PUBLIC INVESTMENTS INCENTIVE FACTORS OF ECONOMIC GROWTH - CASE STUDY OF REPUBLIC OF NORTH MACEDONIA

Florije Miftari
Faculty of Economics, AAB University,Kosovo, florije.miftari@universitetiaab.com
Besime Ziberi
Faculty of Economics, AAB University, Kosovo

Abstract: The basic function of public finances is economic stability that implies the use of public finance instruments in order to stabilize economic cycles to achieve full employment, overall price stability, achieving an adequate rate of economic growth, a stable rate economic development.

Governments to contribute to economic balances, job creation, and productivity growth tend to boost productive public spending by undertaking long-term activities in the sphere of public investment, namely public, health and education infrastructure, as well as in the sphere of research and development. Both theoretical and empirical studies conclude that public investment impacts on economic growth, represent an instrument of low growth, but their increasing effect is influenced by various factors such as economic circumstances, level of development the quality of governance, the efficient management of investment projects, the sectors in which it is invested, the capital fund, etc.

The purpose of this paper is to research the short-term and long-term effects of public investments in the Republic of Northe Macedonia in economic growth. The analysis takes into account the data on the structure of public investment, gross domestic product for the time period 2008-2017. Using the multiple regression analysis OLS, we conclude that in the long run the impact of public investment on economic growth is symbolic given that a very small percentage of public expenditures for public infrastructure investments although Macedonia is characterized by a low capital public fund.

Keywords: public investment, productive spending, economic growth, gross domestic product.

1. INTRODUCTION

Public investment in the public sector, especially investment in education, health, in-house and infrastructure, enables the creation of a favorable environment for promoting private sector investment and activities to create employment opportunities and economic growth. But, according to some theoretical and empirical data, public investment in infrastructure has a significant impact on anti-cyclical fiscal policy. Different programs and projects, undertaken by governments after the Great Depression, both in the US and other countries, have been the main driver of economic incentives by governments. Even during the financial crisis 2007-2009 (Great Recession), government spending on infrastructure projects was an important component of the stimulus package.

Both theoretical and empirical studies conclude that public investments, public infrastructure are a critical factor in the health and wealth of a country by creating conditions and business ambitions for businesses to produce goods and services more efficiently. Usually, governments generally expect the increase in public spending, in particular infrastructure, to result in higher economic growth in the short term by stimulating demand and in the long term, thus increasing overall productivity. However, their growing effect is influenced by various factors such as the economic situation (recession or expansion), the level of development of the country, the type of investment financing, the type of investments (investments in basic infrastructure such as roads, railways, airports and enterprises are expected to produce greater production benefits than investments in certain types of infrastructure, such as hospitals, schools, other public buildings), the quality of governance, the efficient management of investment projects, the sectors in which the investment is invested, the fund of basic capital, etc.

Infrastructure investments are also likely to affect employment. Recent research suggests a modest decrease in the unemployment rate as a result of increased investment in infrastructure. Also, according to recent economic research it turns out that during an economic expansion, with a relatively strong labor market, infrastructure investments are unlikely to have any lasting impact on the unemployment rate. However, during a recession, the same investment is likely to lower the unemployment rate to some extent.

In order to produce positive effects, any public investment promotion recommendation in the EU should go hand in hand with a rigorous selection of projects to ensure that investment is efficient and productive.[129]

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[129] Jasper de Jong, Marien Ferdinandusse, Josip Funda, Igor Vetlov, "The effect of public investment in Europe: a model-based assessment", Europen Central Bank, Working Paper No 2021 / February 2017

However, the economic impact of infrastructure and the way it affects and changes with the business and employment cycle remains subject to significant debate. Most see this form of government spending that is, in anticipation of giving some high-cost economic benefits and ineffective use of resources. Others see investment in public infrastructure as an effective form of government spending that can boost economic activity not only in the long run but also for shorter periods.

Government investment in Europe, on average. in 2015 reached 3.2% of GDP, ranging from 6.7% in Hungary to 1.5% in Israel. The percentage has dropped from an average of 4.1% in 2009, when fiscal expansion was incorporated. One-third of public investment is oriented to economic issues, mainly in transport, followed by defense (15.2%)[130].

During 2009-2017, government investments in Macedonia, recognized in the budget structure as capital expenditures, typically include about 4.4% percent of Gross Domestic Product (GDP). Capital spending by the central and local government reaches the highest level in 2012, about 5.2 percent of GDP, and since then has fallen to about 4.2% of GDP in the year 2017[131].

2. REVIEW OF RELATED LITERATURE

On the effects of public infrastructure investment on private sector productivity by differing scholars, there are opposite views, so David Alan Aschauer (1993), one of the earliest researchers measuring the statistical ratio between public investment in infrastructure and public productivity, concludes that , the slow pace of productivity growth since the early 1970s, coupled with an aging population, with a downward trend of workers to the general population and other demographic factors, poses a dilemma for policy makers interested in strengthening the relative long-term position of the United States in an increasingly competitive economic environment. He considers that public infrastructure is a factor in production and that the fall in public capital is responsible for part of the productivity slowdown.

The opposite view of this issue is Douglas Holtz-Eakin (1993), which rejects conventional arguments for a federal infrastructure program, claiming that a large-scale public infrastructure program has no apparent effect on productivity growth; in the current fiscal climate of scarce federal resources, a federal infrastructure program is not in line with the purpose of reducing the deficit; has better infrastructure strategies than new spending and massive construction programs; and policies aimed at increasing private and non-public investment will have a more positive impact on US competition.

In studies on the impact of public investment on economic growth in 12 EU countries (Jasper de Jong, et al., 2017), using the VAR method, it is concluded that public capital increases productivity in most countries included in the sample, as the impact of public capital over GDP is estimated to be positive. However, although public investment spending broke down during the recent crisis in many countries with major consolidation needs, the authors find no convincing evidence that public capital in production is currently greater than before the crisis.'

The effect of public investment depends on different factors and circumstances. Regarding Jean-Marc Fournier[132], the effect is more pronounced in areas related to major externalities such as research and development or health, while it is lower in countries where the public capital fund is higher, such as Japan. However, public investment is a lever for promote growth in the long run.

Also, according to the findings of the International Monetary Fund conducted in 17 OECD countries, on the macroeconomic impact of public investment, it is noted that increasing public investment increases output in the short and long term, completes investment and reduces unemployment.

Several factors model the macroeconomic effects of public investment. When there is economic and monetary stagnation, the effects of demand are stronger and the ratio of public debt to GDP may decrease. Public investment is also more effective in boosting production in countries with the highest efficiency of public investment and when it is financed through borrowing (debt). According to (Fournier J, 2016), public investment has a positive effect on long-term growth and labor productivity. Public investment can also increase the speed of convergence of growing countries. Public investment is more useful in some areas than others such as health, research and development.

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[130] *Government at a Glance 2017*, OECD Publishing, Paris *http://dx.doi.org/10.1787/gov_glance-2017-en, page 17*

[131]Author's calculations based on data from the Ministry of Finance on macroeconomic indicators https://www.finance.gov.mk/files/u1269/Bilten_juni_2017_1.pdf and series data from the realization of the Budget of RM, https://www.finance.gov.mk/mk/node/898

[132] Fournier, J-M. and A Johansson (2016), "The effect of the size and mix of public spending on growth and inequality", *OECD Economics Department Working Papers*, No. 1344..

Fournier also finds that the economic growth initiated by public investment growth may be reduced to a high level of public capital stock due to lower returns.

3. PUBLIC INVESTMENT IN REPUBLIC OF NORTH MACEDONIA

In the Republic of Macedonia, during the period 2009-2017, government investments recognized in the budget structure as capital expenditures typically include about 4.4% percent of Gross Domestic Product (GDP). Capital spending by the central and local government reaches the highest level in 2012, about 5.2 percent of GDP, and since then has fallen to about 4.2% of GDP in 2017.

Graph 1. The Capital Expenditure trend in the Republic of Macedonia for the Period 2009-2017

	2009	2010	2011	2012	2013	2014	2015	2016	2017
capital expenditure	278	317	366	395	355	364	382	368	418
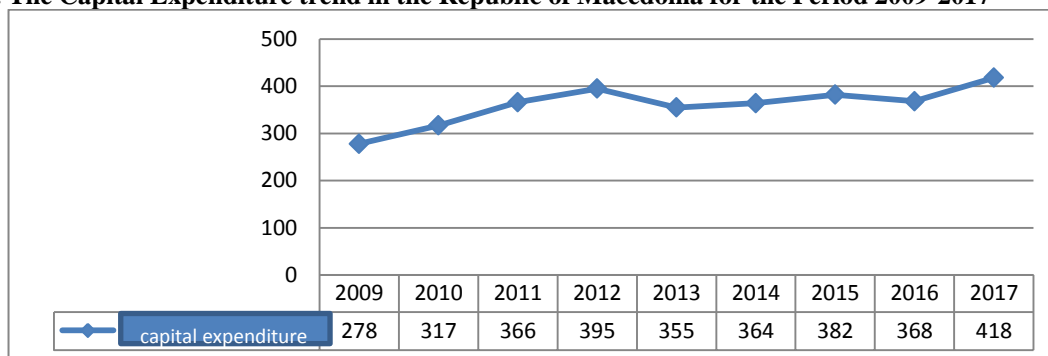
(in million euro)
Source: Authors based calculations and serial data from the realization of the Budget of the Republic of Macedonia, https://www.finance.gov.mk/mk/node/898

Table 1. Capital Expenditures as the GdP of the Republic of Macedonia for the period 2009-2017 (in million euro)

		2009	2010	2011	2012	2013	2014	2015	2016	2017
Real GDP Growth	%	-0.4	3.4	2.3	-0.5	2.9	3.6	3.9	2.9	0.0
GDP at Current Prices		6,767	7,109	7,544	7,585	8,150	8,562	9,072	9,723	10,066
Capital Expenditures		278	316,6	365,8	394,7	354,6	364,3	381,9	368,3	418
% in GDP of Capital Expenditures		4,1%	4,5 %	4,9 %	5,2%	4,4	4,2	4,2	3,8	4,2

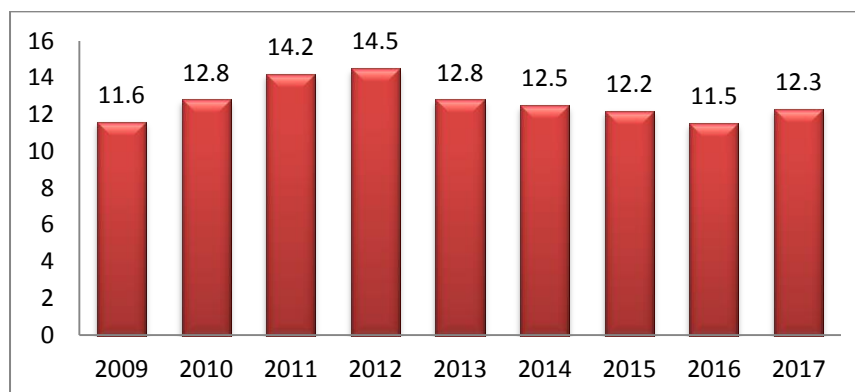Source: Author's calculations based on data from the Ministry of Finance on macroeconomic indicators https://www.finance.gov.mk/files/u1269/Bilten_juni_2017_1.pdf and series data from the realization of the Budget of RM, https://www.finance.gov.mk/mk/node/898

Graph 2. Total Budget Expenditures and Capital Expenditures in Republic of Macedonia for the Period 2009-2017 (in MKD million)
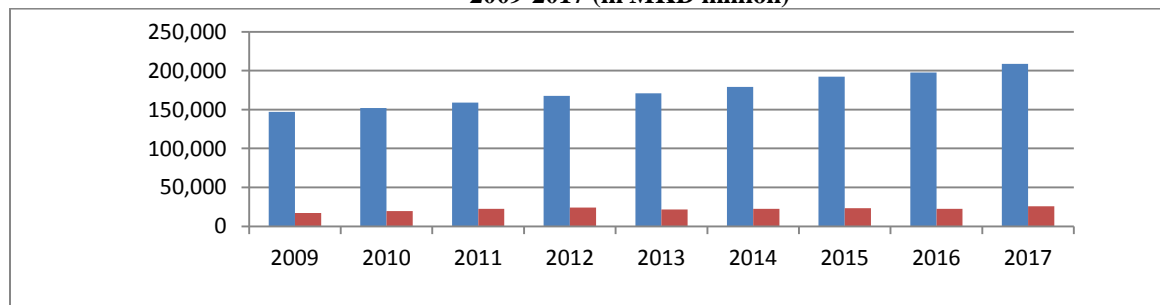
Source: Author's calculations based on serial data from the realization of the Budget of the Republic of Macedonia, https://www.finance.gov.mk/mk/node/898

Graph 3: Participation in% of Capital Expenditures in Total Budget Expenditures

Source: Authors based calculations and serial data from the realization of the Budget of the Republic of Macedonia, https://www.finance.gov.mk/mk/node/898

4. RESEARCH METHODOLOGY

After examining the theoretical literature and in particular the empirical one in terms of measuring the impact of capital expenditures on economic growth we have specified and built the econometric model of multiple regression and we used the small squares method known as the Ordinary Least Square)

The Small Square Method (OLS) is the simplest method for analysis and is the approximate estimator of the dependent variable of the dependent variables when we have one or more undependable variables.

To test the importance of the variables, we have used the STATA system. In the following we will interpret the data and their source to follow the analysis and findings from regression.

The data in this study are secondary data provided by World Bank and Ministry of Finance indicators in Macedonia. The variables included include Gross Domestic Product, Capital Expenditures, Private-Public Private Telecom Investments and Gross Fixed Capital Formation.

The econometric model represents an abstraction of reality. In the simple regression model, we have the dependent variables and an explanatory variable including the random error that implies all other factors that may affect the dependent variables but are ignored in the model.

Dependent variable = Constant + explanatory variables + random error

On the left side of the equalizer is the dependent variable whereas on the right hand side of the equation appear:

$$\gamma_i = \beta_0 + \beta_1 X_1 + \mu_i$$

a) Constant

b) Explanatory variables and

c) The random error

In our concrete case we have built the multiple regression model. Multiple / multi factorial regression involves two or more explanatory variables and considers the following form:

$$y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_{2+} \beta_3 X_3 + \mu_i$$

From the data available in the research we have built the multiple regression model that take the form:

$$GDP = \beta_0 + \beta_1 Cap.\,exp + \beta_2\,inv.\,telec._{+}\, \beta_3 GCF + \mu_i$$

N from the equation we estimate: GDP = Gross Domestic Product; Cap.Exp = Capital Expenditures; GCF = Gross Fixed Capital Formation

In econometric models the influence of variables is estimated through: i) T - statistics; (ii) P - value (probability value); represents the exact level of significance: it indicates the lowest level of significance in which we can reject the zero hypothesis.

The determinant coefficient indicated by R2 indicates how close are the observations with the regression line. The determination coefficient takes the value: **$0 \le R^2 \le 1$**. The STATA program has produced the data on which we build the econometric model in numeric form. The econometric model takes the form of the following:

$$GDP = -55.77 + 0.0014355\,Cap.\,exp + 1.41\mathrm{e}-07\,inv.\,telec._{+}\, 0.553 GCF + \mu_i$$

The results lead us to the fact that the model is significant and the variables selected as independent effect the variable dependent on our economic growth. R - square concretely the determination coefficient in the model tells us

the importance of the model and with a coefficient of 0.7643 we say that 76% of the independent variables explain the dependent variable. We recall that the regression analysis is used to assess statistical variability among variables. Regression coefficients show the average Y change when the respective variable varies for one unit and the other factors remain constant.

That means that with a unit growth of exactly one percent of capital expenditures, Gross Domestic Product will increase to 0.0014355 while keeping other factors unchanged. Variable: Capital expenditures is significant with p-value 0.091. On the other hand, raising a private-public spending unit on Telecom will have a positive impact on economic growth. Variable - Private Public Expenditures in Telekom has been matched with a p-value of 0.057. The coefficient of gross capital formation is not significant with a p-value of 0.194.

Table 2 .Empirical results of analysis

MODEL	OLS	
Independent variables	*Dependent variable GDP*	
	Coefficients	*Standard errors in parentheses*
Capital Expenditures	.0014355	(.000584)
INV.Telecom	1.41e-07	(4.67e-08)
Gross capital formation	.5559653	(.3336496)
Constant	-55.77557	(21.15966)
Observations	30	
R-squared	0.7643	
r2_a	0.5287	
F	6.87	

*** p<0.01, ** p<0.05, * p<0.1

5. CONCLUSIONS AND RECOMMENDATIONS

Based on theoretical and empirical literary literature on identifying the impact of public investment on economic growth, we constructed and modified the linear regression model in many ways with the OLS method using the Softwerik Stata program, came to the conclusion conclude that in the long run the impact of public investment on economic growth is symbolic given that a very small percentage of public expenditures for public infrastructure investments although Macedonia is characterized by a low capital public fund. Bat the growth of one of the capital expenditures has a positive effect on economic growth in the Macedonian Case. Another important aspect of the study is the positive effect of private - public investments, in particular Telecom 's investment, which has also positively impacted economic growth.

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