Greece, with an efficiency score of 24.92, which means that Greece could have increased its output level by 75% at the same input level. In output-oriented analysis, the most inefficient country is again Greece, which achieves an efficiency score of 55.52. These results show that Greece could have achieved the same level of output if it had reduced the quantity of inputs by 45%.

In the analysis of the first input-output efficiency model, Kosovo is classified as a moderately efficient country. The value for input-oriented efficiency is 46.05, which means that Kosovo can achieve the same level of public sector performance with 54% less than the total public spending, while the values for output-oriented efficiency are 60.5, which means that Kosovo could have increased the level of results by 40% using the same level of public spending. Thus, compared to other countries in the sample, Kosovo is within the Production Frontier Technique.

5. Conclusion and Recommendation

The aim of this study was to analyze public government spending efficiency for Kosovo and EU Countries, especially Western Balkan Countries, for the period 2007-2016, by examining Public Sector Performance (PSP), Public Sector Efficiency (PSE) and the non-parametric approach (DEA). The result obtained shows that the PSP value ranges from 0.78, the minimum to 1.39, the maximum. Luxembourg (1.39), Ireland (1.26) and Iceland (1.21) are ranked as the best performing countries, while Greece (0.77), Bosnia & Herzegovina (0.80) and Ukraine (0.84) are ranked as the lowest-performing countries. Kosovo ranks 30th out of 35 countries in the sample, with a performance index of 0.86, which is 15 percent below the average of 1.00. In terms of PSE results vary from 0.76, the minimum, to 1.35, the maximum. Kosovo ranks 23th out of 35 countries in this sample with an efficiency index of 0.96, 5 percent below the average, which is 1.00. It is also noticeable that significant differences in the performance and efficiency of the public sector between EU countries and Western Balkan were encountered.

Analyzing input-output efficiency along the production opportunity curve, concluded that countries such as the Netherlands and Luxembourg have achieved an efficiency score of 100 percent and are considered the most efficient countries in terms of total public spending of all countries in the sample, noting that these countries lie along the production opportunity curve. Based on the input-oriented efficiency results, it is also found that the average of the countries included in the study achieves an efficiency of 46.70. This shows that countries are able to reduce total public spending by 54% and maintain the same level of total Public Performance.

Based on the results of output-oriented efficiency analysis, it is found that the countries in the sample achieved an efficiency of 73.64%, which means that the countries in the sample could have increased the level of output by 27% if they had used the same level of inputs.

The results obtained show the group of countries that have the highest scores for the value of the performance index, rank below the efficiency index value. The ratio of PSP index and government public spending shows that the countries with the lowest public spending have achieved better public sector efficiency (PSE). Moreover, we can note from the results that PSE is inversely correlated with a level of government public spending. These findings support the hypothesis that a higher level of public spending concludes with a lower efficiency outcome.

Public sector performance and efficiency should be a fundamental objective for all levels of government in Kosovo. To achieve this objective, it will be basic to adopt a systematic approach that will enable the improvement of the results of the economic performance index. The main contribution to achieve this is an improvement in economic growth as an important factor of the two sub-indicators, GDP per capita and high unemployment rate, that have performed at the lowest level and contributed that Kosovo has lower performance and efficiency of the public sector.

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