Does Income Level Matter in Growth Effect of Public Expenditure? A Comparative Analysis for Developing Countries over the Period of 1990-2011

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Abstract: The growth effect of public expenditure is a controversial issue in both theoretical and empirical literature. While the Neoclassical Growth Theories suggest no effect of public policies on economic growth, the Endogenous Growth Theories indicate a significant economic effects of public policies. The empirical evidence is inconclusive. This study aims to shade light over the discussion by testing the relationship between public expenditure and economic growth for developing countries over the period 1990-2011. Endogenous variables are taken into consideration and the Two-staged Least Squared Panel Data Method is applied to a sample of two sub groups split according to income levels. The findings are in line with the predictions of Neoclassical Growth Models suggesting that the public expenditure has no role on determining the growth rate regardless of the income level in developing countries.

Key Words: Public Expenditures, Economic Growth, Developing Countries.

Jel Codes: H30, H50, O10.

INTRODUCTION

As economic growth implies higher standard of living, the subject of growth has been one of the most important socio-economic targets. The effects of different variables on economic growth, one of them is public expenditure, have been widely studied in the literature. For instance, the early neoclassical growth models of Solow (1956) and Swan (1956) assume public expenditure has no role on economic growth, and rather see exogenous population growth and technological progress rate as the determinants of economic growth. Later however, some endogenous growth models, such as, of Barro (1990), Barro and Sala-i-Martin (1992) and Cashin (1995), identify the public expenditure's influence on the rate of economic growth through effects on private production functions. Unlike the early neoclassical growth models, the steady-state growth in endogenous growth models is not determined exogenously

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by technological innovations or population growth, but by the parameters of the model, in particular the savings rate (Cashin, 1995: 238).

Based on these discussions, this paper aims to examine the relationship between public expenditure and economic growth in a set of developing countries identified in IMF (2012: 180-183) over the period 1990-2011. For the purpose of investigation of whether the growth effect of public expenditure differ according to income levels of developing countries, the sample is divided into two sub groups based on the World Bank (WB) country classification according to income levels (WB, 2013a). Since, the endogeneity of variables is a critical issue and most of previous studies suffer from the lack of considering it, the Two-staged Least Squares Method is employed to test endogeneity of some variables. The econometric tests conducted verify the soundness of this applied methodological approach.

Accordingly the paper is organized as follows: Section 1 includes a brief review of economic growth theories and examines the existing literature including empirical studies. Section 2 describes the data, the construction of empirical analysis and the results. The paper concludes with a general review and policy suggestions.

1. A BRIEF LITERATURE REVIEW

There is a huge literature about economic growth and its determinants, which can be summarized under into two broad categories as Neoclassical and Endogenous Growth Models.

As indicated before, the early neoclassical growth models of Solow (1956) and Swan (1956), assign no role to public expenditure in determining economic growth rate, where the main sources of growth are seen as derived from exogenous technological change and population growth. Later however, the endogenous growth models (Romer, 1986, 1994; Barro, 1990; King and Rebello, 1990), signify human capital, knowledge and technology as the sources of growth. Since fiscal policies may have an effect on these determinants through affecting decisions of economic agents, the endogenous growth models have emphasized the role of public expenditure on economic growth. Likewise, Barro (1990) contribute to the endogenous growth model by including public sector to the analysis. He reconstitutes private production

function by including government services, and suggests that productive public expenditure and distortionary taxes[3] may affect economic growth rates.

There are number of studies that examine the relationship between public expenditure and economic growth, but the empirical results are not conclusive. Some studies (Ram, 1986; Grossman, 1988; Knoop, 1999) suggest that public expenditure has a positive effect on economic growth, while others (Landau, 1986; Guseh, 1997; Folster and Henrekson, 1999; Ramayandi, 2003) point to the negative relationship between these two variables.

Furthermore, there are a number of studies that pay attention to the effects of different composition of public expenditures (Barro, 1991; Cashin, 1995; Devarajan, Swaroop and Zou, 1996; Sala-i-Martin, 1996; Terasawa, 1998; Brons, Groot and Nijkamp, 1999; Kneller, Bleaney and Gemmell, 1999; Keane and Prasad, 2000; Bleaney, Gemmell and Kneller, 2001; Bose, Haque and Osborn, 2003), however as the main concern is the total public expenditure, these studies are not evaluated in detail in this paper.

Grossman (1988) and Knoop (1999) test the relationship between public expenditures and economic growth for United States, and Ram (1986) for 115 countries over the period of 1960-1980, both studies indicate statistically significant and positive effects. Of the studies suggesting negative effects of public expenditure on economic growth, Landau (1986) and Guseh (1997) employ less developed or developing countries data set. Folster and Henrekson (1999) conclude that public expenditure has a negative effect on economic growth in OECD countries, and Ramayandi (2003) confirm the result for Indonesia over the period 1969-1999.

There are also some studies (Devarajan et al., 1996; Bagdigen and Cetintas, 2003; Cavusoglu, 2005), which conclude that there is no role of public expenditure on economic growth. Devarajan et al. (1996) find the coefficient of public expenditure statistically insignificant for 43 developing countries. Similarly, Bagdigen and Cetintas (2003) and Cavusoglu (2005) conclude that there is no significant relationship between public expenditure and economic growth in Turkey.

[3]Productive expenditures are those which have effect upon the rate of growth and distortionary taxes are those which affect the investment decisions of agents (with respect to physical and/or human capital), creating tax wedges and hence distorting the steady-state rate of growth (Kneller et al., 1999: 173).

In brief, there is no consensus in the literature on the growth effect of public expenditure. This paper aims to contribute to this literature by testing the aforementioned relationship by applying the panel data method on endogenous variables collected for developing countries.

2. DATA, METHODOLOGY AND EMPIRICAL FINDINGS

The relationship between public expenditure and economic growth is tested for two different data sets. The first one consists of a data set of 16 developing countries which are designated as high income or upper middle income countries and the second data set consists of 11 countries that are in middle or low income levels according to WB (2013a) country classification list (for details see Appendix 1). The data set for the period of 1990-2011 is collected from World Development Indicators database (WB, 2013b).

Among the few studies that examine the effects of public expenditure, the majority ignores the income side of the budget. Those using only the income side of the budget however (Helms, 1985; Modifi and Stone, 1990; Kneller et al., 1999) show that this approach might cause a systematic deviation in the parameter estimates. Thus this paper employs tax revenues as an explanatory variable, and following Barro (1990), non-tax government revenues and interest payments that are considered to have no impact on economic growth are not included in the model.

The growth equation, in accordance with the previous studies, containing fiscal variables considered to affect economic growth as well as non-fiscal variables, is constructed as follows:

$$GR_{it} = \beta_0 + \beta_1 GDPPC_{it-1} + \beta_2 LABG_{it} + \beta_3 INV_{it} + \beta_4 TAX\_GDP + \beta_5 EXP\_GDP + \beta_6 CASH \quad (1)$$

where GR is the GDP per capita growth (%), GDPPC is the GDP per capita, LABG is the labor force participation growth rate (%), INV is the ratio of gross capital formation to GDP (%), EXP_GDP is the ratio of total government expenditure to GDP (%), TAX_GDP is the ratio of revenues to GDP (%) and CASH is the ratio of budget cash deficit/surplus to GDP (%).

For both of data sets, firstly, the pooled, fixed effects and random effects models are estimated. Based on Hausman (1978) Test the fixed effects model is preferred to other

models. The results of these estimations are given in Appendix 2. Secondly, the relationship is tested by employing the 2SLS method. This method is preferred because some explanatory variables may be endogenous. The per capita GDP, capital accumulation and fiscal variables are regarded as endogenous variables in the literature (Bleaney et al. 2001).

The estimates of the fixed effects models and the two-stage method of least squares (2SLS) considering the endogenous variables are shown in Table 1.

Table 1. 2SLS Estimation Results

Dependent Variable: GR	**1.Group**	**2.Group**
Explanatory Variables	**FEM (A)**	**FEM (B)**
GDPPC(-1)[a]	-0.0014 (-3.34)*	-0.0009 (-0.58)
TAX_GDP[a]	-0.1786 (-0.72)	0.0953 (0.37)
EXP_GDP[a]	-0.2981 (-1.47)	-0.1061 (-0.53)
INV[a]	-0.1918 (-1.71)***	0.1634 (2.06)**
CASH	0.4748 (2.91)*	0.3154 (2.13)**
LABG	0.7463 (3.24)*	-0.0809 (-0.37)
Wald statistic	200.44*	193.03*
Wald probability	0.0000	0.0000
Hausman Test Statistic	37.78	473.01
Hausman Probability	0.0000	0.0000

Notes: Figures in parenthesis are z statistics.
* p<%1, ** p<%5, ***p<%10.
a; variable is included in the regression as endogenous.

Wald test statistics suggest that both of the models are statistically significant. In the first group of observations (Column A) the coefficient of the lagged value of per capita GDP is found to be negative and statistically significant. This result is consistent with the

convergence hypothesis that suggests that countries with low levels of income will grow faster than high-income countries. The other variables that are found to have statistically significant coefficients are gross capital formation, budget cash balance and labor growth. All of these variables have a positive effect on growth as expected.

In the second group of observations (Column B) gross capital formation and budget cash balance again found to have positive effects on economic growth, however labor growth rates are found to be statistically insignificant this time. It is worth to note that some previous studies (Kneller et al., 1999; Bleaney et al., 2001) present similar results which can be attributed to the lack of practical skills of new employees.

Finally, in terms of the coefficients of fiscal variables (tax revenues and public expenditure), the empirical results suggest that both of them have no role on economic growth. This result is consistent with the Neoclassical Growth Models suggesting that the income level make no significance difference in terms of the public expenditure's growth effect in selected developing countries.

CONCLUSION

The results suggest that public expenditure has no role on determining the growth rate regardless of the income levels of developing countries in the sample. This finding is consistent with the results of some previous studies (Devarajan et al. 1996; Bagdigen and Cetintas, 2003; Cavusoglu, 2005) and Neoclassical Growth Models. The insignificant relationship may arise from some specific characteristics of developing countries (eg. insufficient institutional quality, political stability, rule of law and so on). In that context, as long as the necessary reforms do not take place, increasing economic growth with public expenditures may not be possible. Once again, the relative homogeneity of countries in two groups may be questioned. Nevertheless estimating the effects of public expenditures in high income developed countries and comparing results with developing countries is required and left for exploration in the near future.

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APPENDIX 1.

The Classification of Countries in the Sample According to World Bank Criteria

The First Group of Countries		The Second Group of Countries	
Countries	**Income Group**	**Countries**	**Income Group**
Bahamas	High Income	Bhutan	Lower Middle Income
Bahrain	High Income	Guatemala	Lower Middle Income
Belarus	Upper Middle Income	Indonesia	Lower Middle Income
Belize	Upper Middle Income	India	Lower Middle Income
Brazil	Upper Middle Income	Iran	Lower Middle Income
Bulgaria	Upper Middle Income	Sri Lanka	Lower Middle Income
Croatia	High Income	Nicaragua	Lower Middle Income
Kuwait	High Income	Pakistan	Lower Middle Income
Latvia	High Income	Paraguay	Lower Middle Income
Maldives	Upper Middle Income	Ethiopia	Lower Middle Income
Peru	Upper Middle Income	Mongolia	Lower Middle Income
Seychelles	Upper Middle Income		
Tunisia	Upper Middle Income		
Oman	High Income		
Uruguay	High Income		
Jordan	Upper Middle Income		

Source: WB (2013), http://siteresources.worldbank.org/.../CLASS.XL.

APPENDIX 2.

Panel Data Estimation Results

Dependent Variable: GRPC						
Independent Variables	**I. GROUP**			**II. GROUP**		
	Pooled	**FEM**	**REM**	**Pooled**	**FEM**	**REM**
GDPPC(-1)	-0.0002 (-4.29)*	-0.0010 (-3.31)*	-0.0001 (-3.23)*	-0.0006 (-1.71)***	-0.0005 (-0.36)	-0.0006 (-1.71)***
TAX_GDP	0.0285 (0.53)	0.0700 (0.48)	0.0912 (0.64)	0.1787 (2.05)**	-0.0174 (-0.13)	0.1787 (2.05)**
EXP_GDP	-0.0614 (-1.53)	-0.2823 (-2.85)*	0.1397 (5.54)*	-0.1686 (-2.08)**	-0.0979 (-0.78)	-0.1686 (-2.08)**
GCAP_GDP	0.0427 (0.99)	0.1057 (1.60)	0.0143 (0.39)	0.2077 (7.01)*	0.3334 (7.20)*	0.2077 (7.01)*
CASH	0.3177 (5.10)*	0.3099 (3.09)*	-0.0163 (-0.44)	-0.0805 (-0.90)	0.4284 (3.40)*	-0.0805 (-0.90)
LABG	0.2635 (1.42)	0.2521 (1.26)	0.0222 (0.51)	-0.2912 (-1.31)	-0.1052 (-0.49)	-0.2912 (-1.31)
Hausman Test Statistic	27.86*			35.47*		
Hausman Probability	0.0001			0.0000		

Note: Figures in parenthesis are t or z statistics.
* p<%1, ** p<%5, ***p<%10.