Effectiveness of Public Spending, Financed with European Funds in Central and Eastern Europe

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Abstract: The main goal of economic policy in Central and Eastern Europe – higher economic growth – aiming to reach the average value of GDP per capita in EU – requires to be found all instruments to influence on the aggregate supply. This purpose could be realized with monetary and fiscal instruments. The current research investigates only the impacts of fiscal policy on stimulating the economic growth.

As known, the public spending could make with national and European Union funds in the countries above. This paper studies the public spending, financed with the funds of EU, its impacts on the aggregate demand and after it – on the aggregate supply. This research focuses only on the effectiveness of funds from EU in new member states in the case of Bulgaria, and looks for a way to calculate the impact of expenses on the aggregate demand and after it to aggregate supply.

Keywords: Public spending; European funds; Economic growth; Central and Eastern Europe

JEL Classifications: E62, O41, G21, C32

The main goal of economic policy in Central and Eastern Europe - higher economic growth - aiming to reach the average value of GDP per capita in EU – requires to be found all instruments to influence on the aggregate supply. This purpose could be realized with monetary and fiscal instruments. The paper researches the public spending as an instrument to be stimulated the economic growth in new member states of European Union as Bulgaria. As known, it could make with national and with European Union funds (EF) in the countries above. The research focuses on the public expenses with EF in new member states in Central and Eastern Europe. It looks for to calculate the impact of these spending on the aggregate demand and after to the aggregate supply.

The public spending with European funds distinguishes from such financed with national sources. The specifics are following:

- The taxation made and taxes collect in the countries, net donors of the budget of EU;
- The public spending makes in new member states. It is a conflict of interests, because Gross Domestic Product (GDP), which European funds from, creates on one place, but spends on other place. Due to it, is very important for net donors of EU budget to know the effectiveness of funds paid. Because needs of the convergence between old and new member states, the main measure is significantly reduction of differences of GDP per capita between donors and new members.
Up to now the model is tested for public spending with national funds and additionally for public spending with EF\(^1\) in the case of Bulgaria.

1. Limitations of the Research

- The research uses the data for public spending paid, not the amount in EU budget, because only the projects successfully fulfilled have an multiple effects on the GDP;
- The public spending is distinguished by the criteria “impact on the GDP” — if it creates or consumes a part of GDP;
- Because the different way to be made the data by National statistics – with or not accumulation, monthly or quarterly – are recalculated the different variables to be mathematically compatible;
- The effectiveness is measured through the degree of impact of public spending with EF on the GDP.

2. Model

2.1 Model for Public Spending with National Funds

The original model was developed to test the impact of public spending on the GDP in the states in Central and Eastern Europe. The model is based on the such for testing the influence of monetary and fiscal policy on GDP and expected inflation of Carvalho, Eusepi and Grisse\(^2\). The model is adjusted to specific conditions in Central and Eastern Europe. The testing starts with public spending financed with national funds. It aims to be calculated the coefficients of impact the independent on dependent variables and to be compared with such for the public spending, financed with European funds. The research looks for stronger and multiple effects of public spending with funds from EU.

The public spending financed with national funds is tested up to now in case of Bulgaria for period 2005 – 2013. The period is different with such for public spending, financed with EF, because a lack of projects and of data for EF before 2008.

The model first was tested for the public spending, financed with national funds.

\[
\text{GDP}_t = a_0 + a_1 \text{PS total}_t + a_2 \text{PS total}_{t-1} + \varepsilon_t
\]

where

- \(\text{GDP}_t\) --- Gross domestic product for the current quarter
- \(\text{PS total}_t\) --- total public spending by consolidated state budget for the current quarter
- \(\text{PS total}_{t-1}\) --- total public spending by consolidated state budget for the previous period

\[
\text{GDP}_t = b_0 + b_1 \text{PCS}_t + b_2 \text{PCS}_{t-1} + \varepsilon_t
\]

where


2.2 Model for Public Spending with European Funds

The similar model was developed to test the impact of public expenditure paid by EU funds on the GDP. The study was carried out for period 2008 – 2013, as well as it is tested the impact of public spending, financed with EF during different quarters on annual GDP due to significant differences in the using of EF during the years of period – from very small amounts in the first years to around full amount by the EU budget for Bulgaria during last years of period. (see you the Graph below – part 3)

\[ \text{GDP}_t = a_0 + a_1 \text{EF}_t + a_2 \text{EF}_{t-1} + \varepsilon_t \]  \hspace{1cm} (5)

where

\( \text{GDP}_t \) --- Gross domestic product for the current quarter
\( \text{EF}_t \) --- European funds paid for the current quarter
\( \text{EF}_{t-1} \) --- European funds paid for the previous quarter

\[ \text{GDP}_{\text{year}} = b_0 + b_4 \text{EF}_{t-3} + \varepsilon_t \]  \hspace{1cm} (6)

\[ \text{GDP}_{\text{year}} = b_0 + b_3 \text{EF}_{t-2} + \varepsilon_t \]  \hspace{1cm} (7)

\[ \text{GDP}_{\text{year}} = b_0 + b_2 \text{EF}_{t-1} + \varepsilon_t \]  \hspace{1cm} (8)

\[ \text{GDP}_{\text{year}} = b_0 + b_1 \text{EF}_t + \varepsilon_t \]  \hspace{1cm} (9)

where

\( \text{GDP}_{\text{year}} \) --- GDP for the current year
\( \text{EF}_{t-3} \) --- European funds paid for the current year for the first quarter
\( \text{EF}_{t-2} \) --- European funds paid for the current year for the second quarter
\( \text{EF}_{t-1} \) --- European funds paid for the current year in the third quarter
\( \text{EF}_t \) --- European funds paid for the current year in the fourth quarter.

The model tests the impact of public spending, financed with EF in previous periods, because EU programs have character design and it means they have more long- than short-term effect on the
level of GDP. Furthermore, there is a time lag between the realization of public expenditure paid by EF and its impact on the aggregate supply. The variables used in the model are:

- GDP – quarterly, the data used for its measurement on the components of Final Consumption Expenditure. This indicator of GDP fully corresponds to public spending as a component of aggregate demand, including consumption, investments, public spending and net export;
- Public spending, financed with national funds – quarterly, total, capital spending, for salary and social insurance, for maintenance by the consolidated state budget for the period 2005 – 2013;
- Public spending financed with European funds – quarterly, EF paid, total and by different programs in national currency for the period 2008 – 2013. Because the statistic data is with accumulation, they are revaluated quarterly to be compatible to other data.

3. Data Presented by Graph

3.1 Data for Public Spending, Financed with National Funds

Presented below is the dynamics of public spending, financed with national funds by the consolidated state budget in the case of Bulgaria during the period 2005 – 2013.

![Graph 1](image)

**Graph 1**

**Source:** ИЗТОЧНИК: www.minfin.bg – Statistics – Consolidated fiscal program – Data for Consolidated fiscal program (quarterly)
3.2 Data for Public Spending, Financed with European Funds

Below it shows the dynamics of public spending, financed with European funds total and by main programs in the case of Bulgaria. The data is for the period 2008 – 2013, because after the
acquisition of Bulgaria to EU, one and half year the country is not ready to use European funds for the stimulating the domestic economic growth and to convergence to other countries in the Union.

Graph 4

Source: www.minfin.bg, Bulgaria and EU, Management of public spending, financed with EU funds, Structural and Cohesion funds – financial implementation

Graph 5

Source: www.minfin.bg, Bulgaria and EU, Management of public spending, financed with EU funds, Structural and Cohesion funds – financial implementation
4. Empirical Results

4.1 Results for Public Spending with National Funds

$$\text{GDP}_t = (1.00) + 0.721 \text{PS total}_t - 0.483 \text{PS total}_{t-1} + \epsilon_t$$  \hspace{1cm} (1)

The statistical analysis shows the correlation coefficients are meaningful. The coefficient of determination is close to 0.5, which is an evidence of a stable relationship between the dependent and independent variables. The economic analysis notes strongest impact of the total public spending by the consolidated state budget on the aggregate supply in the current quarter. In total expenditure includes such with a direct effect on the aggregate supply as capital spending and others whose effect is achieved indirectly through the consumer spending. All different types of expenditure will be tested separately below. The calculated correlation coefficient between GDP and the total public spending of the previous quarter in developed countries is positive. This coefficient, calculated for Bulgaria is negative and probably shows following:

- Fluctuation of the total public spending by the consolidated state budget on the quarterly basis, confirming by the data (each year in the fourth quarter is observed higher amount of these expenditure compared with other quarters);
- More of the public spending immediately heads to the consumption. It confirms the characteristic of countries in Central and Eastern Europe - like Bulgaria - with high elasticity of consumer spending on an income. By the overall costs a significant part of the income in different forms goes to consumption and the impact of public spending on the aggregate demand and therefore on the GDP loses in the short term;
- Short time horizon of economic agents in the countries in Central and Eastern Europe.

$$\text{GDP}_t = (1.00) + 0.611 \text{PCS}_t - 0.276 \text{PCS}_{t-1} + \epsilon_t$$  \hspace{1cm} (2)

The statistical analysis shows the coefficient of determination is more significant than such for the total cost by the consolidated state budget. On this base, the economic analysis confirms the
capital expenditure has a direct and an additional multiple effects on the aggregate demand and the GDP. The correlation coefficients between GDP and capital costs are significant. The impact in the current quarter is stronger, indicating these costs immediately produce a high demand for goods and services. As known from the theory, as a result - income increases and employment reduces not only in sectors, where the public capital spending made, but in others. It leads to an increase of aggregate demand, not only through the public spending (G), but also indirectly through the consumer spending (C). The correlation coefficient for the previous quarter is negative, but with less value compared with such in the equation for the total spending. It confirms the thesis the capital expenditure, because long duration of each stage of their turnover, retains the impact on the aggregate demand and therefore on the GDP for long period of time.

\[ GDP_1 = (1.00) + 1.068 \text{PSS}_1 - 0.722 \text{PSS}_{t-1} + \epsilon_t \]  

(3)

By the statistical analysis is found the coefficient of determination for this type of cost - for salary and social insurance - is the greatest compared with such for other types of expenditure. It confirms, the view of other studies of the author, for Bulgaria more significant impact on the aggregate demand and therefore on the GDP has the consumer spending. The correlation coefficients are absolutely significant. For the current quarter, this coefficient shows a very strong impact of the cost of wages on the aggregate demand. It confirms the high elasticity of consumption on an income and high marginal propensity to consume in the country. The earned income transforms into consumer spending in a short period of time and without time lag increases the aggregate demand. And it notes also a multiple effects in other sectors outside the publicly funded. The second correlation coefficient in this equation is negative with a great value compared to such for the previous quarters by other types of spending. The impact of income received from public funds, loses in a very short period of time and reaffirms very short time horizon of economic agents in the countries in Central and Eastern Europe.

\[ GDP_1 = (1.00) + 0.431 \text{PMS}_t - 0.327 \text{PMS}_{t-1} + \epsilon_t \]  

(4.1)

\[ GDP_1 = (1.00) + (0.493) \text{PMS}_t + \epsilon_t \]  

(4.2)

By the maintenance spending are tested two equations - with and without accounting the impact of maintenance for the previous quarter. It due to the type of expenditure - they immediately transforms into goods and services and increases the aggregate demand. The original thesis suggests that the cost for maintenance from the previous quarter will not affect the economic activity in the current one. It is confirmed by the statistical analysis. When it is tested two independent variables - for the current and for previous quarter - the coefficient of determination is not significant and it should be viewed critically. When it is tested only the expenditure for the current quarter, it remains approximately on the same level. The economic analysis notes in this case the expenditure has no significant effect on the aggregate demand in the country. In both equations the correlation coefficients are significant, but have higher value only in current quarter. As in the cases above, it confirms the economic agents without time lag transform earned income in various forms in the purchase of goods and services and realize the impact on the GDP in the same quarter.

4.2 Results for Public Spending with EF

\[ GDP_1 = (1.00) + (0.424) \text{EF}_1 - (0.338) \text{EF}_{t-1} + \epsilon_t \]  

(5)

The statistical analysis finds the correlation coefficients are significant. The economic analysis shows, the public spending with EF paid has a stronger impact on the GDP in the current quarter compared with the previous one. It means nevertheless of the nature of the EF projects, the multiple effects on the GDP immediately realize. Moreover, by the global economic crisis is realized
"crowding out" effect, successfully implemented to be substituted reduced private investment with public ones, which is very important in the countries in Central and Eastern Europe with small disposal local resources. The second coefficient in the regression equation is negative. The economic correlation between the independent variable - EF, and the dependent variable - GDP is a positive. Measured like this, it shows following:

- Strong seasonal fluctuations of using of EF (confirmed by the data - in the first quarter the amount paid is less compared with in others for each year of the period. Nevertheless , as will be seen from coming analysis - it has a strong impact on the value of annual GDP);
- unequal using of European funds year by year – from small amount in first years of period to strong increase in last years.

The testing of public spending financed with EF and its impact on annual GDP quarterly begins with the data for the first quarter.

\[
\text{GDP}_{year} = (1.00) + (0.896) \text{EF}_{t-3} + \epsilon_t
\]  

(6)

Statistically the correlation coefficient is significant. The coefficient of determination shows a strong dependence of the GDP from the using of EF (R - square = 0.803). By the economic analysis EF paid during the first quarter has a strong impact on annual GDP and most probably due to the time lag between making of the spending and their multiple effects on the value of aggregate supply. The amount of EF paid during the first quarter in each of the years, studied in this paper, is least, reducing the maximum possible impact on the aggregate supply.

\[
\text{GDP}_{year} = (1.00) + (0.370) \text{EF}_{t-2} + \epsilon_t
\]  

(7)

The statistical coefficient of correlation for the impact of public spending financed with European funds on the GDP for second quarter should be considered critical. The coefficient of determination displays the depending on the value of GDP from the using of EF, but less than such in the first quarter (R - square = 0.137). By the economic analysis it is found the public spending, financed with EF in the second quarter has a relatively low impact on annual GDP. It probably due to the seasonality in some priority sectors of the Bulgarian economy and the result appears on GDP in the third quarter.

\[
\text{GDP}_{year} = (1.00) + (0.995) \text{EF}_{t-1} + \epsilon_t
\]  

(8)

Statistically the correlation coefficient is extremely significant. The coefficient of determination shows a very strong dependence of the GDP from the using of EF. (R - square = 0.991). Due to the project nature of EU funds paid and it needs from certain time lag between use and their impact on the value of aggregate supply. The public expenditure with these funds during the quarter has strongest influence on annual GDP. From the data it was noted, during the third quarter of years of the period are paid largest amounts of funds. The results of analysis on a quarterly basis and their impact on annual amount of GDP corresponds to the data obtained by the analysis in paragraph 1 of this section, examining the impact of public expenditure paid by EF on GDP for the whole period - 2008 - 2013.

\[
\text{GDP}_{year} = (1.00) + (0.895) \text{EF}_t + \epsilon_t
\]  

(9)

Statistically the correlation coefficient is extremely significant. The coefficient of determination shows a very strong dependence of the GDP of using of EF. (R - square = 0.801). The public spending financed with EF has a strong impact on annual GDP. This analysis fully corresponds with such in paragraph 1 of this section, proving public spending during the current quarter strongly influences on the amount of annual GDP in the Bulgarian economy. It explains the short time horizon of economic agents as part of the realized income in the same period allotters for
consumption, thereby increasing the aggregate demand and hence the aggregate supply in the economy.

In a summary, statistically for all quarters of year (except the second) the coefficients of determination give the strong dependence of GDP from public spending, financed with European funds. The high correlation coefficients between paid European funds and GDP mean the stimulating of the economic activities in Central and Eastern Europe and the increasing of the aggregate demand depends on the absorption of European funds.

5. Conclusions

The main goal of economic policy in Central and Eastern Europe - higher economic growth - aiming to reach the average value of GDP per capita in EU – requires to be found all instruments to influence on the aggregate supply. This purpose could be realized with monetary and fiscal instruments. The current research investigates only the impacts of fiscal policy on stimulating the economic growth and observes public spending, financed with the funds of EU, on the aggregate demand and after it – on the aggregate supply.

The thesis is testing with the regression model, created especially for this research. Statistically the coefficients of determination of dependent variable – GDP and independent variables – public spending are more significant by EF paid compared with national funds. The coefficients of correlation are significant in two cases - paid with national and European funds, giving the possibility to take the conclusions after the testing about the impact of public spending on the aggregate supply and using as an instrument to realize the economic growth.

The economic analyses notes strong influence of public spending with national and European funds on the aggregate supply (excepted such for maintenance), more determining for GDP growth are paid with EF. For the picks of public spending with national funds (first quarter 2008 and first quarter 2009 in a case of Bulgaria) is not calculated more strong impact on GDP though the financial multiplier and it notes the problem with effectiveness of public spending in Central and Eastern Europe. In conclusions, the high correlation coefficients between paid European funds and GDP mean the stimulating of the economic activities in Central and Eastern Europe and the increasing of the aggregate demand depends on the absorption of European funds.

References


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Dr. Kamelia Assenova was awarded with the International Fellowship of International Federation of University Women - Geneva, Switzerland in March, 1992. She was the postgraduate student at the University of West of England – Bristol, UK in 1993. She is a lecturer in Monetary Economics, Economic growth at UNWE, NBU and Russe University – Bulgaria.