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The Impact of Public Investment on Economic Growth in Republic of Macedonia

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Abstract
The main purpose of this paper is to estimate the impact of public investment on economic growth in Macedonia during the 2003-2014 period. Using the method of simple linear regression and ordinary least squares method (OLS) we will make assessment of the impact of public investment on economic growth in the Republic of Macedonia. According to the results of empirical research we proposed that public investments have a high impact on average real growth of the economy of the Republic of Macedonia. As we have found the majority of authors in their studies that public investments have a significant effect on the economic development of a country, and our results are of the same evaluation. Where possible we concluded that increasing public investment to 1%, would affect GDP growth for 0:35%. Since t-test shows that t = 1.26, is greater than 0.05 we may conclude that this ratio has significance.

Keywords: *public investment, economic growth, Republic of Macedonia, economy, development*

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Introduction

In conditions of globalization, the economy of Macedonia functions as an open market economy. In all modern economies, the state has an undisputable role and sometimes it has a primary role in the economic activity. The basic duty of the state in relation to the economy of each country's progress is the establishment and functioning of the legal and institutional platform on which economic activity takes place. Investment is the central factor in determining the gross domestic product, which is the measure of total economic output of a country. The society should invest more in order to increase its capacity to produce more goods and services with low cost which means greater productivity and economic growth. Public investments are closely related with the state and its functions. They are an important tool with what can be dealt in the economic, politic and social life of a state. An important role in the provision of public investment is played also by donors.

Public investments represent that part of national income allocated to cover public expenditures, which are general and special. Public investments mean the designation of public inputs to produce public services. There are complementarity relations between public and private investments about fulfilling one's needs in public, collective and individual at the time of production of wealth, the distribution and its consumption. Public investments play an important role in the redistribution of assets that ultimately performed well between public spending and public revenues, because the state public expenditure foreseen in the budget and performs effectively and can satisfy those needs which citizens - privates not can satisfy them with their tools. So, public investment are spending money which makes the state and other legal entities - public to meet the collective needs and the public interest. Also, public investments play an important role in the reallocation and redistribution of wealth and income within the country, from one district to another. Public sector policy in the government of the Republic of Macedonia in the medium and long term is based on the investment. Expected results are: reconstruction and modernizing the public infrastructure in order to ensure the highest efficiency taking into account the lower cost.

Growth of public investment positively will affect economic growth

To ascertain the validity of the hypothesis we will apply the method of small squares regression analysis respectively. Therefore through regression analysis will be confirmed or will cast hypothesis in question. After entering and setting hypothesis, the paper is organized as follows: in the second half will do the review of literature; in the third part through mathematical formulas will do econometric model specification and clarification of the assessment methods. Then through calculations and specialized program STATA, will replace the values of the variables found in the formula and to test the selected model; In the fourth part we will make the interpretation of the results of population and the last part is the conclusion and limitations of the model with recommendations for policy makers to and further research of this issue by other authors.

Public investment and fiscal policy

Two groups of opinions influence political decisions on public investment. On the one hand, there are microeconomic opinions dealing with the effectiveness and costs and benefits of individual projects. On the other hand, macroeconomic aspect focuses on the overall level of public investment, short-term effects in the economy and the long-

term sustainability of public finances. Microeconomic opinions justifying public investment (as opposed to private investment) based on market failures arising from the difference between financial income and social income. Investing should be taken where the social benefits exceed costs for funding. However, the nature of public goods of some good investment suggests that financial income will be lower than the social benefits and costs. The private sector can adopt social income and will therefore provide less than what you need for this type of investment. When governments can adopt social benefits, direct public investment is justified. The macroeconomic aspect presents two separate opinions. As a component of public expenditure, investment has affected the cyclical position of the economy. Instead of the difference between investment and current budgets, the total deficit is the one that determines the impact of fiscal policy on the total consumption. Microeconomic criterion does not take into account the time of investment expenditures in terms of economic targets for stabilization. Second, we have to consider the longer-term fiscal sustainability aspects (Toigo and Woods, 2016). Due to differences between social and financial income, group projects of public investment financed by government debt, each of which have passed the test of microeconomic efficiency, can lead to unsustainable fiscal position. Sufficiently is to note that high levels of debt affect, among other things, on the economy through (Toigo and Woods, 2016): "crowding out" of private investment efficiency through higher interest rates (Toigo and Woods, 2016); increase budgetary resources should be diverted to "unproductive expenditure" for debt repayments rates (Toigo and Woods, 2016); reducing the available maneuvering room for the government to implement policies for stabilization (Toigo and Woods, 2016).

Opinions about sustainability are important because while each investment project, based on its quality, can improve well-being, their full impact may put public finances on track towards unsustainability potential large losses of welfare resulting from macroeconomic instability and deteriorating structural conditions. This process can be considered a marginal investment which puts debt above the level that is considered sustainable, though it is socially important negative end to the economy as a whole, for example in terms of its impact on long-term interest rates. If instead of borrowing, investment is financed through taxation, then opinions about its sustainability remains a place of different microeconomic efficiency. Heavy losses of twisted effects of taxation would have to be included in calculating the benefits of the project against its costs. In this case, the total investment limit in general would be sustainable levels of taxation. It is therefore crucial to harmonize the three criteria of microeconomic efficiency, fiscal sustainability and stabilization in a comprehensive framework to manage fiscal policy and public investment.

The special treatment for public investments case

A minimum of three arguments that accentuate the special nature of investments were presented: the potential to be self-financing; intergenerational fairness; political-economic questions that present a tendency against public investments. Firstly, public investments can be self-financing by the money acquired from these projects (e.g. user fees) or by the long-term positive effects of economic growth, taxes and public revenue. Economic literature presents different means by which public investments improve economic growth (Kessides, 1993): adding transitional costs to public sector production, which helps to lower the expenditures – partially through the effect of transactional costs, increased access to markets and market data and improved competition in the export/import markets; increasing the productions of other factors (labor and other capital)

by allowing the use of additional technologies and improving the access and availability of data as well as the collection of additional private resources; having a structural influence over the supply and demand; e.g. public infrastructure contributes to economic diversity (especially regarding open technology such as communication which enables application of modern technologies in major part of the sectors).

A significant and growing part of empirical literature studies the potential influence of public capital over production, productivity and production factors. It is theoretically valid that investing can be self-financing. However, a substantial number of qualifications are to be applied. First, the project can have a social value since it increases economic growth. But, depending on the effective tax rate, public financial incomes can still be lower than the favorable costs of the funds (including tax charges associated with the debt or tax finances). Despite this, the percentage of influence of the GDP over some investment projects will be indecisive due to the great length of the production cycle. The percentage of influence will be sensitive to the decrease rate percentage and the tax rate which can change over time. When planning public finances, I would recommend a cautious approach that includes a rigorous decrease of unsafe projects. Second, even when the project increases wealth without creating economic growth (e.g. by decreasing travel length or delivering an educational project, such as the museum), there will be a theoretical possibility to elicit the willingness of users to pay for the service. Even so, the capability to involve user fees depends on the nature of the investment. If the investment creates means or services which are public goods, the characteristic of indispensability does not allow paying for their usage. Even when investing is not a public good, the opinions of other market failures, for example asymmetrical data (like the difficulty the customer faces when choosing the exact amount of health services that need to be taken), deserve better arguments or opinions about the distribution that can lead to policy makers not compelling the users to pay for the services provided by public investments.

The third remark is that the properties of enhancing growth do not relate specifically to those components of public expenditures classified as an investment to a national account. Some items of current expenditures can allow financial incomes to be self-financing. For example, accumulated incomes in human capital (e.g. skills, education etc.) can have an advantageous effect in the long-term growth and the tax basis, but big portion is classified as current expenditures. Nonetheless, there is a balance between completely accepting this opinion and preserving the transparency of the financial frame. It is difficult to adopt a definite definition of growth improving expenditures after the generally accepted fiscal standards are withdrawn. According to Pietro Toigo and Roberts Woods “national accounts have clear and effective definition (there can be other political reasons for preferring this definition, discussed below). It should also be mentioned that some investment projects are not self-financing simply because they are of bad quality and their effect over growth, or amount of user fees, is overestimated or underestimated”.

Since the fiscal frame cannot escalate the quality of investment by itself, a special treatment for macroeconomic level investment needs to be prepared in order to execute a detailed investment plan for evaluation. Furthermore, intergenerational influence of investments is different from that of current expenditures. Big infrastructure projects, like roads, create a flow of services for effective development of investment that can continue for more than 40 years, while the benefits from current expenditures are materialized when the expenditures are made. According to the principle of intergenerational fairness, the costs made to cause flow of services need to expand through generations that have use of them. Empirical evidences demonstrate that expenditures of public capital investments

have a tendency to substantially increase in the distant future. Therefore, the current expenditures need to be financed by current tax incomes, while the investments have to be financed by current and future tax incomes. The most convenient way for the government to expand its investment spending is to finance, at least some fraction of them, by debt. This debt can be paid back by future generations who will also benefit from the investment.

The concept of intergenerational fairness is relatively accessible, but its application can be complicated. Public expenditures finance a big part of public services that can be utilized by different age groups at any time. In order to evaluate the intergenerational influence of public expenditures, the combination of provided goods and services is as important as the difference between current and investment expenditures. Consequently, the identification of different effects over current and investment expenditures is just one of the elements that aid the attainment of intergenerational fairness. There are also more complex dynamics that have an impact on the distribution of expenditures over the groups in a generation. The financial frame should balance out these complexities with the need for explicit and simple rules.

The third argument for distinguishing public investments is part of the political-economic opinions. As soon as the benefits from the investments are materialized in the distant future, public investments can experience an unfavorable treatment in comparison to the current expenditures during the fiscal savings. As underlined by the literature for political economy and fiscal politics (Alessina and Perroti, 1994), the lobby and personal interests have a tendency to cause a partiality in favor of current expenditures. Hemming and Ter-Minasian (2004) noticed that it is easier to reduce the investment expenditures than to reduce the current expenditures, simply by allowing a faster loss of value of investment means through decreasing the maintenance expenditures or stopping some big infrastructure projects. Current expenditures, on the other hand, tend to be focused on in projects that require a permit, public sector employment, salaries and pensions which are politically difficult to reduce. This focus in the short-term political-economic opinions during the long-term efficiency leads to social losses, since growth improving investments are inevitable, but the effects of neglecting investments in public infrastructure occur after a long time.

The fiscal adjustment is based on the reduction of effective public investments rather than the control of current expenditures or the strengthening of incomes, which can also lead to a misevaluation of the structural fiscal position of a country (Easterly, 1999). Difficult choices will be deferred when the investments are extended due to the political and economic consequences of the low-level public capital investment history. Similar misevaluation can be made about the effect of intergenerational fairness. If the effect of the fiscal tightening was assessed with regard to the deficit and debt inclusion, it would be more auspicious for future generations since public obligations are minimized. Despite that, the fiscal consolidation that lowered public investments would be detrimental to the legacy of future generations because of the loss of welfare improvement investment. It suggests that the balance between means and obligations instead only that of obligations (debt) can possess an advantage in the analysis of the influence of politics over generational fairness. This will be further discussed in the following chapter.

Review of the literature

Despite the fact that the relationship of public investment and economic growth has a long period of research, it has a voluminous literature, again this area has numerous

spaces that are far away from the particular response. A part of literature has a positive direction, where it is given that public investments lead to economic growth, not only through positive effects on the economy, such as the provision of education, health, scientific research, advanced technology, but they also promote the growth of private investment, which directly affect real economic growth. On one hand, studies put in to question the efficiency of public investment and its relationship with private investment in the other hand, and argue that public investment incentives not necessarily have a favorable impact on economic growth of a country.

Khan et al. (1990) examine the relative importance of public and private investment in promoting economic growth in a large group of countries in development. The study's results show that private and public investments have a different influence over economic growth, private investments have a much wider impact and direct than public investment. There were also changes in terms of effectiveness that public and private investments generate. Devarajan et al. (1996) presented data on 43 countries in development, which proved that government spending does not have any significant effect on economic growth. Pritchett (1996) suggests another explanation for Devarajan, he discovers hypothesis "White Elephant", under which he argues that public investment in developing countries that are often used for projects are unproductive and inappropriate. As a result, the share of public investment may be too weak a measure to affect current public capital increase. Public investment should be a source of endogenous growth. A endogenous economic growth, which has output is stochastic trend, temporary policy changes have long-term consequences of output. Barro (1991) examines the effect that bring public investment consumer and public spending in the economic growth of countries. After analysis of several variables, he confirmed that public investment didn't have any significant effect on economic growth rates, while the rate of economic growth negatively correlated with the share of consumer spending in government. In1993, Easterly and Rebelo (Easterly and Rebelo, 1993) used panel data to investigate the contribution of transport networks that have economic growth. Came to an important conclusion of the study that existed a strong relationship between economic growth and public investment in transport networks. Nazmi and Ramirez (1997) analyzed the impact of public and private investment. They jumped at the conclusion that public investment had a positive and significant effect in increasing the whole production. At the same time they concluded that the impact of public investment was statistically ident with the impact of private capital expenditures. The issue of whether additional public investment is an effective political strategy will depend primarily in the nature of the process of economic growth, as well as levels of public investment and other types of public spending. A fiscal policy strategy would be reasonable if increased public investment, would have a positive effect and increase the country's economy. Public investment should be measured by the marginal effects that they bring. The fact that a public investment has a positive influence does not mean that increasing public investment would represent an effective strategy of economic growth.

Empirical analysis on testing the effects of exchange rates

Once we have reviewed the empirical evidence of public investment in relation to economic growth, now through an econometric model will test how it will affect the growth of public investment and public spending in the economy of the Republic of Macedonia. First we will present econometric model specification and estimation method and thereafter will analyze the data in empirical paper and will realize estimating

econometric model and as a result will make the interpretation of results. In addition to this part will check the validity of hypotheses that we defined in the introduction to the paper.

Econometric model specification and evaluation of small squares (OLS)

Using the method of simple linear regression and ordinary least squares method (OLS) we will make assessment of the impact of public investment on economic growth in the Republic of Macedonia. We will present the following linear regression model three dimensions:

$$Y = B_1 + B_2 X_1 + B_3 X + u_i$$

• Y - represents the dependent variable - (variables that explain, regresant, endogenous, predicted etc.), in our case research as the dependent variable is economic growth (GDP); X - represents the independent variable (regresor, exogenous, which predicts etc.), in our case as independent variables are public Investments (IP) and public spending (G); B1, B2 and B3 are known as parameters, or otherwise known as the valuation coefficients, where the constant parameter B1, and B2 and B3 represent the parameters of the evaluation of variables that are independent; Ui - is stochastic variables, in different literature can be seen even with the term Error Term, this component contains all the factors or variables that affect the pattern but are not foreseen in the model, is a random variable without observation which can the take positive or negative value.

Evaluation of small squares (OLS)

The simplicity of this model stems from the assumption for the error term, assumed to e≈N (0, σ2). In other words, knowing the value of the term error model which does not explain anything about the other variables (distribution of error term is independent of other variables), and the error term observations are not correlated with each other. In principle only is normally distributed with E (e) = 0 (error term has an average 0) and a constant change. And for a given X series no correlation between observations for more terms are heteroskedastic error. Put another individual observations over time are different individual observations and such approach may be justified in cases where the sample size from indirect data is very small. However, ignoring the panel structure of the data assuming that the error term is independent and identically distributed, leading to results that are not appropriate in many models. Following concerns raised by classic linear regression model, effective assessment can be achieved using the method of small squares (OLS).

The data econometric model are considered as follow in Figure 1 and Figure 2.

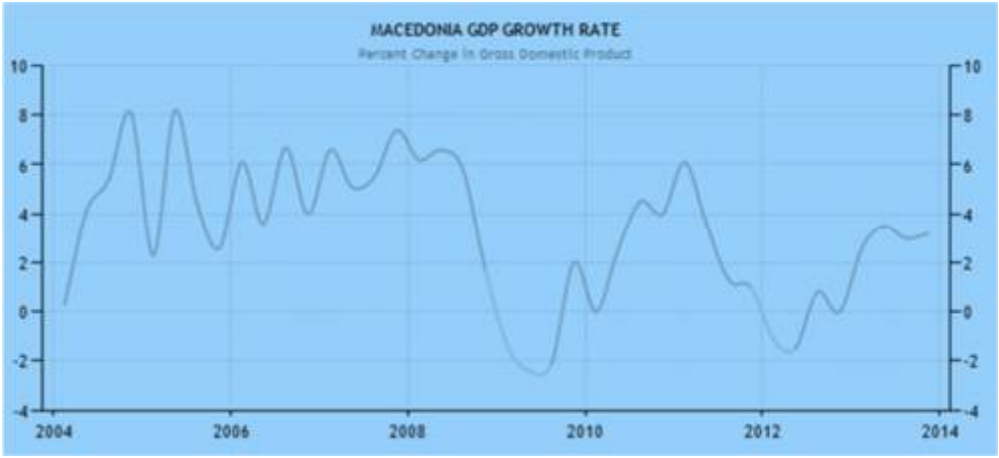

Figure 1. Macedonia GDP Growth Rate. Source: Trading economics, Macedonia GDP Growth Rate. Retrieved from: https://tradingeconomics.com/macedonia/gdp-growth

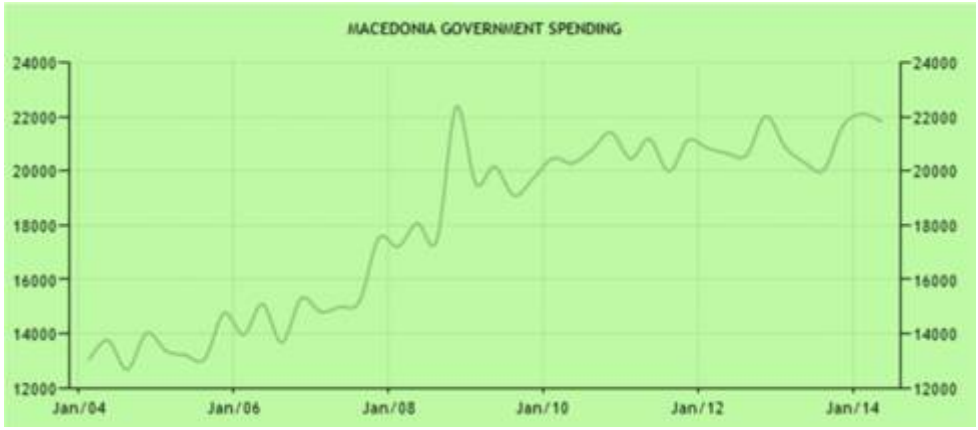

Figure 2. Macedonia Government Spending. Source: Trading economics, Macedonia Government Spending. Retrieved from: https://tradingeconomics.com/macedonia/government-spending

Calculation of econometric model and interpreting the results of population

Now we will do econometric model assessing the impact of public investment (capital) and public spending in real economic raising the Republic of Macedonia. Our aim is that through analysis that we are dealing regression checking the validity of the hypothesis that presented at the beginning of this paper. Since in our case the data are in percentage (%), then it is not necessary that you incorporate these data in the log. We have included three variables model, there is an exogenous dependedvariableor which is GDP and two variables that are public investment and public spending. Below we will present the model as multiple regression.

The Econometric model is as follows:

Y (real GDP) = B1 + B2 *(pub. inv*) + B3 (*pub. spending)* + Ui

Where Y represents real GDP or regresantin, constant coefficient B1, B2, B3 and B4 assessment partial quotients public investment and public spending and error-which represents standard. By STATA_12 software will do the calculation of the equation coefficients evaluation of sample regression function. After estimating the coefficients do evaluation B1, B2 and B3, making substitutions respective values will present three-dimensional regression function.

GDP = 36.79 + 0355pub.inv. - 0.762pub.spending
(se) 13:52 12:28 0.68
(t) 2.72 1:26 -1:12

According to the results of empirical research we proposed that public investments have a high impact on average real growth of the economy of the Republic of Macedonia. With this conclude that the eventual increase public investment to 1%, would affect GDP growth for 0:35%. Since t-test shows that t = 1.26, is greater than 0.05 we may conclude that this ratio has significance. Based on this result we can prove the hypothesis of the paper submitted at the beginning of which states that: *Increase public investment will contribute positively to economic raising.* Meanwhile, regarding the impact of public spending in real economic raising the Republic of Macedonia, the outcome could show the not significant effect of public spending in the economy i.e. during the calculation of

the model indicated that an eventual change of public spending to 1%, will negatively affect economic raising to -0.76%. Seeing t-test is valid -1.12, which is less than 0.05 according to this we can see that this ratio does not significate.

With the results obtained above, we are compatible with most of the studies done in developing countries such as Davarjan (1996) presented data on 43 put into development, which proved that government spending does not have any significant effect on growth, Pritchett (1996) suggests another explanation for Davarajan, he discovers hypothesis "White Elephant", under which he argues that public investment in developing countries that are often used for projects are unproductive and inappropriate. As a result, the share of public investment may be too weak a measure to affect current public capital growth, Barro (1991), examines the effect that investment bring public and public consumption spending in the economic growth of countries. After analysis of several variables, he confirmed that public investment don't have significant effect on economic growth rates, while the rate of economic growth negatively correlated with the share of consumer spending in government. All these results of this research and to others reflect the real situation in Macedonia.

Conclusion

The main aim of this paper is to analyze the impact of bringing increased public investment and public spending in the economy of the Republic of Macedonia. On the basis of empirical results obtained from the model we find that public investment have a significant effect on the domestic economy, which according to these estimates econometric We support our hypothesis formulated at the beginning, which says: Increase investment public would impact positively on economic raising. As we have found the majority of authors in their studies that public investments have a significant effect on the economic development of a country, and our results are of the same evaluation. Where possible we concluded that increasing public investment to 1%, would affect GDP growth for 0:35%. Since t-test shows that t = 1.26, is greater than 0.05 we may conclude that this ratio has significance. However, the figures presented in public by the government and the reality that we live are very different, because not every public investment is efficient. According to the data imply that the more public investments have so many would increase the economy of Macedonia, but this will happen only if the investment would be with profit in the long term and any additional investments also bring economic growth addition, only then can we accept the fact that as far as the state invest the higher would be the economy. This testifies the fact that Macedonia has a high public investment, but not high economic growth, ie not with the same proportion, as public investment should be productive, such as investment in infrastructure, in power plants, education, health, technology where all these conditions would allow easier for private businesses which have a direct impact on the domestic economy, where instead of these investments, they are oriented in the construction of Skopje in 2014, we monument unnecessary and that have twice the negative effect since they are imported from other countries.

Like any other research and this research we own contains some specific limitations which may mention the exclusion of all variables needed to determine more accurately the impact of public investment in the economy, as one might say that if public investments are made spread throughout the country (distribution of investment), the source of funds used are the debts or accumulation of the country's economy, etc.

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