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THE IMPACT OF GOVERNMENT EXPENDITURES UPON ECONOMIC GROWTH IN POST-COMMUNIST COUNTRIES

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Abstract

This paper examines the relationship between the structure and share of government expenditure into Gross Domestic Product (GDP) and the real GDP per capita. Our study uses a micro panel data for a sample made of ten countries from Central and East European, for the period 2002-2012. The empirical results of the linear regression show that the GDP/capita is positively correlated with public order and safety expenditures as well as with economic actions, while national defense and general public services are negatively correlated. The results obtained largely correspond with the ones reached by other researchers approaching the topic of the relationship between economic growth and composition of the government expenditures. The health and education expenses, though instrumental for the long-term development of any society, did not show any significant impact upon the evolution of the GDP/capita, probably as a result of the short-term available data.

Keywords: economic growth, government expenditures, linear regression, sustainability of economic growth
JEL classification: H11; H50

1. INTRODUCTION

In the current EU fiscal framework the most important challenge faced by the member countries is the necessity to ensure the sustainability of the public finances in order to avoid the undermining of the Euro and of the economic union. The fiscal consolidation with an emphasis on the reform of the public finances can be instrumental to regain the confidence and to support economic growth.

An increased attention from the part of politicians and economists regarding the efficiency and performance of the public expenses is quite necessary in this context. The focus should be directed both on the level and the structure of the public expenses. We

intend to find the most important component of the public expenses, which contributes to the economic growth rate of the GDP. In the current context the state has to play an important role to support sustainable economic growth, along with the private capital.

The states apply different strategies in order to size up their public expenses according to the financial national and international context. In the economic crisis periods the state is called to allocate important public funds for social and economic actions. A significant impact upon the level and structure of the public expenses is given by the economic development of the countries, such as developing countries need a significant increase of the public expenses as share into GDP in order to bridge the gaps toward the developed countries.

The current paper analyzes the relation between the structure of the public expenses and the economic growth for a sample made of 10 states, respectively Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The selection of the states was done taking into account the similarities between these countries in what concerns the GDP per capita, economic development and socio-political status (post-communist countries in transition toward a fully functional market economy), as well as the geographic position.

The remainder of the paper is organized as follows. Section 2 presents a brief literature review. Section 3 discusses our data and their sources and presents a baseline analysis of the impact of the structure of the government expenditures on economic growth. Section 4 concludes the paper.

2. LITERATURE REVIEW

Numerous researches are dealing with the issue of the public expenses, approaching either the efficiency of the resources' allocation and the public sector performances (Afonso et al., 2005, p.7), or the structure of the public expenses and its contribution to the economic growth (Yu and Saurkar, 2009; Miyakoshi et al., 2009, pp. 320-340).

Recent empirical resources prove that the structure of the public expenses is more important than their overall level, offering a much clearer picture to the decision makers in view of a more efficient intervention to support a sustainable long term economic growth.

Yu and Saurkar (2009) have studied the impact of the public expenses' structure upon the evolution of the GDP for 44 developing countries from Asia, Africa and Latin America, for the 1980-2004 period. In order to determine the effects of the public expenses (agricultural, education, health, telecommunication, social protection and defense) upon the economic growth, the authors have used the Generalized Method of Moments (GMM). They have found there is a correlation between the public expenses and the GDP growth with each of the expenses category influencing in a different way the dependent variable, according to the region.

Miyakoshi et al. (2009, p. 320) have analyzed the maximization of the economic growth for the 1990-2008 period for 50 developing countries from Asia, Eastern Europe, Middle East and Latin America. The authors have determined the evolution of each expense category which fulfilled the condition for maximizing the GDP growth rate, using a vector for adjusting the public expenses.

Holzner (2011, p. 20) has analyzed the effects and the relations between the inequality, public expenses and economic growth for the developing countries from the Central and Eastern Europe for the 1989-2006 period.

The influence of the public expenses upon the economic growth was also studied by Cooray (2009, pp. 401-402), which took into consideration both the size of the public expenses' components as well as the qualitative factor – the political governance. The model was tested for 71 developed, developing and transition countries for the 1996-2003 period, which were also grouped according to the distribution of the income from the respective countries. The model intended to explain the evolution of the GDP/capita by the mean of the principal categories of public expenses (health, education and defense), investments, the degree of technological advancement, the role of the financial sector and dummy variables (very good, good, poor and very poor government). The study showed that the influence upon the economic development varies from one country to another, as the author found that only the countries with a very good government ensure an efficient use of the public funds, with a positive effect upon the national economy. The article points the need for a good government, which along with the increase in the public spending determines a sustainable economic growth.

Saad and Kalakech (2009, p. 40) have realized an econometric model based on the Keynesian consumption function in view of determining the correlation between the economic growth and four components of the public expenses (defense, education, health and agriculture) in Lebanon for the 1962-2007 period. The long term analysis has shown a positive correlation between the economic growth and the education public spending, the defense spending having a negative influence, whereas the health and agriculture were not significant. In the short run, education and health are in a positive correlation with economic growth, whereas agriculture and defense are not statistically significant.

Arpaia and Turrini (2008) have studied the impact of the public expenses upon the GDP/capita growth, both in the long term as well as for the short term, for EU-15, during the 1970-2003 period, on the basis of the 1911 Wagner's law. The cointegration test applied has shown that economic development and public expenses are connected by the mean of a stable long term correlation. For the analyzed period, the elasticity coefficient between the two mentioned variables registered sub-unitary values. For the less developed countries, with a high proportion of ageing population and low indebtedness, the public expenses grow at a higher pace than does GDP/capita. Also the study pointed out that on average, it takes 3 years for the adjustment of the public expenses toward their long term trend. In the Anglo-Saxon and European Nordic countries, the long term equilibrium is reached in a faster way compared to the Southern Europe countries, where the adjustment period is longer (except for Germany – a longer period and Greece, with a shorter period).

Starting from the same hypotheses Lamartina and Zaghini (2010, pp. 149-150) have completed the previous model for 23 OECD countries for the 1970-2006 period, testing the Wagner's law. The results of the analysis confirmed the Wagner theory, as the elasticity coefficient presented higher than one values (at a 1% increase of the GDP the general public spending increased by 1.028%). The study also concluded that the long term values of the elasticity coefficient are higher for the countries with a lower GDP/capita, suggesting an approach of economic development by the mean of the state funded activities, in order to catch up with the more developed countries.

3. METHODOLOGY, DATA AND EMPIRICAL RESULTS

The main objective of this paper is to analyze the relation between the main categories of government expenses and the economic growth for a sample made up of 10 EU member countries for the 2002-2012 period.

The data regarding the total and by categories public expenses, as well as for the GDP/capita were collected from the Eurostat Ameco data base and the World Factbook site. The explanatory variables, represented by the public expenses categories according to the functional classification, are shifted backward by 1 lag compared to the GDP/capita data, as the effects of the government consumption from the *t* year is transmitted onto the GDP/capita from the *t+1* year. As a consequence, the data for the public expenses categories are due to the 2002-2011 period, whereas the GDP/capita is due to the 2003-2012 period, with a one-year lag.

For the econometric modelling we have used the STATA 12 software.

We have started from the equation:

$$y_{it} = a_0 + a_1 GPS_{it} + a_2 ND_{it} + a_3 POS_{it} + a_4 EA_{it} + a_5 EP_{it} + a_6 HCA_{it} + a_7 H_{it} + a_8 RCR_{it} + a_9 E_{it} + a_{10} SP_{it} + dum_{1t} + dum_{2t} + \mu_i + \nu_t + \varepsilon_{it}$$

Where:

y_i – *ln(GDP/capita);*
GPS – General Public Services (as % of GDP);
ND – National Defense (as % of GDP);
POS – Public order and safety (as % of GDP)
EA – Economic affairs (as % of GDP)
EP – Environmental protection (as % of GDP);
HCA – Housing and community amenities (as % of GDP);
H – Health (as % of GDP);
RCR – Recreation, culture and religion (as % of GDP);
E – Education (as % of GDP);
SP– Social protection (as % of GDP);
dum1 – Accession to European Union;
dum2 – Crisis;
μ_i *- country fixed effects;*
ν_t *- time fixed effects;*
ε_{it} *- error term.*

The *i* index shows the cross-sectional dimension, whereas the *t* index shows the temporal dimension.

The dependent variable *ln GDP/capita* measures the economic development from each country by dividing the GDP to the number of inhabitants from each country.

According to the Keynes theory there is a causal relationship between the public expenses and economic growth because the public activities substitute the private ones, especially in areas such as health, social protection, infrastructure, education, public services and others.

Barro and Sala-i-Martin (1995) have divided the 10 categories of public expenses into two main categories:

- Productive expenses (public services, defense, public order and national safety, education, health, housing, public services and development, environmental protection), expenses that carry an impact upon the efficiency of the private sector;

• Non-productive expenses (culture, recreation and religion, social protection, economic actions) – expenses that affects the welfare of the consumers, but do not change the efficiency of the private sector.

Each category of public expenses has a well-defined role and it is difficult to pinpoint which one of these has a larger impact upon the economic growth. In order to determine this influence we will employ the econometric modelling.

In order to determine whether to use a fixed effects or a variable effects model we have applied the Hausman test.

The result obtained upon applying the Hausman test has shown that upon the panel data we should use the fixed effects regression model.

We have tested the restrictive hypothesis for the panel data, the presence of heteroscedasticity, with the Wald test. As the probability is lower than the significance threshold of 5% (>0.0032) we can reject the null hypothesis which sustains the homoscedasticity phenomenon, such as the analyzed data panel supports the presence of heteroscedasticity.

Generally, the non-observance of the homoscedasticity hypothesis of the residues is due to two categories of factors: the wrongful specification of the regression model or the nature of the phenomenon studied (Andrei, 2008, p. 208).

In presence of heteroscedasticity, the standard errors of the estimators are shifted apart and we should calculate robust errors in order to correct the possible heteroscedasticity.

As the available data make up a micro panel of data we consider it is not necessary testing of the stationarity of the series and the cross-sectional dependencies, as these tests are suitable for macro-panel data, with variables analyzed for periods of over 20 to 30 years (Torres-Reyna, 2007).

With the *testparm* test we have checked whether it is necessary to include the fixed effects and the Dummy variables due to the years analyzed. As a consequence the model includes two dummy variables:

• dum1 employed to determine whether the accession to the EU of the countries from our sample has influenced their economic growth. The variable is taking a value equal to 1 for the years in which the analyzed state is part of the European community and zero for the years when the country was not a part of the EU;

• dum2 reflects the advent of the economic and financial crisis and we wanted to catch the impact of this phenomenon upon the economic growth of the sample countries. We used the value 1 for the 2008-2011 period, when the economic crisis was started and manifested in Europe and the value zero for the economic growth years of 2002-2007. We have chosen this variable as for the vast majority of the analyzed countries (with the notable exception of Poland) the period 2008-2011 meant economic downturn and financial difficulties.

The results have shown that we can reject the H_0 hypothesis, according to which all the coefficients of the dummy variables are equal to zero, as Prob>F=0.0000, below the 10% threshold. We can conclude that the use of time dummy variable is necessary.

We have further run the regression with fixed effects, robust errors and dummy variables in order to catch the relations between the endogenous variable *lnGDP/capita* and the exogenous variables (see table no. 1 below).

Table no.1 The regression table with fixed effects and robust errors – 10 variables

Variables		Estimated coefficient	Standard Error
ln(GDP/cap)	y	-	-
General Public Services	GPS	-4.2507 **	1.9472
National Defense	ND	-9.8263 *	3.7933
Public order and safety	POS	12.7068	7.9137
Economic affairs	EA	2.3208 *	0.8193
Environment protection	EP	1.8876	5.3137
Housing and community amenities	HCA	-1.2514	3.3746
Health	H	2.1544	3.3216
Recreation, culture and religion	RCR	-1.1594	10.2278
Education	E	4.3478 **	2.2698
Social protection	SP	-1.3331	0.9685
Accession to EU	dum_1	0.0221	0.0921
Crisis	dum_2	0.5889 *	0.1106
_cons	a0	8.4315	0.2323
N		100	
$\bar{R}^2$		0.9802	

Source: Author's calculations

Notes: The dependent variable is the real GDP per capita. The table shows the estimated coefficients and their significance level (*10%; **5%). Standard errors (SE) are also shown in parentheses.

The total number of observations was of 100, made up of the annual data due to each of the 10 countries for the 2002-2011. The determination coefficient, R^2, shows the proportion of the total modification of the dependent variable explained by the chosen independent variables. We can notice than 98.02% of the variation is explained by the exogenous variables included in this model.

The Fisher test analyzes the hypothesis that all the coefficients of the slope of the regression equation be simultaneously equal to zero, or that the independent variables (the public expenses) does not influence in any way the dependent variable *lnGDP/capita.* The tests performed rejects this hypothesis should the value Prob>F is very close to zero, in our case of 0.0000 (Gujarati, 2011, p. 16).

Prob>F shows the critical probability of the test, respectively if this value is lower than 5% we can reject the hypothesis of the lack of significance of the independent variables, in favor of the hypothesis that the regression model is a significant one (Zax, 2011, pp. 17-27). As a consequence we can reject the null hypothesis and conclude that at least one the 12 regressors is statistically significant and as such the model is well built.

Another aspect of the regression table refers to the value of *p* for each independent variable. This shows whether the respective variable influences or not the dependent variable. The significance threshold is of 0.05. If the value of *p* for a variable is below this threshold, it means that the respective variable influences in effect the dependent variable. We also have to mention that, although the theory considers the 5% threshold, a significant number of researches and articles consider all the variables whose threshold is below 10%.
From the regression table no. 1 we can notice that for a significance threshold of 5% the variables *national defense* (ND), *economic affairs* (EA) and *dum2* significantly influences the evolution of the GDP/capita, whereas for a 10% threshold the variables *general public*

services (GPS) and *education* (E) are also significant in explaining the evolution of the dependent variable – the economic growth having coefficients significantly different from zero.

Running the multiple regression with fixed effects, robust errors and dummy time variables for the significant variables GPS, ND, EA, E and dum2 in STATA we have obtained the regression table no.2.

Table no. 2 The regression table with fixed effects and robust errors – 4 significant variables

Variables		Estimated coefficient	Standard Error
ln(PIB/loc)	Y	-	-
General public services	GPS	-3.7178	1.4268
National defense	ND	-10.3588	4.1810
Economic affairs	EA	2.4906	0.9943
Education	E	4.6941	4.0928
Crisis	dum2	0.5859	0.0796
_cons	a0	8.5744	0.2421

Source: Authors' calculations

Notes: The dependent variable is the real GDP per capita. The table shows the estimated coefficients and their significance level (*10%; **5%). Standard errors (SE) are also shown in parentheses

After running the fixed effects, robust errors and Dummy time variables regression for the variables whose coefficients were significantly different from zero, the *E* variable does not keep its properties and leaves the confidence interval at a significance threshold of 10%. We have decided to remove this variable from the final regression. We notice that the *public order and safety* variable (POS), has a $p = 0.143$, close to the significance threshold, which lead us to keep this variable for the final regression, as we considered the possibility that the run-over to be the result of the influence of the other variables.

The results obtained after running the final regression with the variables GPS, ND, POS, EA and dum2 are presented in table no.3 below.

Table no. 3 The final regression table with fixed effects and robust errors – 4 variables

Variables		Estimated coefficient	Standard Error
ln(GDP/capita)	Y	-	-
General public services	GPS	-4.6241 *	1.9404
National defense	ND	-9.8208 *	4.0430
Public order and safety	POS	16.2988 *	6.8034
Economic affairs	EA	2.0869 **	1.0535
Crisis	dum2	0.6072 *	0.0746
_cons	a0	8.5327	0.1631
N		100	
R^2		0.9783	

Source: Authors' calculations

Notes: The dependent variable is the real GDP per capita. The table shows the estimated coefficients and their significance level (*10%; **5%). Standard errors (SE) are also shown in parentheses

We can notice that after introducing the *public order and safety* variable (POS) in the final regression its *p* registers a favorable value, below 5%. Hence we can appreciate than the explanatory variables *General public services* (GPS), *national defense* (ND), *Public order and safety (POS)*, *economic affairs (EA)* and *crisis (*dummy) explain in proportion of 97.83% the evolution of the dependent variable (GDP/capita). The econometric model can be rewritten as follows:

$$ln(GDP/cap)_i = 8,53 - 4,62GPS_{it} - 9,82ND_{it} + 16,29POS_{it} + 2,08EA_{it} + 0,61dum_{it} + e_i$$

Both the general public services and the defense expenses are in an inverse relationship with economic growth. Hence, at a 1*pp* increase in the public general services the GDP/capita decreases by 4.62%, respectively by 9.82% at 1*pp* increase in the defense expenses. On the opposite side we find the expenses with public order and national security and the economical actions expenses, whose increase by 1*pp* determine the increase by 16.29% (in case of public order and national security), respectively by 2.08% (in case of economic actions expenses) of the GDP/capita.

The coefficient determined for the dummy variable (dum2) is of -0.61. In conditions of *ceteris paribus*, the countries influenced by the economic crisis phenomenon will register an increase of the dependent variable (GDP/capita) 0.61*pp* lower than for the countries less affected, such as Poland.

4. CONCLUSIONS

The current article analyzed the impact and the correlation between the public expenses and economic growth of 10 East Europe countries for the 2003-2012 using a linear multiple regression with fixed effects and dummy time variables. In order to better catch the effect of the public expenses upon the GDP/capita we have shifted by 1 lag backwards the explanatory variables against the dependent variable, the economic growth.

The results obtained from running the regression have shown that only 4 out of the initial 10 explanatory variables (the public expenses categories according to the functional classification) have a significant influence upon the evolution of the GDP/capita, respectively general public services, defense, public order and national security and economic actions expenses, which account for 97.83% of the modification of the dependent variable.

The health and education expenses do not have a significant influence as our time framework is reduced, whereas the effects of these expenses are felt with an important delay, obviously a lag bigger than one year, fact confirmed by the specialized literature consulted. Our findings in this area do not contradict the conclusions reached by Saad and Kalakech (2009, p. 40) as they performed a long term analysis, which has shown a positive correlation between the economic growth and the education public spending.

The general public services and defense expenses are in a negative relationship with economic growth, the results confirming previous researches (Pieroni, 2009, p. 329). By contrast, the public order and national security expenses modify in the same direction with the economic growth. The effect of the economic actions expenses is due mainly to the state granted subsidies to stimulate economic development along with the accession to the European Union, results which contradict the conclusions reached by a Holzner study (2011, p.20), which stated a negative correlation between economic growth and economic actions expenses.

The dummy variable – crisis was selected in order to express the general economic environment that affected most of the European countries starting with 2008. This variable had a significant impact upon economic growth and practically segregated our analysis period into two subperiods: a first one, between 2002 and 2007 and a second one, between 2008 and 2011. When it took a value equal to 1 it induced the analyzed countries (with the exception of Poland) to show an increase of the dependent variable 0.61*pp* lower than for the period when it had a value equal to zero. The variation is relatively low as the countries included in the sample have similar economic development, the evolution of their GDP/capita displaying similar trends for all the countries.

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