

Expenditure-Growth Nexus: Does the Source of Finance Matter? Empirical Evidence from Selected South Asian Countries

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1. INTRODUCTION

Government can generate revenues to finance its expenditure in three major ways i.e., taxes, bonds and seigniorage.¹ Interestingly, public expenditure financed through different sources affect growth differently. Which source of finance is less distortionary? is a question that has attracted great attention over the years. However, no consensus is available on the relative importance of the financing source.

The prominent work on this issue relates to Miller and Russek (1997) who provide a detailed discussion over the relative importance of tax financed and debt financed increases in government expenditure in terms of economic growth and report that the results vary considerably as the source of finance differs.² Similarly, Bose, Holman and Neanidis (2005) compare the effect of tax financed and seigniorage financed increases in public expenditure on economic growth.³ Likewise, Palivos and Yip (1995) analyse the effects of tax financed and money financed government consumption expenditure on economic growth and social welfare within a framework of endogenous growth model. Latter, in another study Espinosa-Vega and Yip (1999) study the effects of money financed and tax financed increases in government consumption expenditure on inflation and economic growth.

These studies have a common limitation that they do not examine the effects of taxes, bonds and seigniorage individually. The results may vary when all the three sources are taken into account simultaneously. This study attempts to consider major sources of public finance simultaneously to measure precise effect of public

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¹Revenues generated from printing of money are called seigniorage.

²Miller and Russek (1997) report that in developing countries tax financed increases in public expenditure lead to higher growth while debt financed increases retard economic growth. For developed countries, debt financed increases in public expenditure does not affect growth while tax financed increases lead to lower growth.

³Bose, Holman and Neanidis (2005) suggest that in high income countries tax financed government expenditure retard economic growth than if it were financed through seigniorage while for low income countries increases in government expenditure financed with seigniorage retard growth more as compared to if it were financed through taxes.

expenditure on growth. The knowledge regarding the relative importance of different sources of finance is critically important for the decision makers especially in developing countries where high fiscal deficits persist. The rest of the study is organised as follows; Section 2 describes data and variables. Section 3 presents model and econometric methodology. Section 4 comprises results. Section 5 concludes the study with some policy implications.

2. DATA AND VARIABLES

The analysis employs panel data for four South Asian countries viz., Pakistan, India, Sri Lanka and Nepal⁴ over the period 1975–2008. Variables are categorised into two groups, fiscal and non fiscal variables. Fiscal variables comprise public expenditure, public revenues and government surplus/deficit. Trade openness, population growth and investment⁵ are the non fiscal/conditional variables. All variables are measured as a share of GDP except growth in per capita GDP, the dependent variable, and population growth. Variables come from three sources i.e., World Development Indicator (WDI), Government Finance Statistics (GFS) and International Finance Statistics (IFS).

3. THE MODEL AND ECONOMETRIC METHODOLOGY

We start our model by defining the growth rate of per capita GDP as under.⁶

$$g_{it} = \ln y_{it} - \ln y_{it-1} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where g_{it} is growth in per capita GDP in country i at time t . y is the Gross Domestic Product per capita, \ln is the natural logarithm operator. Let X_{it} be the vector of non fiscal/conditional variables that generally appear in growth regressions and W_{jt} be the budget constraint,⁷ the model can be written as under;

$$g_{it} = \beta + \sum_{i=1}^n \theta_i X_{it} + \sum_{j=1}^m \gamma_j W_{jt} + u_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Where u_{it} is the error term. The error term u_{it} captures, as usual, the impact of omitted variables. The critical assumption about error term in classical regression model is that it is independent and identically distributed. In pooled cross-section time series analysis these omitted variables can be further categories into three groups. Hence, the error term can be written as;

$$u_{it} = \alpha C_i + \delta T_t + \pi_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Where C_i denotes the variation in cross country variables such as climate and geography⁸ and α measures the effect of these variables. T_t shows the time variant but country

⁴Unavailability of data forced us to exclude other South Asian countries from the sample.

⁵Gross fixed capital formation as a share of GDP is used as a proxy for investment.

⁶We borrow some work from Miller and Russek (1997), Helms (1985), Bose, Holman and Neandis (2005).

⁷Budget constraint is discussed shortly.

⁸These variables are time invariant.

invariant variables such as world economic conditions, technological changes, external effects such as war and δ captures the influence of these factors. π is the measure of both country and time variant variables. Now by substituting Equation (3) into Equation (2) the model takes the following form:

$$g_{it} = \beta + \sum_{i=1}^n \theta_i X_{it} + \sum_{j=1}^m \gamma_j W_{jt} + \alpha C_i + \delta T_t + \pi_{it} \quad \dots \quad \dots \quad \dots \quad (4)$$

The estimation of above equation by ordinary least square method will yield misleading results if the country specific and time specific effects are ignored.⁹ To avoid this bias we apply Fixed Effect Model (FEM).¹⁰ An alternative to FEM is Random Effect Model (REM) but our choice is biased towards FEM.¹¹

3.1. Government Budget Constraint

Government budget constraint can be written as an identity:

$$EXPN_{jt} = NTR_{jt} + TR_{jt} + D_{jt} + S_{jt} \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

Where $EXPN$ is the total government expenditure including interest payments on debt. NTR is non tax revenue, TR is tax revenue, S is the seigniorage used to finance budget deficit and D is the debt financing or rest of the budget financing.¹² The left hand side of the above identity shows total expenditure while right hand side is the total revenues from different sources. Inclusion of all the above components of budget constraint into Equation (4) will give rise to the problem of perfect collinearity as budget constraint is an identity. So, to avoid this (at least) one of the components of budget constraint must be omitted from the regression equation. The excluded element becomes an implicit source of financing of expenditure as it can change freely. For example if we omit D_{it} and include all other elements in Equation (4) then coefficient attached with public expenditure captures the impact of debt financed increases in public spending on economic growth as the other sources of finance do not change. Likewise, other financing source i.e., tax and debt can be excluded in turn.¹³ This taxonomy has been adopted from Ahmed and Miller (2000), Miller and Russek (1997) and Bose, Holman and Neanidis (2005).

4. RESULTS

As mentioned earlier, Fixed Effect Model (FEM) is used to estimate different specifications. Table 1 shows the estimation output.

⁹See Hsiao (1986).

¹⁰FEM is also called Least Square Dummy Variable (LSDV).

¹¹"If T (the number of time series) is large and N (the cross sectional unit) is small, there is likely to be little difference in the values of the parameters estimated by FEM and REM. Hence, the choice here is based on computational convenience. On this score FEM is preferable" [Gujrati (1995)].

¹²New issues of interest bearing debt make a major part of rest of budget financing [Bose, Holman, and Neanidis (2005)].

¹³Non tax revenue is not a choice variable. So we exclude debt, tax and seigniorage in turn to see the impact of public expenditure on economic growth when financed through these sources.

Table 1

*Results with Aggregated Public Expenditure Using Fixed Effect Model (FEM)
Per Capita GDP Growth is the Dependent Variable*

	Tax Finance	Debt Finance	Money Finance ¹⁴
Total Expenditure	-0.329* [-2.68]	-0.397* [-3.33]	-0.510*** [-1.67]
Openness	0.101** [2.43]	0.103** [2.47]	0.102** [2.44]
Population	0.509 [1.45]	0.504 [1.48]	0.537 [1.58]
Investment	0.149*** [1.75]	0.148*** [1.76]	0.150*** [1.77]
R-square	0.486	0.485	0.486
F-test	2.09	2.07	2.10

*, **, *** mean significantly different from zero (two tailed test) at the 1 percent, 5 percent and 10 percent level respectively. T-statistics are in parenthesis.

We start our discussion with the result for conditional variables. Openness variable conveys generally a consistent story over time. It remains highly significant with a positive sign in all the specifications. This means that trade openness has exerted positive effect on the economic growth of this region. This finding is consistent with the existing empirical literature.¹⁵

Population growth, contrary to general perception, shows a positive impact on growth in this region. It reveals that labour force has contributed to the output of these economies over time. The reason for this result may be the highly dependence of these economies on agriculture sector that absorbs a large number of people and contributes significantly to output of the country. This finding is similar to that of Hakro (2009) who states that labour force is positively and significantly associated with economic performance of the developing South Asian nations. This suggests that government should spend on education, training and skills as these facilities will enhance the productivity of the workers. However, this finding is contrary to Siddiqui and Malik (2001) who report that population growth is negatively associated with growth in South Asia.

The results reported in Table 1 also show that public investment has triggered growth in South Asia which highlights the role of infrastructure in stimulating economic growth in developing countries. This can be explained in terms of either underinvestment on the part of private sector or the greater marginal productivity of public sector resources. It suggests that scarce government expenditure should be directed to increase new human capital along with the maintenance of the existing stock of human capital. The findings are in conformity with the findings of Knight, Loayza and Villanueva

¹⁴We use Fischer (1982) procedure to estimate magnitude of seigniorage in our base line regression.

¹⁵A significantly positive impact of openness variable on investment share of GDP has been reported by Levine and Renelt (1992). Ahmed and Miller (2000) also find a positive significant effect of a country's openness on its investment. Bose, Holman and Neanidis (2005) point out the positive effect of trade variable on economic growth both for developed and developing countries.

(1993), Ahmed and Miller (2000), Ramirez and Nazmi (2003) and Amanja and Morrissey (2005) who report that public investment is positively associated with economic growth in developing countries.

Now the results of fiscal variables, in which we are interested more, are discussed. Table 1 clearly brings out that the method of financing has a crucial role in determining the effects of government spending on economic growth. It is found that tax financed increases in public spending are negatively associated with per capita GDP growth. The findings of Barro (1990) support our results. He states that tax financed public spending, mainly income tax on investment reduce profits on private investment, and thus affect growth negatively. However, Miller and Russek (1997) report results that are contrary to our findings. They conclude that tax financed expenditure are pro growth for the group of developing countries.

It is also found that debt financed increases in government expenditure also affect growth negatively. Similar conclusion is reached by Miller and Russek (1997) who point out that debt financed increases in public spending are negatively associated with growth in developing countries. Likewise, Siddiqui and Malik (2001) conclude that debt accumulation has affected growth negatively in Pakistan, India and Sri Lanka. They also report that all the debt indicators show significant negative relationship with growth.

As well as money financed expenditure are concerned, the findings are not different from the previous two findings. It is concluded that money financed expenditure produces a significant decrease in economic growth for selected South Asian countries. The similar results are also reported by Bose, Holman and Neanidis (2005). They conclude that seigniorage financed public expenditure retards growth in developing countries.

The results derived from the analysis highlight the relative importance of different sources of financing public expenditure in context of economic growth. It is inferred that though expenditure exert negative effect financed through any source on growth yet they can be ranked according to their relative effects. Tax financed expenditure hurts growth least followed by debt financed and seigniorage financed expenditure. This ranking is based on the magnitude of the coefficients attached with public expenditure in different specifications. The negative effect of seigniorage is largest as compare to debt financed and tax financed public expenditure i.e., ($|-0.51| > |-0.40| > |-0.33|$).

The findings that public expenditure is negatively correlated with economic performance in South Asia mentions the inefficiency of the public sector in this region. The reason of this negative effect of public expenditure on growth may be the higher share of non development expenditure in total expenditure. Furthermore, politicisation of public resources can also explain this negative relationship between public expenditure and economic growth. It is also possible that the government size may have risen above the threshold level. The larger negative effect of monetisation of public deficit reveals that the high inflation has caused much to these economies. Tax financed expenditure hurt least which shows that there is room to bridge fiscal deficit by enhancing the efficiency of tax system and increase in tax revenue. It can be achieved by broadening the tax base that is too narrow to generate government revenues to finance its expenditure.

4.1. Analysis with Alternative Measures of Seigniorage

Now we re-do the previous exercise with two alternate measures of seigniorage¹⁶ to check the robustness of base line results.¹⁷ The results are reported in Table 2. It is clear from Table 2 that the results do not change with alternate measures of seigniorage regarding public expenditure. The conditional variables have also the same sign and level of significance.

Table 2

Results with Alternative Seigniorage Measures Using Fixed Effect Model (FEM)
Per Capita GDP Growth is the Dependent Variable

	Fischer (1982)	Walsh (1978)	De Haan, <i>et al.</i> (1983)
Public Expenditure	-0.510*** [-1.67]	-1.157*** [-1.70]	-1.271*** [-1.81]
Openness	0.102** [2.44]	0.099** [2.40]	0.099** [2.41]
Population	0.537 [1.58]	0.439 [1.41]	0.331 [1.31]
Investment	0.150*** [1.77]	0.142*** [1.69]	0.139*** [1.68]
F-test	2.09	2.15	2.16

, *mean significantly different from zero (two tailed test) at 5 percent and 10 percent level respectively. T-statistics are in parenthesis.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study follows the procedure adopted by Miller and Russek (1997), Bose, *et al.* (2005) and Ahmed and Miller (2000) to find the precise effects of fiscal variables on economic growth. Contrary to previous empirical studies, this study considers three sources of financing i.e., tax, debt and seigniorage simultaneously to analyse their individual impact on growth. It is found that source of financing of public expenditure has a crucial role in determining its impact on economic growth. Debt financed public expenditure retard economic growth. Similarly expenditure financed through seigniorage has also significant negative effect on economic growth. Likewise tax financed public expenditure is negatively associated with economic growth. Although all sources of public expenditure hamper growth yet seigniorage financed expenditure has a larger negative effect on growth than debt financed and tax financed expenditure.

Several policy implications emerge from the analysis. Firstly, reduction in deficit is positively associated with economic growth as public expenditure financed through any source retard growth in the sample. Decrease in expenditure holding the revenue constant may be effective to enhance growth. Secondly, the role of governments in these countries has not been efficient and needs to be redefined. Thirdly, tax finance is the

¹⁶Walsh (1998) and De Haan, Zelhorst, and Roukens (1993).

¹⁷There are some other measures of seigniorage available in empirical literature and the analysis with only one such measure does not seem sufficient. The detail description of these seigniorage measures is available in the appendix.

relatively less costly option to finance public expenditure in low income countries as it hurts growth least as compare to its counter parts debt and seigniorage financed public expenditure. However, in general fiscal discipline and reorganisation of scarce resources can boost economic growth in this region.

Appendices

Table A-1

Measures of Seigniorage

Variables	Description
Monetary Base (or high-powered money)	Reserve money (line 14 in IFS)
Seigniorage 1:	Ratio of the change in high powered money to nominal GDP (Fischer 1982)
Seigniorage 2:	Ratio of high-powered money to nominal GDP in current period minus ratio of high-powered money to nominal GDP in last period plus the product of the ratio Of high-powered money to nominal GDP in last period times the growth rate of nominal GDP In current period to one plus the growth rate of GDP in current period (Walsh 1998).
Seigniorage 3:	Ratio of the product of the inflation rate times high-powered money to the product of one plus the inflation rate times nominal GDP [de Haan, <i>et al.</i> (1993), Walsh (1998)].

Reproduced from Bose, Holman and Neanidis (2005) Bose, *et al.* (2005).

Table A-2

Variables and Their Source

Variables	Source
Per Capita GDP	World Development Indicator
Openness (Imports+ Export)	World Development Indicator
Population Growth	World Development Indicator
Gross Fixed Capital Formation	World Development Indicator
Total Revenue	Government Finance Statistics
Tax Revenue	Government Finance Statistics
Deficit	Calculated
Seigniorage	Calculated
Total Expenditure	Government Finance Statistics
Reserve Money	International Finance Statistics
Consumer Price Index (CPI)	World Development Indicators

APPENDIX II

DESCRIPTION OF VARIABLES

1.1. Government Borrowing

To finance its deficit government has to borrow. Contrary to other fiscal variables, to have the direct measure of government borrowing is often a difficult task in empirical literature.¹⁸ Rodriguez (1994) used the difference between deficit and revenues from printing of money as a proxy for the part of total public spending which is financed through issuing of interest bearing bonds. We also follow this approach to measure the government borrowing.

1.2. Seigniorage

Like government borrowing, the measurement of seigniorage has also been a widely discussed issue in empirical literature. To measure its magnitude different alternative estimates have been suggested.¹⁹ We follow the methodology adopted by Fischer (1982), Walsh (1998) and De Haan, Zelhorst, and Roukens (1993) to measure seigniorage.

1.3. Deficit

From total expenditure and total revenues series we construct a variable deficit by subtracting total government expenditure from total government revenues.

1.4. Trade Openness

Trade openness is the sum of exports and imports of goods and services measured as a share of gross domestic product.

1.5. Reserve Money

The monetary base, high-powered money, comprises central bank liabilities that support the expansion of broad money and credit.

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¹⁸Bose, Holman and Neanidis (2005).

¹⁹See Drazen (1985), Klein and Neumann (1990) and Honohan (1996).

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