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# An Analysis of Optimal Government Size for Growth: A Case Study of Pakistan

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## *Abstract*

The government size is important for the development of the economy. We estimated optimum government size for growth in Pakistan by using Heerden (2008) methodology for period from 1973 to 2012. The results for the optimal size of the government show that all the variables are significant. The optimal size of the government size or equivalently the optimal size of the public spending is found to be around 17 percent of the GDP. The actual size of the government spending in current years is 18 percent. This finding is very much interesting since it highlights that the current size of government in Pakistan is above the optimum level or size. There is scope of reduction in ratio of total government spending to the GDP in Pakistan.

**Keywords:** Optimal Government Size, Economic Growth, Pakistan

**JEL Classification codes:** E62, O40, C32

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## 1. Introduction

Economic growth is believed to be the most important macroeconomic indicator of the overall performance of an economy. As it is evident that for a sustainable economic growth, the vicious circle of poverty is to be overcome, it is necessary for an economy to achieve a sustainable level of economic growth. Fiscal policy is an important tool which can be used to affect income distribution and mass poverty that are the critical determinants of economic growth. Fiscal policy can be used to attain the long run economic growth in order to maximize the overall welfare of an economy using public spending and taxation for this purpose (Tanzi, 2006). Government size is the most frequently employed variables, since it is directly related to the government policies. Different people have followed different approaches to measure the Government size. Some people use taxes as a proxy for the government size, whereas, some other have used government expenditure as proxy for the government size. In addition some others have employed the 'employment level' to explain the government size. The optimal size of the government is the problem that has attracted the attention of many scholars. In developing countries government spending is above the optimal level in contrast to many other countries.

There are three conflicting views about the relationship between size of the government and economic growth. According to Keynesian view, a larger government or equivalently large size of the government is likely to enhance the economic growth. High level of government consumption is associated with high level of both private and government demand for goods and services which in turn enhances production of goods and services. This stimulates employment and investment. The government has the authority to regulate and deal with negative externalities. Government plays an important role in removing interest conflicts between private and public sector. The societies with government intervention guarantees the existence of a proper rule of law, law and order and ensures the protection of the property rights which are considered to have favorable impact on economic growth. Another group of economists who argue in this regards that high government expenditure is likely to be harmful for economic growth due to the inefficiencies caused in government institutions. It crowds out private investment that leads to slow down growth and reduction in capital accumulation. Barro (1991) in this context, argued that the government size is more likely to affect economic growth negatively. He argues that it creates inefficiency in private market as well as cause many distortions in some other markets due to the unnecessary government interventions. However, there is another class of opinions who argues that the impact of government size on the economy leads to inverted U shape curve. This implies that government size enhances growth up to certain threshold level and then starts to fall down beyond that threshold level (Barro 1990 and Armev, 1995). In the light of above mentioned three views, relationship between government size and economic growth is ambiguous. There seems no consensus among the researchers. This raises a number of questions. For example, is it possible to have growth through public expenditure? Is it applicable to reduce the government size now a days?

Our main focus is to estimate the optimum government size. For this purpose we have followed Heerden (2008) to calculate the threshold level of the government size or equivalently the optimum government size. The Scully (2008) model pretends that government spending on public goods and services such as national defence and protection of property rights leads to enhance economic growth. But after a certain point, government spending becomes non productive and do not lead to enhance growth because of the welfare spending. There are few studies regarding optimality of government size internationally and in case of Pakistan work done only by Husnain (2011). Our study is estimating optimal government size using data from 1973-2012. We have used a time series data over the period 1973-2012 for the purpose. Data on Real GDP per capita has been taken from State Bank of Pakistan (2010). Government expenditure as a share of GDP is used as a proxy for government size and data of government expenditure has been taken from Pakistan Economic Survey (various issues).

## **2. The Current Scenario of Growth and Expenditure of Pakistan**

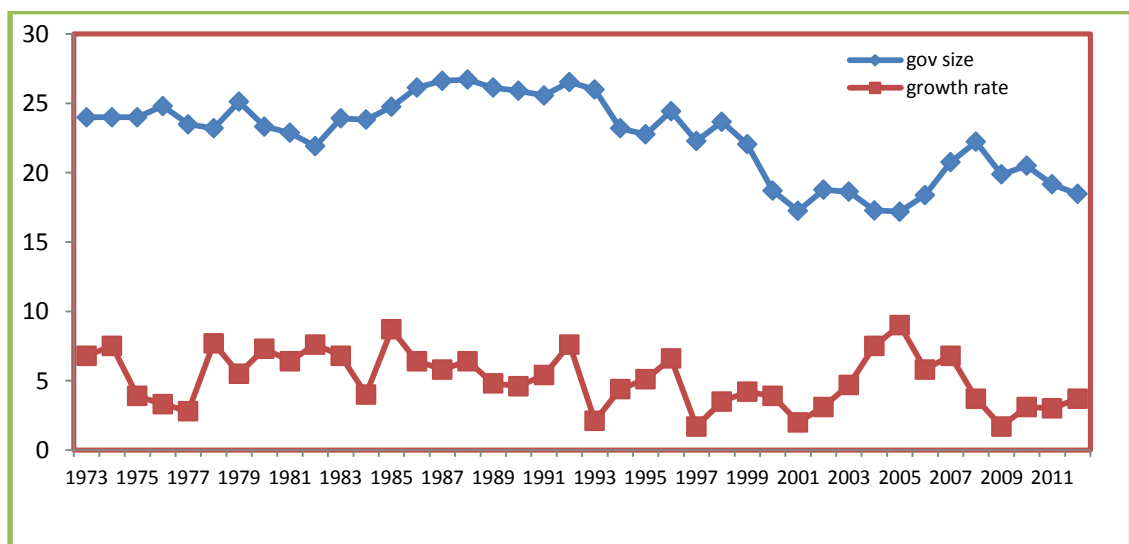
Many ups and downs are being observed in the economic growth of Pakistan over the time. Historically, in some decades a high and sustained economic growth has been observed while, in some other decades the economy has shown very miserable performance and suffered from very low level of growth. Moreover, there has been observed a continuous increasing trend in public expenditure as a percentage of the GDP. In this regard majority of the resources have been allocated to the defense expenditures for military purposes. After twenty years after of independence, the economy had shown highest rate of growth in South Asia, particularly during 1960-70. Likewise, the economy had observed a growth rate of two percent on average during the decade 1980-1990. There are a number of factors that are responsible for this amazing performance of the economy in 1960's. The main reasons and the crucial factors of this excellent growth were the implementation of the green revolution in a large scale, swings in trade policies particularly the adaptation of the import substitution policies that had resulted a boom in private investment. During this decade of excellent performance of the economy, the annual growth rate of physical capital had been observed to be 13.1 percent and that of the human capital was to be 11.6 percent per year during this period. On the other hand, in 1980 the economy has observed the lowest rate of growth of Asian economies. After that, Pakistan remained the slowest growing economy in south Asia due to the persistent poverty over a long period which has increased from 18 percent in 1960 to 34 percent during this time. Likewise, the economy had shown miserable performance in 1970. This was due to the policy of nationalization that had resulted into inefficiency, the allocation of national resources for education and increase in the oil prices that had resulted into a reduction private investment. The average growth remained around 5 percent from 1985-95 but afterwards it declined to 1.6 percent only in 2002. This massive reduction in the growth rate was due to imposition of sanctions by the world after the atomic explosions which were conducted on May 28, 1998. The economy regained its momentum and showed an amazing growth rate of more than 5 percent in 2003. After this the economy has shown mix performance.

The historical trends show that since independence, Pakistan has observed favorable economic growth only in certain decades that include the decades of 1960, 1980 and 2000. The growth rate in these decades remained more than 6 percent while in 1950, 1970 and 1990 decades, the economy has shown an economic growth rate of around 4 percent. The key factors of the favorable growth from period 1960-2004 were the increase in investment and due the rainfall that occurred during this time (IMF, 2005).

Improvement in the growth rate during 2000-05 was due to the adaptation of the stabilization policies (improvement of lower macroeconomic volatility and real exchange rate overvaluation), structural reforms (improvement in public infrastructure, reduction in government burden and expansion of trade openness) and cyclical reversions. During the period of 1983-84 to 1987-88 and 2002-03 to 2005-06 economy grew approximately by an average growth rate of 7 percent due to favorable external environment. However, growth in the current periods differs significantly from the eighties or in other words, the economy had shown very much better performance because of the sound macroeconomic stability, better institutions and good governance that prevailed in that time.

The following Figure 2.1 depicts the behavior of the growth rate and government expenditure as a percentage (which is used as a proxy for the government size) of GDP from 1973 to 2012.

**Figure 2.1: Government Size and Growth Rate of Pakistan Economy (1973-2012)**



Source: State Bank of Pakistan (2010)

The figure 2.1, shows the behavior of government size and government size which is measured as a percentage of GDP. Initially, the behavior of size shows somewhat constant trend over the period but after 1990, it shows declining trend over the period. This implies that public expenditure as a percentage of GDP decreases over time after 1990. During 1975-85, the ratio of public expenditure to GDP remained around 23 percent. The reason of this large size of the government or equivalently increase in the ratio of government expenditure to GDP during this period was due the high interest rate, surge in defense expenditures,

nationalization of the public sector institutions as well as the attempt by the government to increase employment in the economy. Public expenditure further increased during 1985-95 i.e., to 25.48 in 1995 percent of GDP against 23 percent in 1985. This highlights the increasing government intervention in economic activities that have resulted into surge in government expenditure.

The government expenditure as a percentage of GDP shows somewhat decreasing trend which shows a reduction in the government intervention. There is found less government intervention from 1996-2006 as public sector compressed significantly. However, public expenditure as percentage of GDP decreased from 24 percent of the GDP to 17 percent of during 1996-2005. During the last five years the government expenditure has shown a declining trend and that is why the government size has come down to 19.2 percent in 2010-11 from 22.2 percent 2007-08. This reduction in the government size or equivalently decrease in government spending was due to the internal security situation and floods that has caused into a massive reduction in the rice production. During 2011-12, government expenditures as percent of GDP observed further decline and it remained around 18 percent of the GDP. In addition, the tax to GDP ratio has also shown like the public expenditures. So it is concluded that low level of the government expenditure leads to high level of economic growth. This in turn confirms the fact that the large government size is associated with small growth rate.

**Table 2.1: Fiscal Indicators as a Percent of GDP**

Years	GDP growth (%)	Expenditures			Year s	GDP growth (%)	Expenditures		
		Total	Current	Dev			Total	Current	Dev
1976	3.3	24.8	14.5	10.3	1996	6.6	24.4	20.0	4.4
1977	2.8	23.5	12.8	10.7	1997	1.7	22.3	18.8	3.5
1978	7.7	23.2	14.5	8.7	1998	3.5	23.7	19.8	3.9
1979	5.5	25.1	15.6	9.5	1999	4.2	22.0	18.6	3.4
1980	7.3	23.3	14.0	9.3	2000	3.9	18.7	16.5	2.2
1981	6.4	22.9	13.6	9.3	2001	2	17.4	15.3	2.1
1982	7.6	21.9	13.7	8.2	2002	3.1	18.5	15.7	2.8
1983	6.8	23.9	15.8	8.1	2003	4.7	18.8	16.2	2.6
1984	4.0	23.8	17.1	6.7	2004	7.5	16.5	13.7	2.8
1985	8.7	24.7	17.7	6.10	2005	9.0	16.8	13.3	3.5
1986	6.4	26.1	18.4	7.7	2006	5.8	18.4	13.6	4.8
1987	5.8	26.6	20.3	6.3	2007	6.8	20.6	15.8	5.0
1988	6.4	26.7	19.8	6.9	2008	3.7	22.2	18.1	4.4
1989	4.8	26.1	19.9	6.3	2009	1.7	19.9	16.0	3.8
1990	4.6	25.9	19.3	6.5	2010	3.1	20.3	16.8	3.5
1991	5.4	25.7	19.3	6.4	2011	3.0	19.2	16.1	2.8
1992	7.6	26.7	19.1	7.6	2012	3.7	18.0	14.4	3.6

Source: Government of Pakistan, (various issues)

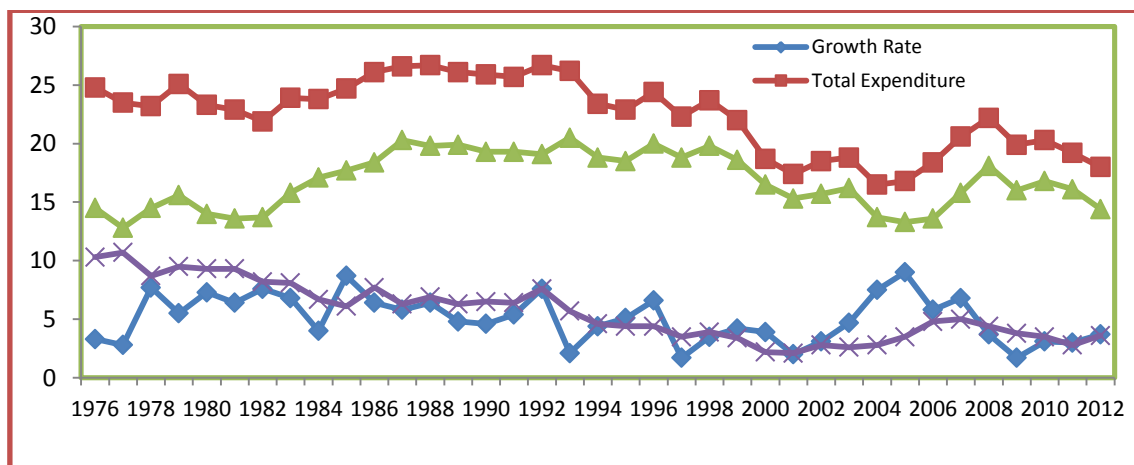
Table 2.1 reports the behavior of growth rate of GDP, total government expenditure, its compositions 'the current and development expenditure'. The table reveals that growth rate

of GDP ranges between 1.7 - 9.0 % during 1997- 2005 over the study period. In 1976 the growth rate of GDP was 3.3 against 3.7 percent in 2012. This implies that the growth rate fluctuates slightly over the period. On the other hand, share of total government spending as a percent of the GDP shows somewhat constant trend up to 1999. But after 1991, total government expenditure as a percentage of the GDP decreases over time. The table also exhibits same behavior of current and development expenditure like that of the total expenditure over time.

The behavior of total government expenditure as a percent of the GDP, the current and development expenditure and their relation to the growth rate can also be viewed through the following figure 2.2.

The figure shows that current expenditures as a percentage of GDP increasing over time but after 1987 it shows somewhat constant trend and falls after 1997. Likewise, development expenditures as a percent of GDP falls over time i.e., it is around 10 percent of GDP in 1976 against 5 percent about in 2012. On the other hand as we have mentioned above that total expenditures as percentage of the GDP exhibits constant trend but after it falls over time.

**Figure 2.2: Behavior of Total, Current and Development Expenditures (1973-2012)**



### 3. Studies on the Optimal Government Size

There is lot of studies done but there seems no consensus regarding the relationship of government size and economic growth. Some of scholars argue that government size impedes economic growth when it crosses the threshold level due to inefficiencies inherent in government. In addition, provision of goods and services and protection of property rights enhance economic growth. There are some studies depict the non linear relationship.

Scully (2008) has shown that optimal tax rate or equivalently the optimal size of the government ranges from 19 to 23 percent. The study has also affirmed that the optimal tax rate for New Zealand on average is 19.7 percent of the GDP over the period 1927-94. Furthermore, the study revealed that government spending on public goods such as national

defence and protection of property rights enhances economic growth. But after a certain point government spending becomes non productive because of the excessive welfare expenditure. This study has found that higher taxes are needed to finance transfer payments and other government welfare spending which have negative and adverse impact on economic growth.

Heerden (2008) has estimated the optimal size of government in terms of revenues and expenditures. Time series data has been used over time span 1960-2006 for South Africa. The results have shown that the optimum tax rate is 21.94 percent which lies within the range of scully from 19 to 23 percent. This reveals that the growth maximizing tax rate is lower than the realized one. In addition, tax burden has adverse impact on economic growth because of lying on downward sloping portion of Laffer curve.

Karagiani (2009) has depicted non linear causal relationship between national income and public expenditure by employing the non linear granger causality test for some of the European countries with six alternative functional form of the Wagner's law.

Hearth (2009) has concluded a non linear relationship between government expenditure and economic growth over the period 1959-2003 for Sri Lanka. The Armeey curve was used for the analysis which had shown that the government expenditure and economic growth are positively related up to the threshold level but negatively related beyond that level.

Facchini and Melki (2011) has identified a non-linear relation between the level of "public expenditure" and "economic growth" for France using annual data for the period 1871-2008, by employing the Armeey curve for the purpose. This curve states that the state and the market failures can be helpful in understanding the inverted U shaped relationship between the two variables mentioned above. It is evident that the market failure meant for the positive impact of public spending with decreasing marginal productivity. It is highlighted by the upward sloping portion the rising part of the curve. On the other hand, the failure of the state explains the negative impact of public spending with increasing marginal effect.

Husnain (2011) has estimated the optimal government size in Pakistan following the methodology of Scully. The findings have shown that the threshold level of the government expenditure is 21.48 percent of GDP which is lower than the current size of the government.

#### **4. Theoretical Background and Specification of the Model of Optimal Government Size**

To compute the optimum government size or equivalently the threshold level of government expenditure, we have employed the methodology used by Heerden (2008). As we know that both the public as well as private sectors contribute to the gross domestic product. Public sector provides goods and services which are financed with tax collections from the people. This becomes the public sector spending. On the other hand, the private people give taxes to government and fraction of the rest of their income is saved which in turn is used to produce



goods and services. The fraction of income of the private people given to the government is given by;

$$\frac{T}{Y} = \tau,$$

where  $T$  is total taxes and  $\tau$  is the associated tax rate and  $Y$  is the GDP. Or in other words,  $\tau$  is the share of public sector in GDP. The share of the private sector in GDP is “1-  $\tau$ ”. (1-  $\tau$ ) is the share of the income of the people left with them after taxation which leads to the production of goods and services. The functional form of this relationship is given by the following Cobb-Douglas production form as;

$$Y = \gamma \left(\frac{G}{Y}\right)^\alpha (1 - \tau)^\beta \dots\dots\dots (1)$$

‘ $\alpha$ ’ and ‘ $\beta$ ’ are the shares of the public and private sectors respectively. Equation (1) is a non-linear production. ‘ $Y$ ’ is GDP and  $G$  is government expenditure. ‘ $\tau$ ’ shows the ratio of tax to GDP and ‘ $\gamma$ ’ shows total factor productivity

The log transformation of equation (4.10) is given by;

$$\ln y = \ln \gamma + \alpha \ln \left(\frac{G}{Y}\right) + \beta \ln(1 - \tau) \dots\dots\dots (2)$$

This is simplified as follows;

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

Now taking second derivative with respect to  $G$ , we get;

$$\partial^2 \ln Y / \partial G^2 = -\alpha G^{-2}$$

This exercise shows that the value of the first derivative is positive while the second derivative is negative as is shown by the negative sign of the second derivative. This shows that public expenditure affects economic growth positively but the magnitude of this effect decreases over the time i-e it affects economic growth at decreasing rate afterward. This results into non-linear relationship between “public expenditure” and “economic growth”.

As it is reviewed that at a low level of government expenditure, the increase in the tax rate stimulates economic growth, since at this level, public spending in infrastructures, communications etc is more productive. On the other hand, at high level of the government spending, a tax increase is associated with a reduction in economic growth since most of the government spending at this level is concerned with welfare spending which do not promote economic growth (Scully, 1994; Heerden, 2008 and Husnain, 2011). Now to find the optimal tax rate or equivalently the threshold level of government size, we follow Heerden (2008) to impose the restriction of a balance budget of the Pakistan, i-e ( $G = T$ ). So to impose this balanced budget restriction the tax rate is given by;

$$\frac{G}{Y} = \tau$$

‘ $\tau$ ’ now is called the anticipated tax rate. Where G is government spending and Y is GDP.

Now substitute  $\frac{G}{Y} = \tau$  into equation (2), we get;

$$\ln Y = \ln y + \alpha \ln \tau + \beta \ln(1 - \tau) \dots \dots \dots (3)$$

So to find growth maximizing tax rate or more specifically the threshold level of government size, we differentiate equation (3) w.r.t ‘ $\tau$ ’. Differentiating we get;

$$\frac{\partial \ln Y}{\partial \tau} = \frac{\partial \alpha \ln \tau}{\partial \tau} + \frac{\partial \beta \ln(1 - \tau)}{\partial \tau} = 0$$

$$\frac{\alpha}{\tau} - \frac{\beta}{1 - \tau} = 0$$

Solving for ‘ $\tau$ ’ (the optimal tax rate), we get

$$\beta \tau = \alpha(1 - \tau) \text{ and finally,}$$

$$\tau^* = \alpha / (\alpha + \beta) \dots \dots \dots (4)$$

## 5. Econometric methodology

### 5.1. Unit Root Test

As it is generally argued that most of the time series are not stationary, or in other words they have a unit root among them. Equivalently their mean and variance change over time. Therefore it is necessary to check the data for stationarity, or equivalently to check the order of integration for the variables concerned. For this purpose we used Dickey and Fuller (1979, 1981) test.

## 6. Estimation and Discussion of the Optimal Size of the Government

To find the optimal size of the government, we estimate the ‘3’ equation to find the values of  $\alpha$  and  $\beta$ . But like any usual estimation, we have employed the ADF test to see the order of integration and then to convert them into stationary variables since estimation of the optimal size of the government needs the variables to be stationary. The results of the ADF test are reported in table below.

**Table 6.1; Results of the ADF Unit Root Test**

Level					1st Difference				
Variables	t-value	Lag length	Intercept	Order of Integration	Variables	t-value	Lag length	Intercept	Order of Integration
Ln Y/N	-0.89	0	intercept	I(1)	Ln $\Delta Y/\Delta N$	-4.799**	0	Intercept	I(0)
Ln $\tau$	-1.18	0	Intercept	I(1)	$\Delta$ Ln $\tau$	-5.94**	0	Intercept	I(0)
Ln 1- $\tau$	-1.19	0	Intercept	I(1)	$\Delta$ Ln 1- $\tau$	-6.24**	0	Intercept	I(0)

(\*), (\*\*) and (\*\*\*) show significance at 10 percent, 5 percent and 1 percent respectively.

Table 6.1 reports the results of the Augmented Dickey Fuller (ADF) test results. The ADF ‘t’ statistics in each case reveals that all the variables are I(1) and they are transformed into stationary by taking first difference. The OLS results are given below.

$$\ln Y = 0.0105 - 0.260 \ln \tau - 1.242 \ln(1 - \tau) \quad (5)$$

(T-Stat)    (8.157)        (-2.742)        (-3.045)

The above results of the equation for the optimal size of the government show that all the variables have carried out significant coefficients as shown by high ‘t’ statistics.

To calculate the optimal size or the threshold level of government size, we use equation (3). So substitute the values of ‘ $\alpha$ ’ and ‘ $\beta$ ’ from the above in equation (4.13), we get;

$$\tau^* = - \frac{0.2596}{(-0.2596 - 1.2415)} * 100 \quad (6)$$

= 17%

The optimal size of the government size or equivalently the optimal size of the public spending or taxes is found to be around 17 percent of the GDP as is shown by the above empirical analysis against 18 percent of GDP in 2012. This reflects a reduction in public spending over the last year. On the other hand, actual size of the government spending is 18 percent. But the estimated optimal size is 17 percent. This finding is very much interesting since it highlights that the current size of government in Pakistan is above the optimum level or size and there is still scope of reduction in total government spending to the GDP ratio in Pakistan.

Our result of the optimal size of government satisfy the Friedman (1997)’s proposition that the optimal size of governments is found to be in the range of 15 percent of the GDP to 50 percent of gross domestic product. Likewise, our result is also in consistent with the conclusion of Scully (2008) who have highlighted that the optimal tax rate in the United State is 19.3 percent. On the other hand, the findings are also in accordance with the findings of Vedder and Gallaway (1998) and Mavrov (2007).

## 7. Conclusions and Policy Implications

To compute the optimum government size or equivalently the threshold level of government expenditure, we have employed the methodology used by Heerden (2008) by imposing restriction of balanced budget constraint. We have used time series data for period 1973-2012. The Heerden (2008) model pretends that government spending on public goods and services such as national defence and protection of property rights leads to enhance economic growth. But after a certain point, government spending becomes non productive and do not lead to enhance growth because of the welfare spending.

According to Armey curve at low level of public spending in Low income countries there is positive relationship held between government size and economic growth. There purpose is

only to attain the subsistence level and they remain below the threshold level. After a threshold level large public spending retards economic growth because of large spending for welfare purposes like pensions etc. Beyond this optimal level levying taxes creates distortions which ultimately crowds out private investment. In this study the actual level of government size is above the optimal government size which is alarming situation.

The optimum size of the government is 17 percent. This implies that the growth maximizing level of the government expenditure or equivalently the threshold level of the government size is less than the current or the actual level of the government size which is 18 percent. Therefore the study recommends reduction of total government spending to arrive at the growth maximizing level of the government size. This can be possible via reducing the unnecessary government spending and diversion of the unnecessary non-development government expenditure towards development spending. It is important to increase the efficiency of government expenditure and economic growth.

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