IS THE SIZE OF GOVERNMENT OPTIMAL IN PAKISTAN?

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ABSTRACT

This study, assuming balanced budget, attempts to determine the optimal size of government in Pakistan using the Scully (1994) model for the period 1975-2008. The time series analysis reveals that government size is optimized when public expenditures stand at 21.48% of GDP. The estimated threshold size is lower than the current size of government in Pakistan. However, the difference between current and optimal size is very small. This suggests that enhancing efficiency of public sector is the better option than large fiscal adjustments to improve level of economic growth as average tax burden does not far exceed the optimum level.

INTRODUCTION

Historical evidence reveals that no society gained high level of economic prosperity without the role of government. Societies without proper governments faced different kinds of anarchy that halted their growth over time. The emergence of governments in these societies ensured the rule of law and protected property rights leading to high level of economic development. Thus, the role of governments remains important for the economic prosperity of the nations.

On the other hand, societies where all economic decisions were made by the governments witnessed relatively low level of economic affluence because large governments stifled the spirit of private agent, which resulted in low level of economic development. Put differently, the economic prosperity is limited both at zero and hundred percent level of government. Thus, question arises; how large should be the size of government?

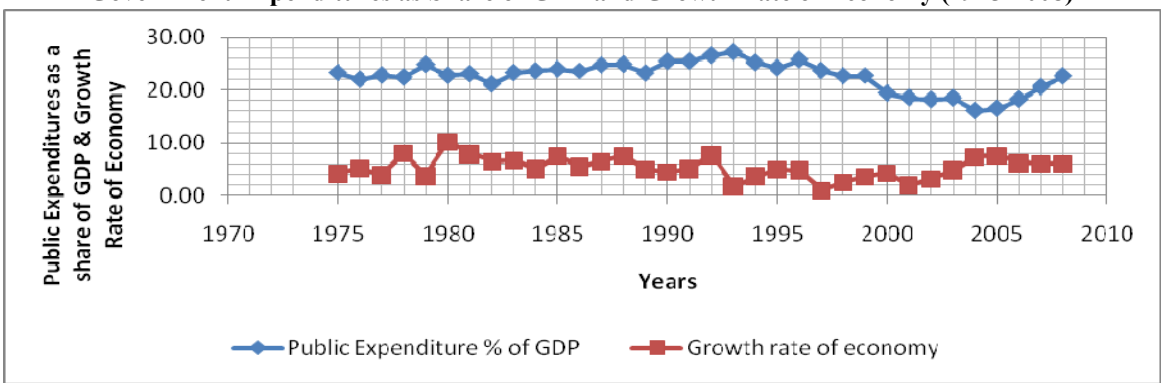
Empirical as well as theoretical literature has focused on this issue with conflicting results in recent decades. A group of economists believes that large government size stimulates economic growth (Ram, 1986, 1989; Rubinson, 1977) among others. On the other hand some economists deny this phenomenon and conclude that as the size of government increases in relative term it reduces the growth of per capita income (Landau 1983, 1986; Barro, 1991). Bairam (1990) and Grossman (1990) conclude that government can affect growth positively as well as negatively. However, within this diversity of explanations a consensus emerges that up to a certain level, government activities are pro growth but beyond this point the size of government may reduce economic well-being. The debate concentrates the question that at what point the public expenditures become counterproductive.

Only a handful of studies have attempted to determine the optimal level of public expenditures for developed countries whereas, up to best of my knowledge, no study can be found in case of developing countries on the issue. This study attempts to determine the optimum level of government expenditures/taxes in Pakistan using data for the period 1975-2008. This will help the policy makers to increase/decrease public expenditures, as a percent of GDP, to bring the government size closer to the optimal level. The rest of the study has been structured as under: Section 2 shows public expenditures and growth scenarios in Pakistan over time. Section 3 & 4 describe data and analytical framework respectively. Section 5 presents estimation and results. The last section, 6, concludes the paper with some policy implications.

GROWTH AND PUBLIC EXPENDITURES SCENARIOS IN PAKISTAN (1975-2008)

The growth path of Pakistan economy fluctuates over time. In some decades it showed an impressive growth while in other decades this momentum was lost. From mid 1970s to mid 1980s, Pakistan economy grew at an impressive average percentage growth rate of 6.25. The decade from 1985 to 1995 witnessed an average growth rate of 5 percent. From 1996 to 2002, growth rate paints a dismal picture. Growth rate declined from 5% in 1996 to 1.6% in 2002. This happened mainly due to the imposition of economic sanctions by international community following the atomic explosion on May 28, 1998. It affected growth adversely in Pakistan and left the economy reeling at just more than 2 percent average growth rate in this period. Since 2003 economy has regained its momentum and it is growing at an impressive rate of more than 5 percent per annum.

Figure 1
Government Expenditures as Share of GDP and Growth Rate of Economy (1975-2008)



Source: GFS various issues and WDI CD-ROM 2009.

In Pakistan, public expenditures to GDP ratio was 23.11 percent between 1975 and 1985 fueled by several agendas. The major determinants of this high level of public expenditures were nationalization of institutions and government's efforts to increase level of employment in the

economy. Higher level of defense expenditures and interest payments can also be accounted for this larger size of government in Pakistan in this period. Public expenditures rose from 23.11percent to 25.78 percent of GDP from 1985 to 1995 showing greater involvement of government in economic activity. The next ten years (1996-2006) may be called the era of less government involvement as the public sector squeezed significantly. Public expenditures shrunk from 26 percent of GDP in 1996 to 18 percent of GDP in 2005, a decrease of substantial 30 percent. However, since 2006 public expenditures in Pakistan are showing an upward trend.

Figure 1 clearly shows that both public expenditures and economic growth have been volatile over the years in Pakistan. It can be noticed that low level of government expenditures are associated with relatively high growth rate and vice versa.

DATA

The consolidated central government expenditures as a share of GDP are used as a proxy for the size of government. This variable comes from Government Finance Statistics (GFS), a publication of the International Monetary Fund (IMF). GDP at current prices is obtained from World Development Indicators (WDI 2009), published by the World Bank (WB). Time period of the study ranges from 1975 to 2008. Accordingly, 34 observations are available for the analysis.

ANALYTICAL FRAMEWORK

The analysis employs the methodology of Scully (1994 & 2006) and Heerden et al (2008) to find the threshold level of government expenditures in Pakistan. The mathematical formulation is based on a non linear Cobb-Douglas production function with a government sector and a private sector. The public sector provides goods financed with tax revenues i.e. $\frac{G}{Y} = \tau$ and 1-τ is the share retained by private agents after taxation. Both public and private goods contribute to output.

$$Y = \gamma\,(G/Y)^{\alpha}(1-\tau)^{\beta} \quad \text{(1)}$$

Where

Y= Gross Domestic Product

G= Government Expenditures

τ = Tax to GDP Ratio

γ = Total Factor Productivity

α = Relative Share of Government Sector in Total Output

β = Relative Share of Private Sector in Total Output

In logarithmic form equation (1) can be written as;

$$\ln Y = \ln\gamma + \alpha\ln\left({}^{G}/_{Y}\right) + \beta\ln(1-\tau) \quad \text{(2)}$$

The equation (2) is differentiated twice with respect to G to show that an increase in government expenditures affect growth positively but at a diminishing rate.

$$\partial lnY/_{\partial G} = \left[\left\{\partial lnY/_{\partial \ln\left(\frac{G}{Y}\right)}\right\}\left\{\partial \ln\left(\frac{G}{Y}\right)/_{\partial\left(\frac{G}{Y}\right)}\right\}\left\{\partial\left(\frac{G}{Y}\right)/_{\partial G}\right\}\right]$$

$$= \alpha\left(\frac{Y}{G}\right)\left(\frac{1}{Y}\right)$$

$$= \alpha G^{-1}$$

$$\frac{\partial^2 lnY}{\partial G^2} = -\alpha G^{-2}$$

The first derivative is positive while second derivative is negative which verifies that public expenditures positively affect growth but at diminishing rate.

By definition $\frac{G}{Y} = \tau$, therefore, substitution into equation (1) yields;

$$lnY = ln\gamma + \alpha \ln\tau + \beta \ln(1-\tau) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

To find growth maximizing tax rate, we differentiate equation (3) with respect to τ and set it equal to zero.

$$\partial lnY/_{\partial\tau} = \alpha/_{\tau} - \beta/_{1-\tau} = 0$$

Rearranging terms; $\alpha/_{\tau} = \beta/_{1-\tau}$

$$\beta\tau = \alpha(1-\tau)$$
$$\beta\tau = \alpha - \alpha\tau$$
$$\alpha\tau + \beta\tau = \alpha$$
$$\tau(\alpha+\beta) = \alpha$$
$$\tau^* = \frac{\alpha}{(\alpha+\beta)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

ESTIMATION AND RESULTS

We estimate equation (3) to find values of the parameters, α & β. Empirical evidence reveals that economic variables are mostly non stationary. Thus the regression of non stationary variables may lead to spurious results. Therefore, we start our empirical analysis by testing the stationarity of the variables. Augmented Dickey Fuller (ADF) unit root test has been employed for this purpose. The results are reported in table 1.

Table 1 **ADF Unit Root Test** **Null Hypothesis: The series has a unit root**						
Variables	Level			First Difference		
	C	C &T	None	C	C &T	None
LnY	-0.32	-3.15	7.64	-4.70*	-4.56*	-1.92***
Lnτ	0.07	-2.08	3.37	-3.97*	-3.78**	-2.09**
Ln(1-τ)	-0.35	-3.03	4.84	-5.15*	-4.98*	-1.88***
C and T denote Constant and Trend respectively., **, *** mean significant at 1%, 5% and 10% respectively.*						

Table 1 brings out that the variables are integrated of order one i.e., non stationary. Therefore, variables are first differenced to make them stationary before applying OLS to estimate the regression coefficients. The OLS results are presented in table 2. It is clear from table 2 that all the coefficients are highly significant.

Table 2 **Dependent variable is Δ LnY**			
Variables	Coefficients	Standard Error	T-Values
C	0.002	0.002	1.179
ΔLnτ	0.212	0.026	4.760
	0.775	0.008	3.227
		R-Square: 0.976	DW: 2.08
Note: Δ is first difference operator. Ln denotes natural log while Y, τ and (1- τ) represent GDP, government share in output and share retained by private agent after tax.			

Calculation of Optimal Level of Public Expenditures/Taxes

To measure the threshold government size, the values of regression coefficients are substituted in equation 4.

$$\tau^* = \frac{0.212}{(0.212 + 0.775)} * 100 = \quad 21.48\%$$

Our calculation shows that the optimal level of public spending/taxes in Pakistan is 21.48% of GDP as against the 22.7% level in 2008. Therefore, it is concluded that current size of government in Pakistan is above the threshold size and there is a scope of 5.4 percent to decrease public expenditures to attain the optimal size of government.

The comparison of optimal size of governments in developing and developed countries seems useful. In table 3, we present international evidence on the optimal size of governments in developed countries.

Table 3 **Optimal level of public expenditure in developed countries**			
Country	Size of government (% of GDP,1996)	Optimum size (% of GDP)	Percentage change in spending as a share of GDP
Italy	44.90	37.09	-17.39
France	54.73	42.90	-21.62
Finland	58.74	38.98	-33.64
Sweden	65.02	45.95	-29.31
Germany	48.72	38.45	-21.08
Ireland	39.60	42.28	+6.77
Netherlands	51.97	44.86	-13.68
Belgium	52.97	41.91	-20.88
Average percentage change			-18.85

Reproduced From Pevcin (2004)

Table 3 shows that the estimated optimal size of government is larger in industrialized countries as compare to Pakistan. The high optimal level of public expenditures/taxes in industrialized countries is due to the efficiency of these governments that keep the functioning of downward sloping phase of the Scully curve away for a longer time. Contrary to this in developing countries, like Pakistan, due to many factors like bad governance, corruption and political use of scarce public resources efficiency of government remains low and the negative effect of public expenditures start earlier than the developed countries.

Our estimate of optimal size of government is in line with the findings of Freedman (1997) who states that the optimal size of governments ranges from 15 percent to 50 percent of gross domestic product. Similarly our results match the findings of Scully et al (2008) who find the level of tax rate that maximizes economic growth in US about 19.3 percent of GDP. The findings are also supported by Vedder et al (1998) and Mavrov (2007).

Reliability Analysis

Auto-correlation is a common phenomenon in time series analysis. The Durban Watson statistics reported in table 2 reveals that residuals are uncorrelated. Further, some more tests are applied to check whether the results are reliable or not. The outcomes of these tests are reported in table 4.

It is clear from table 4 that our model has no specification error and residuals are not correlated. No Hetroskasdicity is found and on the basis of Jarque-Bera test it is concluded that residuals are normally distributed. In the presence of above tests results, it can be concluded that our estimates of regression coefficients are reliable and need not to be adjusted.

Table 4
Selected Diagnostic Test Results of the Model

Test	Null hypothesis	Test - Statistics	P-value	Conclusion
Ramsey RESET F Test	Model is stable with no specification error	1.21	0.314	Can not reject null hypothesis and conclude that model is stable with no specification error.
Normality Test (Jarque- Bera)	Residual are normally distributed	JB = 3.53	0.171	Null hypothesis cannot be rejected and conclude that residuals are normally distributed.
Breusch-Godfrey LM F Statistics	No serial correlation in the residuals up to the 2nd order	1.79	0.186	Can not reject null hypothesis and conclude that residuals are not correlated up to 2nd order.
ARCH F Test	No auto regressive conditional hetroskedasticity up to the 1st order	0.160	0.692	Null hypothesis cannot be rejected. Hence there is no auto regressive conditional hetroskedasticity up to the 1st order.

CONCLUSION AND POLICY IMPLICATIONS

We use time series data from 1975 to 2008 to estimate optimal size of government in Pakistan under the assumption of balanced budget. The analysis suggests that the optimal size of government is lower than the current size of government (21.48 < 22.7) and there is a scope of 5.4% reduction in public expenditures. International comparison reveals that both current and optimal sizes of public expenditures are high in developed nations when compare to Pakistan. This shows that government expenditures become counterproductive at earlier stage and the downward phase of the Scully curve starts functioning at comparatively low level of public spending in a country like Pakistan.

Some interesting policy implications emerge from the analysis. Firstly, as the optimal size of government is lower than the current size, hence there is a scope to decrease government expenditures in Pakistan. Low tax burden will encourage the private sector that in turn can stimulate economic growth in the country. Secondly, as the current and optimal levels of public spending have merged recently in Pakistan, the only issue is to enhance efficiency of the public sector as it is already closer to the optimal level. Lastly, the current increasing trend in public spending in the country needs to be checked as it may hurt the economy in future. Fiscal discipline through cuts in public expenditures can help achieve this objective.

Future research may focus to measure the gains that can be made by reducing the size of government to the optimal level. In addition the dead weight loss can be measured for the years in which government size remained beyond the optimal level. The finding of optimal level of different categories of public expenditures such as defense, education and health can also be an interesting topic for the researchers.

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