

# THE IMPACT OF FISCAL POLICY ON ECONOMIC GROWTH: PANEL DATA ANALYSIS

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## Abstract

*The economic transition after 1990's from socialism toward free market economy has changed the role of state in connection of spending decisions and tax policy. The dynamics of fiscal policy has received less attention among researchers in the past. The present study is a comprehensive analysis of the effectiveness of fiscal policy for economic growth. The study examines the effects of fiscal policy on the economic growth during the period of 2002 to 2014, based on International Financial Statistics (IFS) database and World Development Indicator (WDI) database. The study analyzes the impact of a fiscal shock on economic growth for 10 countries, with the use of panel ARDL econometric technique. The results of the study summarize the fact that fiscal policy is a key instrument in the process of economic growth in the sample economies.*

**Keywords:** Panel Data, Fiscal Policy, Government Expenditures, Economic Growth.

**JEL Classification:** H 610

## Introduction

Despite the gigantic literature on the effects of monetary policy on macroeconomic activities, the role of fiscal policy in economic research has received less attention. The financial crises of 2008 have turned out the interest of researchers to revive and analyze the important role of fiscal policy. The government policy is playing an important role in economic research. Various schools of thoughts in economics have diverse approach toward fiscal policy and originate different conclusions about its effect on the economy. Most often fiscal policy is evaluated by its impact on growth and investment; hence investment is a direct factor for economic growth. The effect of fiscal policy on output and investment is still not well understood as out of different views one view is that government has no control over investment-consumption decisions Hsiao (1995), while Phelps (1965) exam-

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ined that, “in the present market economies with the given monetary and fiscal controls, government has significant authority over the investment decisions.” This study will provide a brief review of the literature of the impact of fiscal policy on economic growth, inflation, private consumption, private investment and the composition of output.

The important issue that fiscal policies will address is that how fiscal tightening or fiscal expansion affects macroeconomic activities. Fiscal tightening decrease the budget deficit, while, fiscal expansion increases it. The expansion is caused by tax reductions or increases in government spending or both at the same time. Similarly, fiscal contraction involves increase of taxes or cuts in spending or both at the same time. Both policies have a contingent impact on the key important macroeconomic variables. In fiscal discipline there is a fascinated relation between economic growth and fiscal policy. Different studies examined effects of budgetary policy on inflation, investment, consumption, external debt and economic growth. According to Hoppner (2001), GDP growth rate responds positively to shocks in government spending and negatively to shocks in taxes. While in the long run, it has a negative response to deficit budget. The new classical growth model is the common tool to predict macroeconomic growth. This model assumes that both capital and labour is a function of output and is exogenous. Unlike the classical growth model, the endogenous growth models predicated differences among various countries in capital affecting growth pattern in the long term. According to Tomljanovich (2004) the fiscal policy effects cannot predict the long run effect of spending and revenue of the state following the classical growth model. However, Barro (1990) takes into account government’s taxation and spending in the endogenous growth models and find their significant contribution. Tanzi and Zee (1997) argued that taxes, public expenditure and budget deficit attained less attention in traditional studies because of lack of data. The growth equations in these studies do not include the variables of fiscal policy as a major determinant while measuring the economic growth.

Some authors like Barro (1990), Baxter and King (1993) have suggested that fiscal deficit is affecting both money growth and inflation; but researcher like Hoelscher (1986) was not in favor of such views, he was of the opinion that there is no such causality between deficit and inflation. Bixi, Ghanem and Islam (1998) showed empirical results that inflation will lead to increase budget deficits. Saleh et al. (1996), Vamvoukas (1999), Wolff (2006) and Megarbane (2002), Ali (2010) concluded that a rise in current account deficit of balance of payments is a result of unfavorable deficit budget and considered it a major hindrance in growth pattern. Easterly (1993) concluded that much of the existing literature on economic growth and fiscal policy explain differences in growth activities depending on country characteristics such as: levels of education, saving rates and different types of policy implications.

The endogenous growth model analyzing the impact of government expenditure is divided into productive and unproductive categories (Barro, 1990; Turnovsky & Fisher, 1995). The productive government expenditures are raising the marginal productivity of private factors of production

and stimulating economic growth. While the unproductive expenditures do not affect production directly. The aim of this bifurcation is to divert the government expenditures from unproductive to productive expenditures. In recent analysis the government expenditures are differentiated on the basis of economic sectors. Traditional models of endogenous growth abridging the economy to productive sector which does not compose of reallocation of resources, especially to public investment. Moreover, the multi-sector growth models are differentiating public investment through elasticity's of output (Glomm and Ravikumar, 1997). The influence of productive government expenditure on growth, specifically the investment in technology and investment in final output, are enhanced. Moreover, the expenditures on human capital, physical capital, health and education are considered very prominent in enhancing growth. Agénor and Moreno-Dodson (2006) studied the government expenditure on infrastructure, health and education, taking under consideration the complementarities among these sectors. They found the degree of parameters characterizing education and health technology play an important role in human development process. Rajaram (2007) also used productive models around these three sectors. He concluded that for lower and middle income countries public infrastructure directed by health and education spending can improve the public investment. According to Moreira (2007), public spending can be split around education, health, investment in security and infrastructure. Her study found that different policy experiments have various impacts on the growth of economy. Monteiro and Turnovsky (2008) analyzed how shift in education expenditure from infrastructure can affect long term growth. They concluded that such diversion will enhance growth in the long-run. All these studies examined only the government spending without its source of financing. Though, theoretical studies recommend the net effect of productive public spending will change on how it is financed. Simpson (2004) and Cashin (1995) examined that when spending is financed through taxes on capital and labor income, it will have non-monotonic effect on the long-run growth.

In short run, there are numerous macroeconomic effects of fiscal policies. Different instruments leads to different results (Skinner, 1992). Thus, a decrease in tax rate will increase the permanent income and any change in the fiscal expense determines a raise of the public economic sector. It will increase consumption expenditure of the private economic sector. The social benefits expected from the larger consumption of public sector may be measured. The clients' choice to raise saving or consumption expenditures after increase due to fiscal system reduction is playing a vital role while determining its impact on the economy. If it is used as an instrumental variable, the immediate effect over production is little noticeable in short-run, while in long run it will show a considerable effect on production. Any permanent change in fiscal balance rate leads to a much effective impact in case of temporary change while it will be compensated by fluctuations of the economy. It needs modifications in fiscal spending because it has stronger impact on the temporary character.

Abdullah et al. (2008) examined the long run relationship between public expenditure and economic growth using Pedroni Cointegration method. They found a significant and positive impact of public spending, education and health spending on economic growth. Moreover, distortionary

taxation, defense spending had a significant negative impact on economic growth. Chen and Gupta (2010) examined the public spending in education and health and other structural factors who are affecting economic growth. They implied, the GMM technique for the estimation of endogenous growth model and considered key explanatory variables included in growth equation and considered an important determinants of economic growth. The results demonstrated that public spending in education and health was significant negatively.

The studies of the effect of public expenditure on the economy has shown a positive effects. Ranjan and Sharma (2008); Cooray (2009); Wu, Tang and Lin (2010); and Nworji, Okwu, Obiwuru and Nworji (2012) studied the impact of public spending on economic growth and found a positive significant impact. However, Abu-Qarn (2003) and Laudau (2012) resulted a negative significant relationship. Furthermore, Kormendi and Meguire (2011) and Adefeso and Mobalaji (2012) found no correlation between the concerned quarters.

### Research Methodology and Panel Data Techniques

#### *Theoretical Framework*

The standard exogenous growth model assumes that productive government expenditures positively affect public capital, which ultimately leads to long run economic growth. The role of government spending is trace back to the studies of Arrow and Kurz (1970) who presented exogenous growth models. In the study of Barrow (1990) the role of government spending was more emphasized. The main ideas was productive public spending has positive impact on the marginal product of private capital and makes the long run growth rate an endogenous variable.

The standard form of the equation is given as:

$$Y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 GE_{it} + \beta_4 h_{it} + \mu_{it} \text{-----}(1)$$

Following Barro (1990), Feder (1982), Ram (1986) and Grossman (1988), government spending (GE) can be incorporated as an independent variable.

Following equation (1) this study uses the following equation in order to estimate the impact of government expenditures on economic growth in the presence of control variables:

$$Y_{it} = \beta_0 + \beta_1 GE_{it} + \beta_2 X_{it} + \mu_{it} \text{-----}(2)$$

Where Y represents economic growth, GE represents government expenditures and X represents set of control variables (Inflation, Private Investment, Cost of Borrowing, Trade and Household Final Consumption).

### *Model Specification*

In neoclassical growth models fiscal policy is not effecting the economic growth (Bleaney, 2001). Conversely, fiscal policy can change the growth and output predicted by endogenous growth model. Barro (1990) assumes the Cobb-Douglas form of production function,

$$y = f(k, g) = A K^{\alpha} g^{1-\alpha} \text{-----} (3)$$

here,  $0 < \alpha < 1$ . In above equation  $k$  = the unit of capital in aggregate term and  $g$  = the unit of public purchase of goods and services

Endogenous growth models explain the channel through which the fiscal policy is influencing the long-run economic growth (Barro, 1991).

To capture the fiscal policy effects, the study will use the following functional form to gauge the relation of fiscal policy and macroeconomic activities.

$$\text{While } Y = f(\text{FP}, X) \text{-----} (4)$$

Here,  $Y$  shows macroeconomic activities; such as economic growth, private investment, consumption and inflation. Vector  $X$  represents the growth regressors and control variables such as exchange rate, interest rate etc. Fiscal policy variables represented by  $\text{FP}$ . The variables of fiscal policy are budget deficit, public expenditures and tax revenues. A change in fiscal policy variable will affect  $Y$ . The present study uses a dynamic model of economic growth equation across countries over time using the extended version of Solow model (Barro, 1996). The econometric model for describing the determinants of economic growth including fiscal policy variables and control variables is given by the following equation.

To judge the effectiveness of fiscal policy in the presence of control variables the empirical equation is being modeled as below:

$$Y_{it} = \lambda_0 + \lambda_1 \text{FP}_{it} + \lambda_2 Z_{it} + \mu \text{-----} (5)$$

The aim of this model is to find out whether fiscal policy has a significant impact on economic growth in the presence of other control variables in the model. The variables consumption, investment and inflation are taken from Barro's (1995) growth equation, trade balance as control variable is taken from Hsiao (1995). Fiscal deficits, government expenditures, tax revenues, current government expenditures and development expenditures as fiscal policy variables are used in the study.

### *Objectives of the Study*

The study is designed in order to analyze the impact of fiscal policy on economic growth for

ten economies including leading economies (Germany, Japan, Switzerland, USA and UK) and lagging economies (Bangladesh, China, India, Pakistan and Sri Lanka) during the period of 2002 to 2014. The list of selected developing countries incorporates five emerging Asian economies. China shares patterns of economic growth owing to geographic location, cultural similarities and parallel strategies for economic development among selected lagging countries. While, the list of developed countries with more than 5 million population and these countries are believed to have much common characteristics and fiscal consolidation with China. By taking these countries in to similar group, we are expecting to alleviate the problem of parameter heterogeneity and control for the difference in institutions and technology.

### *Data*

The present study will use panel data for all macro variables included in estimation of dynamics of fiscal policy for a sample of ten economies namely USA, UK, France, Germany, Switzerland, Pakistan, India, China, Bangladesh and Sri Lanka. The study entails annual data for the period of 2002 to 2014. Data for the variables of Government Expenditure (GE), Inflation (INF), Private Investment (PINV), Cost of Borrowing (CAB), Trade (TRADE) and Household Final Consumption (HFC) is collected from International Financial Statistics (IFS) database and World Development Indicator (WDI) database.

### *Methodology*

To test the long run relationship, the method utilized by Pesaran and Smith (1998) and Pesaran et al. (2001) will be used. ARDL has several advantages relative to other techniques of co integration. The Panel ARDL method can make a distinction between regressors and regressand. ARDL has another important advantage that it can be even applied when the explanatory variables are endogenous (Pesaran & Shin 1999). Another peculiar characteristic of ARDL is that it can be applied to I (0), I (1) or fractionally co integrated variables (Pesaran & Pesaran 1997). This study utilizes ARDL system for co integration analysis.

The error correction version of ARDL model is given in equation 6:

$$\Delta Y_{it} = \nu_0 + \sum_{i=1}^p \beta_1 \Delta Y_{i,t-i} + \sum_{i=1}^p \beta_2 \Delta GE_{i,t-i} + \sum_{i=1}^p \beta_3 \Delta X_{i,t-i} + \delta_1 Y_{it-1} + \delta_2 GE_{it-1} + \delta_3 X_{it-1} + \omega_{it} \dots \dots \dots 6$$

Where Y represent macroeconomic activities such as economic growth, consumption, private investment, debt and inflation. GE represents government expenditures, X represents set of control variables and w represents white noise error term. i and t represent cross section and time simultaneously.

Since the numbers of years are 12, however this data set is for 10 countries. Hence, for 120 observations ARDL is the most favorable technique to be used. Because of the following reasons: ARDL is considered comparatively a better technique even though the explanatory variables are endogenous (Pesaran & Shin 1999; Pesaran et al., 2001). Samudram and Vaithilingam (2009) used ARDL to analyze the effects of fiscal policy dynamics in Malaysia and Mohammadi et al. (2008) used the same technique, to analyze the effects of public expenditure on economic growth in case of Turkey.

### Results and Discussion

This study has applied Panel ARDL techniques, in order to analyze the effects of fiscal policy on economic growth for the period of 2002-14 for selected sample economies which includes Pakistan, China, India, Bangladesh, Sri Lanka, UK, USA, Japan, Germany and Switzerland. The results of growth equation (5) are given in table 1.

Table 1

*Results of Growth Equation using Panel ARDL*

*Dependent Variable: EG*

| Variable                       | Coefficient |
|--------------------------------|-------------|
| GE                             | 0.75 (0.08) |
| INF                            | 0.07 (0.09) |
| PINV                           | 0.08 (0.00) |
| CAB                            | 0.06 (0.00) |
| HFC                            | 0.19 (0.00) |
| C                              | 0.85 (0.07) |
| R <sup>2</sup> = 0.88          |             |
| Adjusted R <sup>2</sup> = 0.87 |             |
| F-statistics = 37.29           |             |
| Durbin Watson=2.13             |             |

The Government Expenditures (GE) is significant in the growth equation. It means that GE has a positive relation with economic growth, when government raises its expenditures it will automatically increase aggregate demand of the economy and will increase the tempo of growth. Similarly Inflation (INF) is also significant and showing that a rise in inflation will encourage growth in the selected sample economies. Moreover, INF is relatively stable in the developed as well developing economies during the mention period. When there is rise in INF it will enhance and boost economic activities. The results further show that Private Investment (PINV) significantly affects economic growth and confirms the economic theory postulate that any increase in PINV will encourage aggregate demand and economic growth. Cost of Borrowing (CAB) is significant in the present case and it means that a rise in CAB will enhance output and productivity and will lead the economy towards growth. The Household Final Consumption (HFC) is also significant and shows a rise in HFC will

push aggregate demand in the economy and will further boost up the economic activities, such as: production and employment. The R2 value suggests that the overall model is significant and explained the change in economic growth with respect to explanatory variables. The F-statistic suggests that the overall model is significant. Moreover, the Durbin Watson value shows that there is no perfect multicollinearity. The overall model results are satisfactory and considered a good fit to the data.

Table 2

*Results of Country Wise Analysis of Growth Equation*

|           | USA   | UK    | SWT   | SL    | PAK   | JAP   | IND   | GER   | CHI   | BAN   |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| COINTEQ01 | 0.14  | -0.64 | -1.60 | -0.17 | -0.82 | -0.40 | -1.21 | -0.27 | -0.01 | -0.25 |
| D(PINV)   | 1.11  | 0.00  | -0.05 | 0.07  | -0.05 | -0.07 | 0.00  | 0.14  | 1.00  | 0.11  |
| D(TR)     | -0.01 | 0.46  | 0.85  | 2.34  | 1.32  | 0.99  | 0.78  | -0.43 | 0.00  | -0.55 |
| D(HFC)    | 0.04  | 0.41  | 0.10  | -0.06 | -0.24 | -0.28 | -0.02 | -0.45 | -0.01 | 0.14  |
| D(CAB)    | 0.04  | 0.18  | -0.36 | -0.21 | 0.06  | 0.43  | 0.39  | 0.26  | 0.00  | -0.12 |
| C         | -0.16 | 0.61  | -0.70 | -0.34 | 2.33  | 1.38  | 1.81  | 0.10  | -0.01 | 0.50  |

### Conclusion and Suggestions

The present study analyzed the dynamics of fiscal policy in ten sample economies which include the list of both leading (US, UK, Germany, France and Switzerland) and lagging economies (Pakistan, India, Sri Lanka, Bangladesh and China). The major findings from the analysis are summarized as follows:

The variety of empirical and theoretical reasons presented above support the fiscal policy matters for the macro economy in both the short and the long run. The distinction between temporary changes and permanent changes, considerations of unanticipated and anticipated changes, liquidity constraints, considerations of tax liabilities for forecasting purposes and a number of other issues are rooted in econometric and analytical research. The empirical results coupled with a number of theoretical stipulations to the preposition of neutrality suggested by Barro (1974) is hardly holding true. One of the objectives of the present work was to explore the growth patterns of different leading and lagging economies regarding the recent debate in particular about clarification whether growth in the sample economies was driven by improvements in efficiency or factor accumulation.

The present study also presents a comprehensive assessment of the impacts of fiscal policy on economic growth. The results suggest that government expenditures have in particular a positive but small contingent impact on GDP. Moreover, it has a varied impact on private investment and household consumption. It has also a positive impact on the cost of borrowing and on price level. Furthermore, the results also suggest that public debt has a strong positive impact on the economic growth and its impact become more persistent when interest rate was included in the analysis. Lastly, the results support the stabilizing role of public debt on the fiscal deficit which can facilitate the



revenue and expenditure gap in sample economies. It suggests that government be inclined to adjust the revenue-expenditure gap through debt developments and can further hamper the development process in sample economies. It is a confirmation to the studies of (Ardagna, 2007), (Faini 2006), (Gale and Orszag, 2003) and (Laubach, 2009).

The core target of the present section is to recommend some policy suggestion to combat the existence complexities of fiscal framework. The present study suggests that fiscal policy is playing a multi-dimensional and comprehensive role in the development of capitalistic and socialistic economies. It suggests that fiscal policy must be used with proper care and attention must be given to the most important needs and requirements of the economy.

The impact of fiscal policy in sample leading and lagging economies on key macroeconomic variables shows the importance of various methods and techniques used in the present study. The volume of government sector is a key determinant in economy stabilization and sustainability and the macroeconomic policies can lead to long-run economic growth and development in these countries.

The study suggests that budget deficit should be in a proper control and must be narrow and keep below 4 percent of GDP. Otherwise, if budget deficit remained unsustainable it will have negative impact on macroeconomic objectives of the government and will have undesirable macroeconomic costs. Furthermore, if deficits are above the threshold, it will rise inflation and hamper the tempo of economic growth. The vicious circle of public debt may be managed more efficiently, fiscal deficit may be controlled well in this manner, because the debt to GDP ratio will increase if budget deficit as a percentage of GDP is greater than real growth rate of GDP. Conversely, reduction in government expenditure will lead to reduction in fiscal deficit rather than rise in mobilization of resources. The government must give its due attention to long term development plans, in order to see the ultimate aim of government expenditure in the long-run.

The fiscal framework is different in these countries and the reason for such difference is the divergences in the nature of policies coupled with various sectors which can lead to complementary in economic activities. It will open the way to bilateral policies among countries without focusing on specific country and for this purpose fiscal policy can be a better tool to hand the government to stimulate economic growth at different levels.

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