An Analysis of the Impact of Government Size on Economic Growth of Pakistan: An Endogenous Growth

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by

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Abstract:

Keeping in view the importance of economic growth in a country's development, this study intended to examine the relationship between the government size and other determinants on economic growth using a time series data over the period 1973-2012. To specify the growth equation, we have followed the Barro (1990) model of endogenous growth. The exogenous variables in the model consisted of the government size, employment, inflation, capital and trade openness. To examine the impact of the 9/11 incident, the earth quake in 2005 and financial crises, we have introduced three dummies in our growth equation. Keeping in view the nature of variables and possible endogenity in the model, we have used the VAR methodology which is believed to overcome the possible endogenity. The estimation strategy comprised of two steps. In the first step, we have estimated the long run growth equation using the Johansen co-integration technique. In the second step, we have estimated the ECM model to arrive at the short run growth elasticities with respect to the variables concerned. The long run results indicated that almost all the variables have found out to be significant with their expected signs except for trade openness which carried negative coefficient. The negative and significant coefficient of the government size suggested that large government size negatively affect economic growth of Pakistan. On the other hand, the positive and significant coefficient of capital indicated that increase in capital holdings enhances economic growth. The positive and significant long run coefficients of inflation and employment highlight that economic growth increase along with increase in inflation and employment. The trade openness variable was found to be significant with positive sign which is the only significant variable in the ECM model except the dummies. The ECM term in the error correction model has carried out significant coefficient with negative sign and plausible magnitude that highlights the stability of the model.

Keywords: Government size, Economic growth, Co-integration, Time Series Analysis.

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. Moreover, the economic development is determined by a number of factors that include the size of the economy, economic conditions, level of employment, endowment structure and trade performance etc. On the other hand, 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, 1994). The long run economic growth of an economy is determined by a number of aspects such as initial human and physical capital, labor force, growth rate of inflation, per capita GDP, trade openness and so on. Like there are a number of other factors which influences economic growth. Among these, political stability and size of the government expenditure and government size etc. 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 issue of effectiveness of public policies like fiscal and monetary policies on economic growth and development has gained considerable popularity among the researchers. There are many studies that have worked on the relationship between economic growth and its determinants throughout the world. Many others have attempted to evaluate the impact of government size on the GPD and GDP per capita growth and have found that government size significantly affect the growth rate of GDP. The findings are to some extent contrasting, as some of them have found negative relationship between government size and economic growth. In addition some others have concluded that positively affect of GDP growth rate or equivalently economic growth. There seems no consensus among the researchers regarding the relationship between government expenditure and economic growth. 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?

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. 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. However, there is another class of opinions who argues that the impact of government size on the economy leads to inverted U shape cure. 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 Armey, 1995).

There are differences among the opinions of researchers regarding the impact of government size on economic growth both in developed and developing countries. In case of developed countries some of group argues that the government size is negatively related to the GDP growth rate because it causes crowding out of private investment, higher interest payment and tax burdens. The increment in the government size reduces the growth rate because it requires more spending. To raise revenue, the government imposes additional taxes to finance additional spending. This rise in taxes reduces economic activities and ultimately private investment which in turn have a negative impact on growth rate (Barro 1990, Landau, 1983). On the other hand, some others argue that in developing countries, size of the government has a positive impact on economic growth because it encourages private investment since a large government is likely to invest more in infrastructure and technological up-gradation and diversification. Many other have found the said relation to be inconclusive for example 'Yasin (201 1), Ghali (1997), Lin (1994), Vedder & Gallaway (1998) and Hsieh & Lee (1994)'.

So keeping in view the differences in the opinions of researchers regarding, this study intends to evaluate the relationship between economic growth and its determinants particularly to examine the impact of government size on the economic growth of Pakistan.

2. Rationale/Relevance of the Study

After we have studied a vast literature, it is revealed that a lot of studies have been conducted by different people both in developed as well as developing countries to examine the impact of government size on economic growth. We have found differences in the findings of the researchers across the world as some studies highlight that government size and economic growth are negatively related or equivalently large size of the governments reduces economic growth. In contrast, some other pinpoint that the said relationship is positive i-e a large size of the government is associated with high economic growth. As far as the studies in Pakistan are concerned, we have found no study which has relied on the examining the relation between government size and economic growth. Therefore the first and most important contribution of this study is to evaluate the relationship between government size and economic government since no study is available on this pattern[2]. So the available studies in Pakistan on this pattern are seemed to be suffered from the weakness from the specification point of view since some of the empirical studies for example Ahmed (2005) and Iftikhar (2011). Another contribution of the study is to see the impact of the 9/11 incident in 2001, on our economic growth. This incidence is believed to have adversely affected our economic activities and has slowed down economic growth. For this purpose, we introduce the dummy 'D_{01}" in our model. Another necessary augmentation is that we incorporate the dummy variable 'D_{05}' in our empirical model. This dummy will capture the impact of the severe earthquake in 2005 on our economic growth. It is believed that this incidence has also adversely affected our economic performance, since most of the national resources were diverted towards reconstruction, compensation and infrastructures. This has slowed down domestic economic activities. Yet another important contribution of this study is to evaluate the impact of financial crises on our economic performance. For this purpose, we have included the dummy 'D_{08}' in our model. This dummy captures the impact of financial crises in 2008, as it is revealed that these crises have many distortionary impacts across both developed and underdeveloped countries and have shrunk down world economic activities.

[2] Iftikhar (2011) has estimated the optimum government size in his study, but this study is more extensive since it also examined the growth determinants by specifying the growth equation for Pakistan.

Another impact associated with these crises is that the capital availability in developed countries, particularly in the United States and UK has fallen down. In result, the capital flow across the countries, particularly from developed towards developing countries has reduced, which has resulted in to reduction of the availability of capital with domestic investors. This reduction in investment in turn, is believed to have serious concerns on our economic performance. Another significant contribution of study is that we have not replicated our model from any other study. Rather our model stems from the standard Barro's model of endogenous growth. We have used the Barro (1990) model with some necessary augmentations mentioned above to see and evaluate the relationship between economic growth and government size.

3. Review of Literature

Several studies are available that have been carried out by different people across the world to examine and highlight the factors that affect "economic growth" based on annual data as well as cross sectional data. Most of them have highlighted the importance of government size in determining economic growth. However there are significant differences that are found across their findings about the nature of the impact of "government size" on "economic growth". This is because of the severe methodological problems, as many of the growth determinants in turn endogenous to economic growth. This is the case of endogenity problem, which has not been handled properly by some researchers. On the other hand some have found inconclusive results in this regard. The findings also reveal differences regarding the impact of other growth determinants including inflation, poverty and investment etc. From the literature it has also been concluded that different people have followed different methodologies and different specification approaches. Some of these studies both at national as well as international level are briefly described as follows.

It is revealed from different studies like Loizides and Vamvoukas (2004) and Yuk (2005) that causality between GDP and government expenditure. Rehman et al, (2010) argues that the causality run from GDP to government whereas Rehman and Ahmed (2007) have concluded the reverse causality among the variables. Or in other words, some of them have supported the Keynesian view regarding the causal relationship whereas some have highlighted the validity of Wagener's Law. More specifically, this can easily be interpreted that studies that we have mentioned above, provide mix results about the relation among 'government size' and 'economic

growth', since GDP is used to measure economic growth whereas the government expenditure is employed to explain the government size.

In this section, we provide an overview of the national and international studies which have found out positive and significant relationship between 'government size' and 'economic growth'.

Literature shows that there is some consensus among some of the researchers regarding positive and significant impact of 'government size' on 'economic growth'. This is because of that a large government size is associated with positive externalities which are resulted due to excessive government spending in a number of sectors that promote and encourage economic activities and ultimately stimulates growth rate of GDP. In contrast, a large government size ensures enough intervention of the government in certain sectors and institutions and sectors that can be helpful in creating efficiencies and removing market failures. In contrast, there are few studies that have highlighted a non-linear association between government size and "economic growth".. Following, we provide an overview of some of the studies that have found positive as well as non-linear relationship between government size and economic growth.

Kaldor (1966) has examined the importance of 'government size' in determining "economic growth". The study was conducted to test whether the marginal effect of 'government size' on economic growth is positive or negative. The results concluded that the overall impact of government size on economic growth is positive in all cases and the marginal externality effect is positive because of high total factor productivity in 1960's. The findings confirmed that positive effect of government size is stronger in 'low income countries' than 'high income economies'.

Carr (1986) has investigated whether the government size increases or decreases economic growth. This study was conducted for fifteen countries using the data over the period 1960-80. The findings revealed that government has positive and significant impact on economic growth.

Ram (1986), Kormendi and Meguire (1986) depicted positive and significant association among the 'public spending' and "GDP growth rate". This confirmed that government size is characterized with providing insurance and ensures private property rights.

On the other hand, public expenditure is believed to enhance private investment that lead to accelerate the growth rate. So it is concluded that the studies establish positive relationship between government spending and GDP.

Ghali (1998) have examined the relationship between 'government size' and 'economic growth' for ten 'OECD' economies. The findings concluded that the 'government size' is conducive to economic growth. The multivariate coinegration technique was employed for the analysis. The variables included in the model were the GDP growth rate, total government expenditure, investment, import and exports. The study highlighted that the 'government size' granger cause economic growth in all the cases i-e for all the countries.

Kolluri (2000) has used bivariate framework for G-7 countries to analyze the relationship between government spending and gross domestic product over the period 1960-1993. The empirical findings reveal that the government spending is income elastic in the long run.

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 Armey 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 (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 Armey 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. In contrast, there are a many studies that have shown negative association between government expenditure and GDP. Some of these kinds of studies are outlined as follows;

There are many of studies that have established negative relationship between government expenditure and government size. This class of opinions argues that larger government size reduces economic growth since a large government size is associated with crowding out of private investment, higher interest payment and tax burdens. The increment in government size reduces growth because it needs more funds to finance government expenditure that ultimately results in to inappropriate allocation of national resources. Some of these kinds of studies are outlined as follows;

Landau (1983) has conducted his study for 65 developing studies. The findings have shown that increase in government consumption expenses reduce economic growth while the capital expenditure stimulates economic growth. According to the findings of Bairam (1990), government expenditure has detrimental impact on economic growth.

Barro (1991) has used panel data to highlight the impact of 'economic growth'. The analysis was conducted using the average annual rate of 'growth of real GDP per capita' and the 'ratio of real government consumption expenditure to real GDP' as a measure of the government size. The findings have concluded that government consumption expenditure affect negatively and significantly economic growth.

Wahba (1995) has focused on the effect of the components of 'public expenditure' and revenue on 'economic development' for 56 developing countries. The results revealed that growth in investment and increase in exports has positive impact on 'economic growth' like the 'government capital expenditure' that enhances the growth rate. Labor force growth and current government expenditure have negative effect on 'economic growth'. The findings conclude that government should spend more on provision of public goods, production of goods and services and infrastructure.

Ghura (1995) has pointed out that 'government consumption expenditure' adversely affect 'economic growth'. The analysis was carried out using pooled time series and cross sectional data for 33 African economies. The study has concluded that higher growth countries experienced high ratio of investment, low inflation rate and high growth of exports.

Guseh (1997) has attempted to see the impact of government size on economic growth along economic and political system in developing countries. The study has used the

panel data and employed the fixed effects model to test the relationship for 59 developing countries. The results depicted that growth in the size of the government has negative effect on economic growth which is three times larger in the non Democratic Socialist economies than the Democratic Market economies. The findings conclude that a 1 percent increase in government size reduces economic growth by 0.143 percent. Moreover, the results showed that a 10 percent increase in the government size reduces economic growth by 0.74 percent in Democratic Mixed economic system.

Garghyrou (1999) has tested the nature of relationship between national income and the four categories of public spending over the period1975-1990 for Greek economy. The results revealed that increase in the non productive and personal expenditures do not increase growth, on the other hand public investment is positively related with growth same as productive public consumption.

Knoop (1999) has evaluated the impact of size of government on the welfare growth of US economy. Time series data was used over the period 1970-199. The results have shown that size of the government has a negative and significant impact on economic growth.

Folster & Henrekson (1999, 2001) have conducted a panel study for developed economies using a time series data ranging from 1970-1995. The study has shown that a large size of public expenditure affects negatively economic growth of those economies.

Sjoberg (2003) has conducted to see the association between government consumption and investment and the GDP growth rate over the period 1960-2003. The Armey curve was used to check this relationship. The study concluded that small governments cannot enhance economic growth. Moreover, the study further highlighted that too much government spending impedes growth. Consumption was found to be negatively related whereas investment was found to be positively related with GDP growth rate.

Pevcin (2004) has shown that the ‘government expenditure significantly negatively related with economic growth. The analysis was carried for 12 European economies. Moreover, the study has shown that the optimum size of the government ranges between 36 and 42 percent.

Berg (2007) has examined the relationship between government size and economic growth over the period 1970-2005 for OECD rich countries. More specifically, OLS and Bayesian algorithm approach were employed over the panel data. The results confirmed negative impact of government size on economic growth. The findings revealed that the negative impact of taxes and public expenditure can be removed by focusing on the institutional quality such as economic freedom and globalization. The results revealed that initial GDP, tax and government expenditure significantly affect economic growth.

Loto (2011) has examined the impact of government expenditure on economic growth in Nigeria over the period 1980-2008. Sectoral expenditures and the five key sectors of the economy including security, health, transportation and communication and agriculture were considered for the analysis. The findings highlighted that in case Nigeria public expenditure affects negatively economic growth. So the co-integration prescribes that spending on agriculture has negative and significant impact while spending on security, transportation and communication has positive, but insignificant impact on economic growth.

There are many other studies that have found mix relationship between the government size and economic growth. Some of them are shown below.

The study done by Grier & Tullock (1989) has resulted that for different group of countries the impact of these variables is different like government growth is positively correlated with GDP growth for the Asian countries, and negatively related for the Africa.

Lin (1994) has highlighted that there is positive and significant impact of government size on economic growth for developing countries in the short run whereas negative impact was found to be in the middle period.

However spending on education has positive impact on economic growth but the government consumption was found to be negatively related Hansson & Henrekson (1994).

There are some studies regarding Pakistan are given below.

Naveed Ahmed and Fareed Ahmed, (2005) have examined whether the government size growth impact for D-8 countries. Time series data used ranging from 1973-2002. The government final consumption expenditure has been used as a proxy for government

expenditure. Moreover Engle and Granger (1987) two step procedure is applied and no long run relationship between real government share in GDP and real income per capita has been found. The cointegaration test has not used fully to capture the true relationship between these variables and ECM technique is not incorporated to find short run relationship. There is important point that Granger test don't give pure results by using only two variables. There was found no 'causality' from both size between 'government expenditure' and per capita income in Bangladesh, Egypt, Nigeria and Pakistan and results shows that government size does not cause per capita income.

Iftikhar (2011) has employed the methodology of Scully (1994) to estimate the threshold level of the government expenditure i-e the level of government expenditure that maximizes the economic growth. Annual data over the period 1975-2008 and the study has shown that optimum level of the government size of Pakistan is 21.48 percent of GDP which was smaller than the actual size at that time. Therefore the study proposed a reduction of scope of 5.4 percent in the level of government expenditure.

The government expenditure as a percent of GDP has been taken as a measure of government size but not using taxes as measurement of the government size. Agent et al (2006) and Folster & Henrekson (2001) have considered both of the government expenditure and taxes for the analysis. However, the cointegaration technique is not used in this study to estimate the long run association between "public spending" and "economic growth" and not checked the short run dynamics of this study.

4. Econometric Modeling of the 'Government Size and Growth in Pakistan'

4.1. Theoretical Background and Specification of the Model

This study intends to examine the importance of government size in determining the level of economic growth. For this purpose, we follow the study of Barro (1990), in which he has shown economic growth as function of capital and government spending in the Cobb-Douglas form. Barro interpreted government spending as a tool of the fiscal policy which has long term effect on economic growth. It argues that the tax policies encourage investment, improves growth rate and utility level only if the social rate of returns on investment exceeds the private

return. According to Barro's (1990) growth model, the public sector services are regarded as productive input for the private producers.

$$Y=A\,K^{1-\alpha}\,G^{\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (1)$$

Where, $0<\alpha<1$

Y: Level of per capita GDP,

A: Total factor productivity or level of technology,

K: capital

G: Government purchases:

The model is characterized with diminishing returns with respect to capital for given government spending and constant returns to scale for both capital and government spending. The model can be written in the log linear form as follows;

$$\log Y = \log A + \alpha \log G + (1-\alpha) \log K \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

$\log A = A_0$, $y=\log Y$, $g=\log G$, $k=\log K$

$$y = A_0+\alpha\, g + (1-\alpha)\, k \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots... (3)$$

The important implication by Barro (1990) model is that the size of the government is efficient and optimal when marginal productivity of government expenditure is one. There are a number of studies that have used the Barro model to examine the relationship between government size and economic growth. These include the studies of Guesh (1997), Kneller et al (2000), Sjoberg (2003), Taban (2010), Berg (2011), Jalles (2011) etc. On the other hand, there are only few people have examined the impact of government on economic growth using the Barro Model of endogenous growth. In this study the standard Barro model of 1990 has been used with a number of some necessary augmentations to test and evaluate the relationship between government size and economic growth of Pakistan.

After studying vast literature, it is concluded that many people have used the Barro model. In contrast in Pakistan, the studies of this kind are very rare and most of them are simple and suffer from methodological and specification problems and weaknesses. Some of these studies are the studies of Iftikhar (2011) and Ahmed (2005) who have attempted to overcome the

problems in the existing studies by employing the Barro (1990) model of endogenous growth with some modifications. We have re-specified and augmented the standard model of Barro with some necessary augmentation. To augment and introduce additional variables in the model, we have followed the procedure of Amir and Dar (2002) and Anaman (2004) who assume that the other variables affect economic growth through their impact on the total factor productivity. So following these studies, we assume that government size, trade openness, inflation, gross fixed capital formation and employment have impact on economic growth through total factor productivity. But here we assume that the total factors productivity is determined by inflation, trade openness and employment level. More specifically we define A_0 as;

$$A_0 = \alpha_0 + \alpha_1 \text{ INF} + \alpha_2 \text{ TO} + \alpha_3 \text{ EMP} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where,

INF: Inflation rate,

TO: Trade openness,

EMP: employment.

Substituting equation (4.4) into equation (4.3) and adjusting the coefficients, we get the following version of our extended Barro model.

$$y = \alpha_0 + \alpha_1 \text{ INF} + \alpha_2 \text{ TO} + \alpha_3 \text{ EMP} + \alpha_4 \, g + \alpha_5 \, k \qquad (5)$$

The econometric representation of above model is

$$Y_t = \alpha_0 + \alpha_1 \text{ INF}_t + \alpha_2 \text{ TO}_t + \alpha_3 \text{ EMP}_t + \alpha_4 \, g_t + \alpha_5 \, k_t + \varepsilon_t \quad (6)$$

Where, ε_t is the error term which is assumed to be white noise.

The Error Correction specification of our growth equation is given by;

$$\Delta y_t = \alpha + \sum_{i=1}^{p} \Gamma_{1i} \Delta y_{t-i} + \sum_{i=0}^{p} \Gamma_{2i} \Delta g_{t-i} + \sum_{i=0}^{p} \Gamma 3_i \Delta To_{t-i} + \sum_{i=0}^{p} \Gamma 4_i \Delta Emp_{t-i} + \sum_{i=0}^{p} \Gamma 5_i \Delta k_{t-i} + \sum_{i=0}^{p} \Gamma_{6i} \Delta \pi_{t-i} + \Pi_{11} ECT_{t-1} + \varepsilon_t \quad (7)$$

4.2. Econometric Methodology

In this study, we employ the Johansen cointegaration. This technique allows more than one co-integrating relationship. If the variables have a long run association, then they are said to

have co-integration among them. It is believed that most of the time series data have a unit root i-e they are non-stationary, or in other words, their mean and variance change over time. But these variables can be converted into stationary variables through differencing and most of them are stationary at first difference. The first condition for co-integration is that variables must have the same order of integration. The second condition for the existence of co-integration among the variables is that error must be integrated of lower order or more specifically, if all the variables are stationary at the first difference i-e I(1), the error must be stationary at level i-e I(0). Therefore it is necessary to check the co-integration among the variables before any econometric analysis. We use the Johansen co-integration methodology to check co-integration among the variables concerned.

4.2.1. 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 have employed the augmented dickey fuller (ADF) test which is specified as follows;

$$\Delta y_t = \alpha + \delta\, y_{t-1} + \sum_{i=1}^{m} \delta\, \Delta y_{t-i} + \varepsilon_t \text{ ,.................................} \quad (8)$$

In (4.8), "Δy_{t-i}" shows the lagged value of dependent variable to account for the autocorrelation. We use the augmented dickey fuller ADF test to check the stationarity of the variables concerned.

4.2.2. Testing for Cointegration using Johansen's Methodology

After testing the order of integration we estimate our model. For long run assosiationship we apply the likelihood ratio test which is based on the maximum Eigen value and trace statistics on the Johansen (1988) procedure. The necessary condition for co integration is that all variables should be *I (1),* they should be integrated of the order 1. So the main concern of the Johansen procedure is to find the number of co integrating vectors in the system. There would be no long run relationship if numbers of coinegrating vectors are zero. Moreover if there are 'r' co integrating vectors it means there is long run relationship between the variables of interest. We use the procedure of Johansen and Juselius (1990, 1992) since it allows for multivariate co-

integrating vectors and avoid the Engel Granger procedure of Co-integration to test the growth equation that we have specified in the last chapter. The Johansen procedure uses the basic idea of the vector auto regressive (VAR) model that allows the simultaneous evaluation and multiple relationships among the variables. EG approach is a univariate analysis since it is based only on a single co-integrating vector. In contrast, in the case of a multivariate analysis, there is more than one co-integrating vectors.

We have used a time series data over the period 1973-2013 for the purpose. Most of the data has been taken from the State Bank of Pakistan (SBP) and Pakistan economic survey 'various issues' 2012-13. Data on Real GDP per capita, inflation, exports and imports have been taken from State Bank of Pakistan. Data on gross fixed capital formation, employment and government expenditure has been taken from Pakistan Economic Survey 2012-13, various issues.

5. RESULTS AND DISCUSSION

5.1. Test of Stationarity

As we have mentioned above that most of the time series are non stationary or equivalently their mean and variance vary with time. These variables can be converted into stationary variables through differencing. If they are not converted into stationary variables, the estimates are not valid and reliable. To check stationarity of variables concerned, we have employed the Augmented Dickey Fuller (ADF).

Table: 1 Unit Root Test Results

Level					Ist Difference				
Variables	**τ values**	**Lag Length**	**Intercept**	**Order of Integration**	**Variables**	**τ values**	**Trend/Intercept**	**Lag length**	**I(i)**
GDP PC	**-0.88**	**0**	**intercept**	**I(1)**	**ΔY(GDP PC)**	**-4.799****	**Intercept**	**0**	**I(0)**
G SIZE	**-1.18**	**0**	**intercept**	**I(1)**	**ΔG/ΔY**	**-5.93****	**Intercept**	**0**	**I(0)**
TO	**-2.81**	**2**	**intercept**	**I(1)**	**ΔTO**	**-5.66****	**Intercept**	**0**	**I(0)**
EMP	**-1.70**	**0**	**intercept**	**I(1)**	**ΔEMP**	**-5.50****	**Intercept**	**0**	**I(0)**
CAP	**-2.90**	**2**	**intercept**	**I(1)**	**ΔCAP**	**-3.60*****	**Intercept**	**0**	**I(0)**
CPI	**-1.38**	**4**	**intercept**	**I(1)**	**ΔCPI**	**-3.53****	**Intercept**	**3**	**I(0)**

(*), (**) and (***) shows significance at 10%, 5% and 1% respectively

The results of the ADF test depict that all the variables are integrated of the same order i-e *I (1).* After we have confirmed that all the variables in our model are integrated of the same order which is a necessary condition for the existence of long run equilibrium relationship between the variables, the Johansen co integration can be employed to check co integration or equivalently to see the long run relationship among the variables concerned.

5.2. Cointegration Analysis

In order to test the co-integrating relationship between the variables we have used Johansen co-integration technique introduced by Johansen (1990). For co-integration analysis VAR system has been estimated with six endogenous variables (GDP per capita, Employment, Inflation, Capital, Trade openness and Government size) and three exogenous dummies (D_{01}, D_{05}, D_{08}). In 2001, 9/11 incident occurred which has adverse impact on economic growth. Likewise, earthquake incident in 2005, resources were diverted towards non productive purposes or in other words on rehabilitation and construction. So ultimately it effected growth negatively. Similarly, in 2008 financial crises tended to slow down the economic growth and lost the confidence of investors. We use the lag selection test to determine the optimum lag length.
The optimal lag has been selected using lag length criteria tests. The results are presented in the Table 2.

Table 2. VAR Lag Order Selection

Lag	Log L	LR	FPE	AIC	SC	HQ
0	372.3493	NA	5.84e-17	-20.35274	-20.08882	-20.26062
1	554.5815	293.5964*	1.78e-20*	-28.47675*	-26.62931*	-27.83194*
2	577.8333	29.71062	4.31e-20	-27.76852	-24.33756	-26.57102
3	612.3499	32.59906	7.77e-20	-27.68611	-22.67163	-25.93592

*indicates significance at 5 %

In the above table 2, all criterions (LR, FPE, AIC, SC, HQ) confirmed the first lag for estimating VAR at 5 percent. The Johansen technique has been done by choosing the Linear Deterministic Model out of five assumptions. The results of the Johansen test are reported in table 3 below.

Table 3: Johansen Unrestricted Cointegration Rank Test

Hypothesized No.of CE(s)	Hypothesis	λ trace		λ max	
		Statistic	Critical V	Statistic	Critical V
None	H0:r=0, H1:r≥1	129.47*	95.75366	52.98*	40.07757
At most 1	H0:r=1, H1:r≥2	76.48*	69.81889	29.28	33.87687
At most 2	H0:r=2, H1:r≥3	47.20	47.85613	26.233	27.58434
At most 3	H0:r=3, H1:r≥4	20.97	29.79707	12.588	21.13162
At most 4	H0:r=4, H1:r≥5	8.376	15.49471	7.8905	14.26460
At most 5	H0:r=5, H1:r≥6	0.4860	3.841466	0.4860	3.841466

The maximum Eigen value and the trace statistics both highlight the existence of a long run relationship among the variables. However, both the test statistics values confirm only one co integrating vector.

5.3. The Long Run Results of the Johansen Co-integration Procedure

The results given below report the long run elasticities of economic growth obtained from the Johansen Co-integration technique.

$$Lpgdp = -4.454 - 0.514\,LGSZ_{1t} + 0.915CAP_{2t} + 2.444\,EMP_{3t} + 1.069\,INF_{4t} - 1.559TO_{5t} \quad \textbf{(8)}$$

(T- Stat) (-4.868) (7.382) (5.835) (3.162) (-3.117)

We have used the ratio of government expenditure to GDP of Pakistan as a proxy for the government size. The first and foremost point is that the government size carries negative and significant coefficient with high magnitude. This confirms the fact the government size is negatively related with economic growth in the long run. The magnitude of its coefficient is -0.52, which means that a 10 percent increase in the government size is associated with 5.2 percent corresponding reduction in economic growth. The finding is consistent with the theory that a large government size affects negatively economic growth. This is because of the fact the government expenditure is used as proxy for the government size and developing countries exhibit a large proportion of non development in total expenditure which is associated with

reduction and distortion of investment. The results are in confirmation to the earlier findings of Berg & Henrekson (2011), Berg (2007) and Sjoberg (2003) who have found out negative and significant relationship between government size and economic growth. On the other hand, the results are in contrast to the findings of Facchini (2011), Karagiani (2009) and Hearth (2009) who have pointed that in small countries or for LDC's the government size has positive impact on economic growth. They argue that small countries are usually associated with low level of government spending. In result these countries have low level of non development expenditure and transfer payments as compared to their aggregate development expenditure. Our finding support the first group which reveals that in case of Pakistan, government size has negative and significant impact on economic growth in the long run.

The 'capital' variable in our model appears with its expected sign and carries positive and highly significant coefficient with meaningful magnitude. The coefficient of this variable is 0.92 which reflects that 10 percent change in capital is associated with 9.2 percent change corresponding change in economic growth in the long run. This confirms the fact that any increase in capital accelerates economic growth since it encourages investment. The findings are in consistent to the theory as well as to the earlier findings. For example, Peralias and Avila (2011) and Facchini (2011) have shown that capital as a proxy of investment has positive and significant impact on economic growth.

Trade openness also appears with a larger and highly significant coefficient but unfortunately with unexpected negative sign. This implies that trade openness adversely affect economic growth. This finding or behavior of trade openness can be justified for the case of Pakistan for which imports of goods and services are far greater than to exports. This, results into deficit in cross border trade balances which is financed via domestic and external borrowing that can be viewed harmful for domestic investment and economic activities. This negative effect may be due to the different trade structure and nature of exports. Since there are some existing findings in which trade openness has been found to be negatively related with economic growth like the findings of Rodriguez and Rodrik (1999). Large trade openness has significant and negative impact on growth in the low income economies because these are behind the technology frontier and cannot understand the benefit of increasing trade while making with high industrialized countries. Dowrick and Golley (2004)

The ‘employment’ variable in our model appears with expected positive sign and statistically significant coefficient with high magnitude. The coefficient of this variable is 2.44’ which implies that a 10 percent increase in employment is associated with 24.4 percent increases in economic growth in the long run. This entire means that a slight increase in employment brings larger than proportional change in economic growth.

To calculate ‘inflation’, we have used the growth rate of consumer price index (CPI). The important notable point is that this variable carries positive and significant coefficient. The estimated coefficient of inflation is 1.10 which means that any increase in inflation carries almost proportionate change in economic growth. The findings are consistent with some studies like Malik and Chaudhry (2001), Fischer, (1993) and Barro, (1996). There are many studies in which negative relationship has been explored or in other sense inflation is considered to be harmful for economic growth (Bruno and Easterly, 1998). Our result of inflation is also consistent with the fact that inflation is considered to accelerate economic activities and thus leads to economic growth.

In the above section, the long run elasticities of the determinants of economic growth have been analyzed. The results have shown that most of the variables in the model have appeared with their expected signs and significant magnitude. Particularly the ‘government size’ variable has shown a negative impact on economic growth in the long run. Besides this capital, inflation and employment have carried positive and significant coefficients. In addition trade openness carries negative and significant coefficient.

5.4. Analysis and Discussion of the Results of the Dynamic Error Correction Model

In this section, we seek to discuss and analyze the results of the Error Correction Model. To estimate the ECM, we have employed the general to specific methodology. The idea behind this methodology is that we successively drop the entire insignificant coefficient one by one from the model. The rest of the model is called the parsimonious model. Enders (2004) has employed the general to specific methodology to estimate the Error Correction Model of this kind. In this general-to-specific approach, starting with general form which comprises both the constant and deterministic trend, t-test is used to check the significance of trend coefficient. The optimum lag length is one both in the long run as well as short run estimation. The results of parsimonious ECM model are given in following table.

Table 4. Results of Error Correction Model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
DTOP	0.130301	0.046527	2.800571	0.0084
D01	-0.014081	0.007089	-1.986233	0.0551
D05	0.014633	0.007160	2.043733	0.0488
EC1(-1)	-0.023520	0.002670	-8.8115932	0.0000
Adjusted R-Squared	0.290524			
Durbin-Watson	**2.128652**			

Table; 5, Results of the Diagnostic Tests

Diagnostic Test Statistics	Calculated Value	P-Value
Normality (Jarque Bera Test)	3.581	0.1668
Serial Correlation (Breusch-Godfrey)	2.028	0.1544
Hetroscedasticity (Breusch-Pagan-Godfrey Test)	3.158	0.9512

We have performed certain diagnostic tests to check the validity of the model. These tests include the autocorrelation, Hetroscedasticity, stability and the normality tests. Above Table presents the diagnostic tests results. The value of the test statistic for serial correlation shows that there is no existence of serial correlation as shown by the Breusch-Godfrey LM test of serial correlation, since the associated 'p' values is greater than 5 percent that accept the null hypothesis of no serial correlation. Likewise, the model does not suffer from Hetroscedasticity as shown by Breusch-Pagan-Godfrey test with its calculated value is 3.16. So the null hypothesis of no Hetroscedasticity is accepted at the 5 percent level of significance. Similarly, we cannot reject the null hypothesis of normality as shown by the associated test statistics which is 3.58. This shows that the model passes the test of normality.

To check stability of the model, the CUSUM and CUSUMQ techniques have been employed which are based on the ECM model that we have estimated. It is evident from the graphical presentation that both the CUSUM and CUSUMQ series are lying between their critical bonds at the 5 percent level of significance. This confirms the stability of ECM model with respect to all the variables including structural break effects.

Fig: 1. Cusum

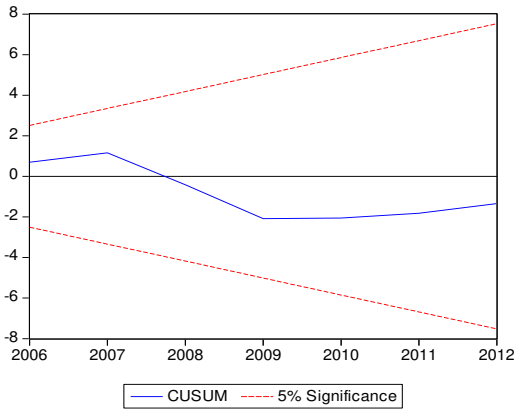
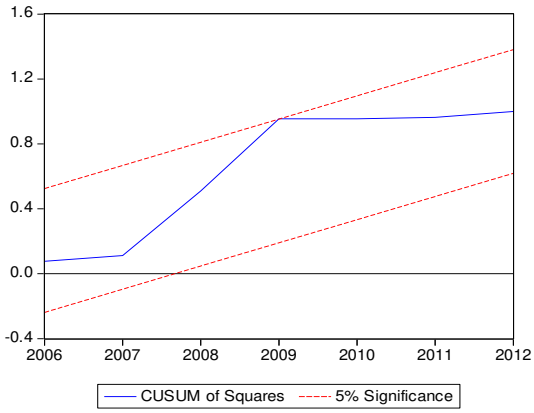


Figure: 2. Cusum of Squares



The above table 5 reports results of the error correction (ECM) model. The first and important result in the ECM model is the negative and significant coefficient of the ECM term which is -0.0235. This implies that around two percent of the deviations are adjusted per year. This shows stability of the model although the speed of adjustment is not much quick. In other words coefficient of the ECM term is relatively small which implies that the adjustment of the short deviations around the long run time path is slow. Anyhow the model is considered to be stable since the all the exogenous variables contribute to adjust all the short run fluctuations around the long run time path. The other variables in the model are the short run elasticities that highlight the short run impact on economic growth. Most of these variables in the model were turned out to be insignificant. The only significant variables in the model that we left with are the two dummies 'D01 and D05' and trade openness. The other variables in the model which were found to be insignificant both with levels and lags are the government size, inflation, capital and employment. In addition the dummy variable 'D08" also appeared to be with insignificant coefficient. The coefficient of trade openness is 0.13 which shows that a one percent increase in trade increases economic growth by 1.3 percent in the short run. This result is in contrast to the long run impact of trade openness which is negative. The dummy variable "D01" carried negative and significant coefficient. But the dummy variable "D05" carried significant but positive which is against our expectation. This could be due to the fact that after this incidence, a large flow of foreign aid to Pakistan was observed in the subsequent years. This might has promoted domestic economic activities and have led to economic growth.

Finally, it is concluded that in long run government size has negative impact on economic growth. While in short in it has no significant impact on economic growth. Our dummy variables D_{01} and D_{05} were found to be highly significant in the short run also and appeared with negative and positive signs respectively. This implies that the 9/11 incident has an adverse impact on our economic growth. This is because of its adverse impact on investment climate. The dummy variable 'D_{05}' which was included in the model to capture the impact of the earthquake in 2005 appeared to be unexpectedly with positive impact on economic growth

6. Conclusion and Policy Implication

6.1. Conclusion

We have analyzed the impact of government size on economic growth in Pakistan as government size is considered to be the core factor which causes economic growth. The study intends to empirically examine the long run as well as short run relationship among government size and economic growth. There are many empirical studies regarding developing and developed countries but no consensus has been found between concerned variables yet. As we have mentioned earlier, that this study is carried out for Pakistan to examine relationship between government size and economic growth using a time series data over the period 1973-2012. We have followed the Vector Auto Regression (VAR) methodology and estimated the Vector Error Correction (ECM) Model to arrive at the short run elasticities of the variables concerned. The findings concluded that the government size has negative and significant impact on economic growth in the long run. This confirms the fact that large government size is associated with inefficiencies in many institutions and leads to crowd out private investment. The findings further concluded that the capital has positive and significant impact on economic growth of Pakistan in the long run. This implies that any accumulation in the capital holdings enhances economic growth in the long run. The results further revealed that trade openness negatively effects economic growth of Pakistan in the long run. This finding is in contrast to some of the earlier findings. But in the case of developing countries and Pakistan in particular, trade openness is believed to affect economic growth negatively in the long run, since trade deficit is usually observed for these economies and they could not successfully exploited the benefits of international trade. On the other hand, the employment variable appeared with positive and significant sign in the model. This reflects that the resources are efficiently utilized

in the economy. Inflation appears with positive but insignificant sign which confirms that it is beneficial for economic growth.

The variables in the parsimonious model that we have left with are the trade openness, the two dummies D01 and D05 and the error correction terms. The positive and significant coefficient of trade openness indicates that trade openness affects positively economic growth in the short run. On the other hand, the dummy variable "D01" appeared to be with significant and negative coefficient with meaningful magnitude. Similarly the dummy variable "D05" carried unexpected positive coefficient which means that earthquake occurred in 2005 has positive impact on economic growth. Finally, the negative and significant coefficient of the ECM term depicts stability of the model with reasonable degree of adjustments of the deviations around the long run time path.

6.2. Policy Implication

In this section we seek to provide an overview of the policy implications and recommendations on the basis of our empirical findings. As this study attempted to examine and evaluate the relation between the government size and economic growth. So we have found a number of interesting findings regarding of the growth determinants on the basis of our empirical analysis from which a number of interesting policy implications can be derived. On the basis of these finding, the study advances the following policy implications

The analysis of the results reflected that the government expenditure used as proxy for the government size has an adverse impact on economic growth. This has been shown by the negative and significant long run elasticity of economic growth with respect to the government size. This negative impact of government expenditure could be due to the surge in government expenditure, particularly an excessive increase in the non development expenditure which in turn crowds out private investment and adversely affect economic growth. So to promote private investment, the government should reduce non development expenditure and divert resources towards development expenditure. It should invest in infrastructure both in hard and soft which is expected to accelerate economic activities and will have positive and favorable impact on economic growth.

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