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Public Expenditure and Growth in Developing Countries: Education is the Key

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ABSTRACT

This paper examines the growth effects of government expenditure for a panel of thirty developing countries over the decades of the 1970s and 1980s, with a particular focus on sectoral expenditures. Our methodology improves on previous research on this topic by explicitly recognising the role of the government budget constraint and the possible biases arising from omitted variables. Our primary results are twofold. Firstly, the share of government capital expenditure in GDP is positively and significantly correlated with economic growth, but current expenditure is insignificant. Secondly, at the sectoral level, government investment and total expenditures in education are the only outlays that are significantly associated with growth once the budget constraint and omitted variables are taken into consideration. Therefore, we conclude that education is the key to growth for developing countries.

Keywords: Public Expenditure, Economic Growth, Education, Omission Bias, Public Financing, and Budget Constraint.

JEL Classification: O4; E62; H6

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1. Introduction

The recent revival of interest in growth theory has also revived interest among researchers in verifying and understanding the linkages between the fiscal policies and economic growth. Over the past decade and a half, a substantial volume of empirical research has been directed towards identifying the elements of public expenditure (at its aggregate and disaggregate levels) that bear significant association with economic growth. This empirical literature varies in terms of data sets, econometric techniques, and often produces conflicting results[1]. Explanations offered to account for these varied and conflicting results can broadly be divided into two categories. According to the first, it is the differences in the set of conditioning variables and initial conditions across studies that are responsible for the lack of consensus in the results (Levine and Renelt 1992). In contrast, the second category consists of a handful of studies (Helms 1985; Mofidi and Stone 1990; Kneller *et al*. 1999) that suggest this variation in the results, in part at least, reflects the wide spread tendency among researchers to ignore the implications of the government budget constraint for their regressions. In particular, the latter view emphasizes the need to consider both the sources and the uses of funds simultaneously for a meaningful evaluation of the effects of taxes or expenditures on economic growth.

In addition to producing conflicting views, the existing literature displays a disturbing trend. Most of the conclusions drawn in the recent literature on the growth effects of public spending are based either on the experiences of a set of developed countries or on the basis of large samples consisting of a mixture of developed and developing countries. Accordingly, there remains little by way of understanding the process by which public expenditure policies shape the prospect of economic growth for developing countries. This trend has continued despite the long standing view among development experts that there exists not only a significant difference in the composition of public expenditure between the developed and developing countries, but the difference is also profound in the way in which public expenditures shape the outcome in these two

[1] Consider, for example, the association between government size (as measured either by the level of total public expenditure or by the level of public consumption expenditure) and economic growth. According to some studies, such association is significant and positive (Ram, 1986; Romer, 1989, 1990, 1991). The same association has been found to be significant and negative in other studies (e.g. Landau 1983, 1985, 1986; Grier and Tullock 1989; Alexander 1990; Barro 1990, 1991). Yet other studies have found this association to be insignificant or fragile (e.g. Kormendi and Meguire 1985; Levine and Renelt 1992). A similar variation in results can also be observed among studies which look for the growth effects of public expenditures at disaggregated levels.

set of countries[2]. The only exceptions to the above trend that we know of are the contributions by Landau (1986), Devarajan *et al.* (1996), and Miller and Russek (1997). Despite their commendable objective, these studies, however, share one of the aforementioned weaknesses that is pervasive in the existing literature. In particular, none of these studies include the government budget constraint in full in their analysis. Accordingly, the parameter estimates in these studies are prone to systematic biases.[3]

The primary objective of this paper is to examine the growth effects of public expenditure by sector for a panel of thirty developing countries, paying attention to the "sensitivity" issue arising from initial conditions and conditioning variables while also avoiding the omission bias that may result from ignoring the full implications of the government budget constraint. On one hand, by focussing attention exclusively to developing countries and, on the other, by recognising the existence of the government budget constraint, the present paper fills an important gap that currently exists in the literature.

In particular, our aim in this paper is to pin down which specific components of government expenditure significantly impact on economic growth. Here, we are not interested in the financing of this expenditure per se, but we include the important financing variables (government budget surplus/deficit and tax revenue) to avoid the coefficient biases that would result from their omission (Kneller *et al*., 1999). Further, where government expenditure components are found to be individually significant, we include them jointly to investigate whether their apparent individual roles are genuine, or spurious in the sense of being attributable to other components with which they are correlated. In other words, from an econometric perspective we again control for possible omitted variable bias that will result should any component of government expenditure that is important for growth be excluded from the model.

Our disaggregated analysis is also valuable from the policy perspective. Our results for the growth effects of public expenditures by individual sectors of the economy gives rise to information that is particularly useful for developing countries, which are

[2] Please refer to the World Bank Report, 1988, for details.

[3] The possibility of omission bias arises in Landau (1986) and Devarajan *et al*. (1996) due to the fact that these studies only focus on the expenditure side of the budget constraint and ignore the revenue side. In contrast, the source of omission bias in Miller and Russek (1997) lies in its own purpose – that is, to demonstrate that the growth effect of public expenditure is dependent on the mode of financing. According to their argument, this objective is best achieved by running regressions based on the specifications that exclude budget surplus/deficits – a variable that has been established in previous studies (e.g., Fischer 1993) to have a significant and robust association with economic growth.

resource constrained and where the allocation of limited public resources between the sectors is an issue of paramount importance. In this regard, our main contribution is the finding that education is the key sector to which public expenditure should be directed in order to promote economic growth. This result is novel and overturns previous findings of negative or insignificant positive effects of education expenditure on growth for developing countries (Landau 1986; Devarajan *et al*. 1996; Miller and Russek 1997). However, as argued above, our analysis is more satisfactory from an econometric perspective than these earlier studies.

Our two principal empirical findings can be summarized as:

(1) The share of government capital expenditure in GDP is positively and significantly correlated with economic growth, while the growth effect of current expenditure is insignificant for our group of countries.

(2) At the sectoral level, government investment and total expenditures in education are the only outlays that remain significantly associated with growth throughout the analysis.

Other findings of our analysis are:

(3) Although public investments and expenditures in other sectors (transport and communication, defence) initially have significant associations with growth, these do not survive when we incorporate the government budget constraint and other sectoral expenditures into the analysis.

(4) The private investment share of GDP is associated with economic growth in a significant and positive manner.

(5) There is strong evidence that a government budget deficit gives rise to adverse growth effects.

The remainder of the paper is organised as follows. Section 2 discusses our data and its sources. In Section 3, presents a baseline analysis of the impact of government expenditure categories on growth, which is extended in Section 4 to examine the implications of omitted variable bias and the government budget constraint. Section 5 concludes.

2. Data and Variables

Our data set on public expenditures include series for both current and capital expenditures[4] (at aggregate and sectoral levels) of the Central Government Consolidated accounts for thirty developing countries[5] for the period of 1970-1990. Despite some of its known drawbacks, the *Government Financial Statistics (GFS)* – an annual publication of the International Monetary Fund – has established itself as a primary source for data on government expenditures. In our case, however, the usefulness of this data source is limited. In addition to the aggregate capital and current expenditures, we wish to study the effects of capital and current expenditures by sector (e.g., defence, education, health, agriculture, transport and communication, and manufacturing). For developing countries, information on the latter variables are not available in the *GFS* data series. To overcome this problem, we have constructed a data set after consulting a large collection of World Bank Country Economic Reports and Public Expenditure Reviews[6]. From these, information about the central government's total, current and capital expenditures by sector was available over 1979-1990 for thirty developing countries, and hence these countries constitute our sample.

Data for other variables has been drawn from two different data sources. Initial GDP per capita, population, initial human capital, life expectancy, political instability, private investment, initial trade ratio, black market premium and the terms of trade have been extracted from the Barro and Lee (1994) data set. Growth of GDP per capita, agriculture's share in GDP, and broad money (M2) have been extracted from the World Bank CDROM. Availability of fiscal information and some other variables makes it impractical to conduct an analysis at the annual frequency. Thus, unless we state otherwise, a data point for a variable corresponds to the decade average value (1970-1979, 1980-1989) of that variable. The details of the variables and their data sources are included in the appendix.

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[4] We have followed the Government Finance Statistics Yearbook (published by IMF) guidelines for classifying expenditures into current and capital expenditures.

[5] The countries are listed in the appendix.

[6] In an earlier exercise, Easterly and Rebelo (1993) collected data on public investment by sectors. We differ from this existing data set on two grounds. First, our data set includes information on both public investment expenditures and current expenditures by sector. Second, the measure of public investment used by Easterly and Rebelo also includes investment by public enterprises. In contrast, we strictly follow the *GFS* guidelines and exclude pubic enterprise investments. We acknowledge that this narrower definition may give rise to some bias in the results. At the same time (as acknowledged by the authors themselves) the measure used by Easterly and Rebelo (1993) creates a tendency to overstate public investment by including investments by public firms that have activities and goals similar to those of the private sector. Our data set and further details about the data sources are available on request from the authors.

3. Baseline Results

To start with, we classify the variables into three distinct sets: **I, M** and **Z**. The set **I** consists of variables that commonly appear as conditioning variables in growth regressions. The set **Z** includes variables that often have been included in previous studies as indicators for monetary policies, trade policies, and market distortion.

Finally, the set **M** consists of variables that are of particular interest for the present study, namely Central Government expenditures and their major components at aggregate and sectoral levels. These variables are expressed as percentages of GDP. In total, we consider twenty such variables, as detailed in the appendix. To make our tables digestible, however, we do not report results for variables with no significant association with growth at the most elementary stage of our analysis, that is, in the base regression of (1) below.

Operationally, we use a panel set-up in which the dependent variable (growth rate in real GDP per capita, GR_{it}) is observed twice (as decade averages) for each country for 1970-79 and 1980-89. The system includes a separate constant term, β_{0t}, for each decade. The other coefficients are constrained to be the same for both time periods. Panel estimation is carried out by the seemingly unrelated regression (SURE) method, with two equations for each country (one equation for each decade). Thus, the disturbance term, u_{it}, for country i at time t, is allowed to be correlated with term $u_{it'}$ for the same country at the different date, t'. The variance of u_{it} varies with t but not with i. In practice, the estimated correlations of the error terms across the time periods turn out to be small and insignificant (see the tables below).

3.1 Base Regressions

Initially, we examine whether the variables of interest (i.e., the elements of the set **M**) are significantly correlated with growth after controlling for the **I** variables. For this, we run a series of base regressions each of which includes all conditioning (**I)** variables and one government expenditure (**M)** variable:

$$GR_{it} = \quad _t + \quad _j \quad ^I_j I_{j\,it} + \quad ^M M_{it} + u_{it}$$