

Bexheti, Abdylmenaf; Mustafi, Besime

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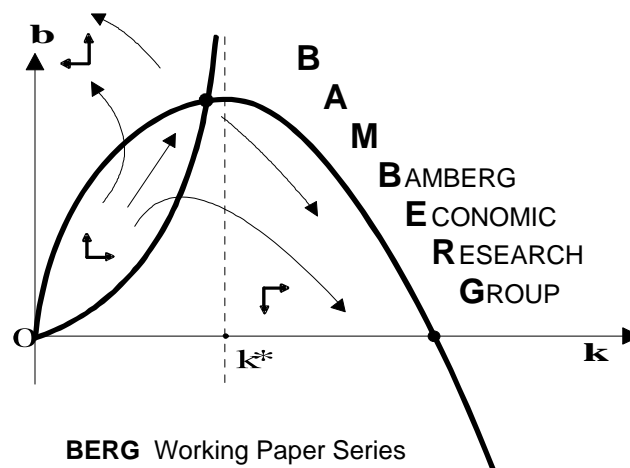
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Impact of Public Funding of Education on Economic Growth in Macedonia

Abdylmenaf Bexheti and Besime Mustafi

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Bamberg Economic Research Group
Bamberg University
Feldkirchenstraße 21
D-96052 Bamberg
Telefax: (0951) 863 5547
Telephone: (0951) 863 2687
felix.stuebben@uni-bamberg.de
<http://www.uni-bamberg.de/vwl/forschung/berg/>

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Redaktion:

Dr. Felix Stübben*

* felix.stuebben@uni-bamberg.de

Impact of Public Funding of Education on Economic Growth In Macedonia

Academician Abdylmenaf Bexheti (Corresponding author)
Faculty of Business and Economics, South East European University
Ilindenska b.b,1200 Tetova, Macedonia
Tel: +389 44 356 059 E-mail: a.bexheti@seeu.edu.mk

Besime Mustafi, PhD Student
Faculty of Business and Economics, South East European University
Ilindenska b.b,1200 Tetova, Macedonia
Tel: +389 44 356 065 E-mail: b.mustafi@seeu.edu.mk

Abstract

The main aim of this study is to investigate the relationship between public spending on education after the process of decentralization and economic growth in Macedonia as low income state. This paper do not have intention to make a picture of education system in Macedonia, how it functions or if education is open to all, but has the aim to measure the public spending on education as a determinant that has impact on economic growth even positive or negative. This paper raise the following important question: ***do all measures of public spending on education promote economic growth?*** As a lack of data in developing countries like is Macedonia the specification of empirical models to test the causal effect on public spending on education and growth is paradox and this explain why the road through which public education expenditure affects economic growth is not yet well understood. The inter-relationships between government expenditure and education quality should be taken into account when formulating education policy to promote economic growth (Corray, 2000). The channels by which education can promote growth maybe do not lie to quantity of public spending but on quality of the policy that means where youth end after their education.

We investigate the link between public spending on education and economic growth in Macedonia using Logarithmic Multiple Regression Model. We came in conclusion that the model is significant. The result shows negative effect on public spending on education and economic growth in the case of Macedonia. The results also raise another statement ***what exactly are the highly educated workers doing together (that is so sensitive to their being highly educated) if it does not involve things changing at the margin?*** (Aghion, et.al 2009). It ends with some key conclusions and recommendations that there has to be founded another channels to produce quality education - skilled labor by which will rise the productivity and economic growth.

Keywords: public expenditures, education, economic growth, real GDP, public investment, skilled labor.

1. Introduction

The relationship between economic growth and various macroeconomic factors has attracted the interest of many economists and policymakers since long ago. The history of the issue led back to the era of the classical economist Adam Smith, followed by neoclassical economists such as Alfred Marshall and Henry Schultz (Tilak, 2005). There a lot of questions rising by academicians, economists, researchers and others regarding the factors that affect economic growth. A lot of research papers were done to estimate the factors that affect economic growth dedicated to different countries. Education is seemed to be a crucial factor for a nation that promotes economic growth as (Friedman, 2002) said: “The gain from the education of a child accrues not only to the child or his parents but also to the other members of the society. The education of my child contributes to your welfare by promoting a stable and democratic society. It is not feasible to identify the particular individuals (or families) benefitted and so to charge for the services rendered. There is therefore a significant “neighborhood effect”.

Mitra (2011) Said that population that is better educated has less unemployment, reduce dependence on public assistance program and greater tax revenue. From well educated nation benefit the whole country. The incentive to expand and improve depends on the rate of return expected” For public education, that rate of return, for the general taxpayer, not just the parents, has to be the public benefit they get from it; the increases in productivity, unity, civility, health, etc. of our society (Becker 1993) . As Becker says, people and the society have to clarify that education is a public benefit when the whole people in charge benefit.

Education is becoming the most powerful engine of global growth and success. It is also considered an important tool that has a great impact on the level of the country’s development and growth. Public financing of education as investment is an economic issue well debated nowadays. There are a lot of research papers that estimate the relationship between public funding of education and its impact on economic growth. The results depend from the level of the countries development.

These papers came with different conclusions. Some of them showed that the higher the public funding the higher is the economic growth. Some others authors come in conclusion that the link between these two variables is even negative and some others concluded that even though there is a positive link this is a fade. So we can conclude that the relationship between these two economic indicators vary from the countries development. That means there are developing countries – low income countries with low standard of living and on the other hand developed countries with high income level and the standard of living.

When we take in consideration the results from research papers that are dedicated for developed US countries we see that the results are quite positive. The positive link is also for European Countries but US countries are more developed in this direction. Regarding to EU budget (2007-2013), participation in Research was increased in the part of private participation; each part is 5-6 times higher in USA compared to Europe, (Bexheti 2013). Investing in research can lead in creating more productive workforce and regarding this issue the US Investments in Education are quite high linked with economic growth. There are also some different results even negative when the research for public spending on education and economic growth is dedicated for countries in transition.

The education level and the GDP are very important for the whole social wellbeing. Investing in education means to invest in human resources that are one of the most important factors of production function that is directly linked with the countries development level and with the standard of living. In this world of globalization the achievement of the competition is another important issue that has impact on economic growth. In theory there are a lot of models that show the positive link between public expenditures on education and the economic growth.

Following the Solow Model (1956) if the public expenditures on education are productive this may intent to invest in human capital but this affect only the equilibrium factor ratios, not the growth rate at all, but in general there are growth effects. Following the Solow model we also can say that this theory cannot show the same result if we take in consideration the countries level of development taking in the consideration the productivity and quality of public spending on education in Macedonia. A lot of empirical studies show the relationship between public expenditures in education and economic growth. Even though they come out with different conclusions they contribute in highlighting the correlation between public funding of education and economic growth.

The relationship between public spending on education and real GDP is an issue that the transition countries that are candidate for European Integration has to take into account very carefully. Public expenditure of education should

create skilled labor that is linked directly with the lowering the unemployment rate, rising the investment and in the same time improving the social wellbeing at all. One focus of European Policy makers is also to improve the quality of public spending on education. This lead as a responsibility for European economies to prepare skilled labor with the main aim to gain global competition.

Qualified people with the right skills can boost the European Union's economy by leading innovation and improving competitiveness (Funding of Education in Europe 2000-2012 the Impact of the Economic Crisis). In this research paper we will try to estimate the link between public spending on education and economic growth in Macedonia as a low income country, after the process of budget decentralization. We use Logarithmic Regression Models to estimate the variables and come in conclusion that even though there are limitations in this paper as a result of lack of data (The process of decentralization after 2005), the model is significant. **The result shows negative effect on public spending on education and economic growth in the case of Macedonia. The results and other data are presented below in the paper.**

1.1 Review of related literature

There are a lot of research papers that estimate the relationship between public funding of education and economic growth both in developed and transition countries. Some results of Barro (1999), Hanushek and Kimko (2000), Hanushek and Kim (1995) and Hanushek and Woessmann (2007) showed positive link between education quality and economic growth. Gregorious and Ghosh (2007) made use of the heterogeneous panel data to study the impact of government expenditure on economic growth. Their results suggest that countries with large government expenditure tend to experience higher economic growth.

Adelaide (2008) suggests no relation between total government expenditure on education. Also Cooray, (2009) find that total government expenditure on education has no statistically significant effect on economic growth. Also note that the quality variables increase substantially in size and significance when government expenditure is controlled for.

Abu and Abdullah (2010) investigates the relationship between government expenditure and economic growth in Nigeria from the period ranging from 1970 to 2008. They used disaggregated analysis in an attempt to unravel the impact of government expenditure on economic growth. Their results reveal that government total capital expenditure, total recurrent expenditure and education have negative effect on economic growth. The underline idea is that by investing in education the state will create skilled labor which supposes to be the engine of a country development.

Berger and Fisher (2013) said that States can build a strong foundation for economic success and shared prosperity by investing in education. Providing expanded access to high quality education will not only expand economic opportunity for residents, but also likely do more to strengthen the overall state economy than anything else a state government can do.

In today's economy, the trend of exponential growth of the competitiveness doesn't require quantity but more quality in education and applied knowledge (Buxheti, 2007) *Just as castles provided the source of strength for medieval towns, and factories provided prosperity in the industrial age, universities are the source of strength in the knowledge-based economy of the twenty-first century" (Dearing 2002)*

Public funding of education is a key factor that influences the whole social wellbeing in a country. The government should take care in public financing of education to promote so economic growth. More generally, public spending has virtually no impact on health and education outcomes in poorly governed countries. These findings have important implications for enhancing the development effectiveness of public spending. The lessons are particularly relevant for developing countries, where public spending on education and health is relatively low, and the state of governance is often poor, Rajkumar and Swaroop (2007).

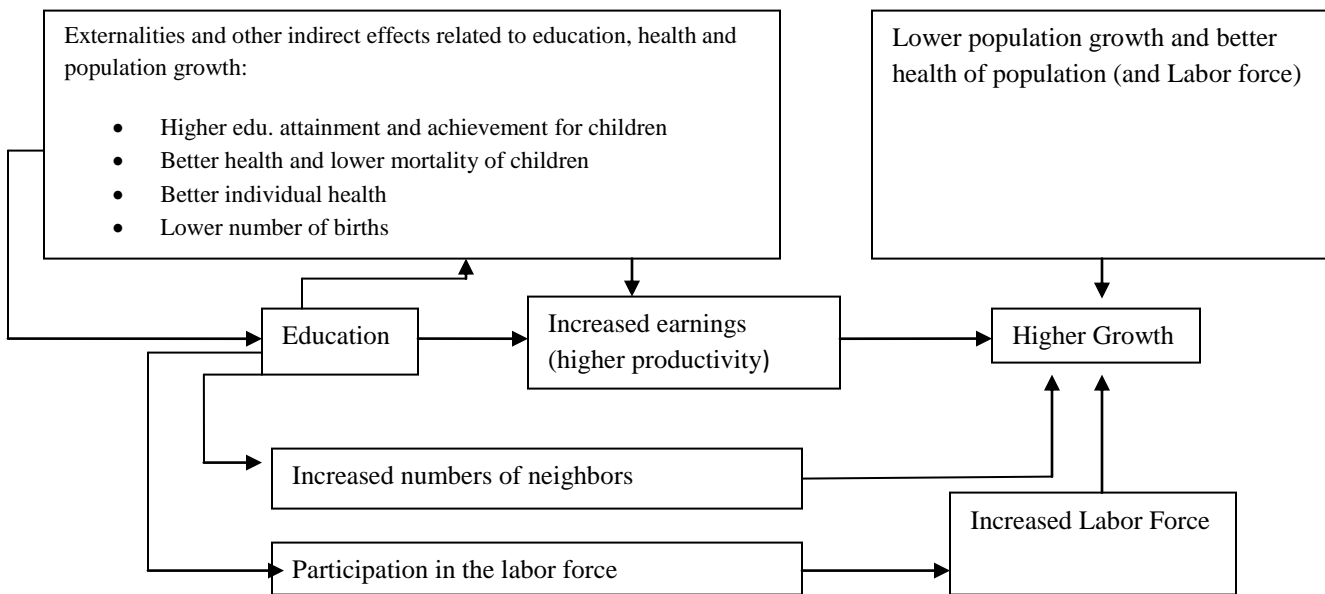
Gregorious and Ghosh (2007) made use of the heterogeneous panel data to study the impact of government expenditure on economic growth. Their results suggest that countries with large government expenditure tend to experience higher economic growth.

Devarajan and Vinay (1993) used panel data for 14 developed countries for a period ranging from 1970 to 1990 and applied the Ordinary least square method on 5-year moving average. They took various functional types of expenditure (health, education, transport, etc) as explanatory variables and found that health, transport and communication have significant positive effect while education and defense have a negative impact on economic growth.

Woodhall, (2007) answered to the question: Do recent advances in economic thinking contribute to the major challenges faced by education?" must, in this case, receive the answer "Yes". The paper has shown that recent research on measurement of externalities and the contribution of education to economic growth, through knowledge creation and transmission, have strengthened the notion that HE is a public investment.

Michaelowa (2000) said that Education increases an individual's earning potential, but also produces a 'ripple effect' throughout the economy by way of series of positive externalities and diagrams the impact of education on both micro and macro level as follows (refer Figure 1):

Figure 1: Micro and Macro Level effects of Education and Economic Growth



Source: Michaelowa, Katharina (2000), "Returns to Education in Low Income Countries"; Evidence for Africa

Berger and Fisher (2013) conclude that states can build a strong foundation for economic success and shared prosperity by investing in education. Providing expanded access to high quality education will not only expand economic opportunity for residents, but also likely do more to strengthen the overall state economy than anything else a state government can do.

High quality education means highly educated workers but it is not clear how this skilled labor will create innovation to promote economic growth. *What exactly are the highly educated workers doing together (that is so sensitive to their being highly educated) if it does not involve things changing at the margin?* - Aghion, et.al (2009).

Basic Theoretical Framework

The Keynesian Theory-A lot of economist paid attention in estimating the relationship between these two issues like education and growth. From the Keynesian view, public expenditure can contribute positively to economic growth. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government expenditure augments the aggregate demand, which provokes an increased output depending on expenditure multipliers.

The Solow's Theory-Is introduced by Robert Solow and T.W. in 1956. In Solow model, other things being equal, saving/investment and population growth rates are important determinants of economic growth. Higher saving/investment rates lead to accumulation of more capital per worker and hence more output per worker. On the other hand, high population growth has a negative effect on economic growth simply because a higher fraction of saving in economies with high population growth has to go to keep the capital-labor ratio constant. In the absence of technological change & innovation, an increase in capital per worker would not be matched by a proportional increase in output per worker because of diminishing returns.

Musgrave Theory of Public Expenditure Growth-Is oriented and shows the income elasticity of demand for public services in three categories depending of per capita income. He shows that when per capita income is low the demand for public services is low as well. As in this point peoples tried to satisfy the primary needs, but when per capita income increase and the demand for public services like health, education and transport began to rise. This increase will force the government to increase the expenditures on financing them. But also he shows that at developed countries that have high levels of per capita income, the rate of public sector growth tends to fall as the more basic wants are being satisfied.

The Endogenous Growth Theory-The model shows that in a lot of cases the economic growth comes from technological factors. That means for a country an ability to utilize the recourses in more productive way . Much of this ability comes from the process of learning to operate newly created production facilities in a more productive way or more generally from learning to cope with rapid changes in the structure of production which industrial progress must imply (Verbeck, 2000)

1.1.1 Model specification

There are a lot of authors that estimate the link between public spending on education and economic growth using different econometrics models that depend from the data that are used. Nkiru Patricia and Daniel Izuchukwu used log regression model to estimate the variables, some others like, Davidson and Mackinnon (1993), Engert and Hendry (1998) and Verbeck (2000) states that vector error correction models VECM is a good tool for government spending and economic forecasting model.

Taking in consideration that these models requires more data, which are not available in transition countries like Macedonia, to examine the effect of public expenditure in Education on economic growth in Macedonia, we adopt the Logarithmic Regression Model that test how much public funding of education, separately in three categories or proxies as: direct expenditures in education, capital expenditures in education and indirect expenditures on education (wages) has impact on economic growth.

For the estimated model (Linear Regression) we employ three explanatory variables, such as direct expenditures on education, capital expenditures on education and indirect expenditures on education, which determine the Real GDP. We have generated OLS regression analysis to investigate the relationship between the Real GDP and expenditures on education (direct, capital and indirect). The variables are generated as logarithmic values of the sum of GDP Real and expenditures on education. We performed the regression by including all the variables in the model. However, because of the relatively high correlation between the expenditure variables of the data in Macedonia, the significance of the independent variables was disturbed.

This **model** therefore estimates that:

$$\log Y_t = \beta_0 + \beta_1 \log x_{1t} + \beta_2 \log X_{2t} + \beta_3 \log X_{3t} + \mu_t \dots\dots\dots(1)$$

Where Y_t is the dependent variable, β_0 is the intercept term, β is the regression coefficient, X is a set of baseline explanatory variables and μ_t is the error term. The above model was modified and estimated as follows:

$$\text{Log (GDP Real)} = \beta_0 + \beta_1 \log(\text{EDU .Di.Exp}) + \beta_2 \log(\text{EDU .Cap.Exp.}) + \beta_3 \log(\text{EDU ..Ind.Exp}) + \mu \dots\dots\dots(2)$$

GDP Real is the dependent variable, direct expenditures on education is first independent variable, capital expenditures on education is second independent variable, and indirect expenditures on education (wages) is third independent variable and u is a disturbance term, it contains factors others than x_1, x_2, \dots, x_t that affect Y . This means that no matter how many explanatory variables we include in our model, there will always exist others factors that we cannot include and these are collectively contained in μ .

However, because of the relatively high correlation between the expenditure variables of the data in Macedonia, the significance of the independent variables was disturbed. The equation above can be restated to carry its parameters as follows:

Main Model

$$\text{Log GDP Real} = \beta_0 + \beta_1 \log(\text{EDU .Di.Exp}) + \beta_2 \log(\text{EDU .Cap.Exp.}) + \mu \dots\dots\dots(3)$$

This model is main regression model in the paper. To analyze the others variables and their impact on GDP Real we build two explanatory regression models as follows:

Explanatory Model 1

$$\text{Log GDP Real} = \beta_0 + \beta_1 \log(\text{EDU ..Ind.Exp}) + \mu \dots\dots\dots(4)$$

Explanatory Model 2

$$\text{Log GDP Real} = \beta_0 + \beta_1 \log(\text{EDU .Cap.Exp.}) + \mu \dots\dots\dots(5)$$

The regression data are presented below in the paper.

1.1.2 Data presentation and analysis - regression results

In this research paper as it mentioned above we specified the model and we adopt the Logarithmic Regression Model that test how much public funding of education, separately in three categories or proxies as: direct expenditures in education, capital expenditures in education and indirect expenditures on education has impact on economic growth.

The variables used are data spinning from 2005 after the process of decentralization of public financing of education. The main aim of this study is to estimate the significant of these variables in the models described above. Therefore the regression and the others statistical results are shown in the tables below.

Regression Results on the effect of public spending in education on real Gross Domestic Product (GDP)

For the estimated model (logarithmic Regression) we employ three explanatory variables, such as direct expenditures on education, capital expenditures on education and indirect expenditures (wages) on education, which determine the Real GDP.

Using State Office Statistics data's, we obtain the following regression output:

Model Summary:

Main regression model of the paper

Main: reg gdp reale direct expenditures capital expenditures

Source	SS	df	MS	Number of obs =	6
-----+-----					
Model	4.1265e+15	2	2.0633e+15	F(2, 3) =	4.30
Residual	1.4392e+15	3	4.7972e+14	Prob > F =	0.1315
-----+-----					
Total	5.5657e+15	5	1.1131e+15	R-squared =	0.7414
				Adj R-squared =	0.5690
				Root MSE =	2.2e+07

gdpreale	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+-----					
dir.exp.~te	-20.22381	9.629998	-2.10	0.127	-50.87076 10.42314
cap.exp. ~le	-2.822908	21.20559	-0.13	0.903	-70.30855 64.66273
_cons	6.14e+08	5.81e+07	10.58	0.002	4.29e+08 7.99e+08

According to the regression results, the estimated model can be written as follows:

$$\text{Log (GDP Real)} = 6.14 - 20.2 \log(\text{EDU} . \text{Di} . \text{Exp}) - 2.82 \log(\text{EDU} . \text{Cap} . \text{Exp}) + \mu$$

We find significant results for the one of the explanatory variables, i.e. direct expenditure at 10% level of significant. Thus the equation can be interpreted as follows:

For every additional direct expenditure on education, holding the capital expenditures on education constant, the GDP Real decreases by 0.202%.

Explanatory Regression Model 1.

However, because of the relatively high correlation between the expenditure variables of the data in Macedonia, the significance of the independent variables was disturbed. We estimate how indirect expenditures separately from others variables impact Real GDP and the equation was restated as :

$$\text{Log GDP Real} = \beta_0 + \beta_1 \log(\text{EDU} .. \text{Ind} . \text{Exp}) + \mu$$

reg gdp reale other indirect expenditures on education - wages

Source	SS	df	MS	Number of obs =	6
-----+-----					
Model	3.9993e+15	1	3.9993e+15	F(1, 4) =	10.21
Residual	1.5664e+15	4	3.9161e+14	Prob > F =	0.0330
				R-squared =	0.7186

-----+-----					Adj R-squared = 0.6482	
Total		5.5657e+15	5	1.1131e+15	Root MSE = 2.0e+07	
-----+-----						
gdpreale		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+-----						
ind.ex.edu~a		-29.33213	9.17864	-3.20	0.033	-54.81612 -3.84814
_cons		5.61e+08	3.56e+07	15.73	0.000	4.62e+08 6.60e+08

According to the regression results, the estimated model can be written as follows:

$$\text{Log GDP Real} = 5.61 - 29.3 \log(\text{EDU .Ind.Exp}) + \mu$$

We find significant results for the one of the explanatory variables, i.e. indirect expenditure (wages) at 10% level of significant. Thus the equation can be interpreted as follows: For every additional indirect expenditure on education, the GDP Real decreases by 0.293%.

Explanatory Regression Model 2.

The third equation was dedicated to estimate how capital expenditures are related with Real GDP and the regression showed no significance.

```
.reg gdpreale capital expenditures
```

-----+-----				Number of obs = 6		
Model		2.0108e+15	1	2.0108e+15	F(1, 4) = 2.26	
Residual		3.5549e+15	4	8.8873e+14	Prob > F = 0.2070	
-----+-----					R-squared = 0.3613	
Total		5.5657e+15	5	1.1131e+15	Adj R-squared = 0.2016	
-----+-----					Root MSE = 3.0e+07	
-----+-----						
gdpreale		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+-----						
Cap.exp ~le		-32.43028	21.56034	-1.50	0.207	-92.29139 27.43084
_cons		5.12e+08	4.33e+07	11.82	0.000	3.92e+08 6.33e+08

As this model is not significant we do not go through its interpretation.

1.1.3 Conclusions

Macedonia as a low income country and with low standard of living is going through a large numbers of economic reforms with the main aim to gain the global competition and to be part of EU. These reforms have substantially improved the countries ranking in global taking into consideration World Bank /Doing Business Reports.

Unfortunately the changes are not having the desired positive impact on key economic indicators such as growth, jobs, average salaries and income. Even before the last global financial crisis, GDP growth in Macedonia was only about half that of its other Balkans neighbors. Entrepreneurship and workforce skills are inadequate, further inhibiting growth (USAID 2014). The reforms are concentrated in education system in generally and public financing of education in particular. After the process of Decentralization (2005)

Republic of Macedonia has been one of the first of Former Yugoslav Republics which have introduced per student financing of education Herczyński, et.al (2009) as part of the wider decentralization process in the country. The fiscal decentralization process was designed by the Ministry of Finance in two phases: First phase, during which municipalities became responsible for maintenance of transferred facilities, but all salaries were still paid by the central government. Second phase, during which municipalities were also entrusted with the payment of staff salaries (Herczynski 2011)

Macedonia has planned and realized a huge numbers of reforms, especially in normative aspects. As a result of that for time period from 2005 -2015 there are a huge numbers of reforms in educational system, the law also is changing very often. As a result of these dynamic and permanent reforms the economic indicators show us unsustainable even paradoxical data. The reforms in education has been more designed based on political reason or drive on principle „more is better in state of better is more,, (populist massive education in state of quality) and not been related to the labor market need's. These days the topic is also very actual-proposed measures in education policy making without having analysis and research. This is one of the reason and the answer of the issue that is raise to be discussed in this paper: *“As a lack of data in developing countries like is Macedonia the specification of empirical models to test the causal effect on public spending on education and growth is paradox and this explain why the road through which public education expenditure affects economic growth is not yet well understood”*. ***This means that these reforms will orient the country even for a decade in unsustainable education system that affects economic growth and social wellbeing.***

From the Regression Results it was found that the government expenditure on education in Macedonia has significant effect on Real Gross Domestic Product (RGDP). In this case, public financing of education is a true parameter of measuring economic growth. The findings show to us that public expenditures on education do not are productive that means if we raise the public expenditures, GDP Real will decrease.

In Review of related literature we see that in developed countries rising public spending on education will raise the economic growth at all. This means that as we mentioned before: *“Entrepreneurship and workforce skills are inadequate, further inhibiting growth, in Macedonia (USAID 2014)”*. This orients us towards a lot of recommendations on reviewing the possibilities for the creation of productive public spending on education. This leads in creation of skilled labor that will have effect in labor market and the economic growth.

1.1.4 Recommendations

To highlight the findings in this paper there are presented the following recommendations;

1. Government should raise the **productive** public spending on education but in direction to fulfill the trade labor requirements and to action like an accelerant from degree holders and trade labor. The designing of education policy must be done based on analysis and research. Yes reforms but not pro forms!
2. Government should be careful in managing the public spending on education in a way to increase the skilled labor. Education Policies must be drive based on principle, better is more on state of more is better, Professional schools must be first priority in education policies in country.
3. Government should direct the public expenditures on education towards productive sectors that will contribute in improving the standard of living contributing so on economic growth at all.

4. Government should create programs to train youth in gaining work based learning experience and thus improve the quality of the workforce supply on the local labor market.
5. There has to function the network that will match the skills required in the labor market with those developed in the education system.
6. Education providers should create integrated academic programs with firms.

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