

Fiscal Policy and Output Gap: A SVAR Analysis for Pakistan

Zakia Batool

Assistant Professor, Department of Economics NUML
Zbatool@numl.edu.pk

Farhan Yasin

M.Phil Scholar, Department of Economics NUML
Yasinf169@gmail.com

Dr Syed Arshad Ali Shah

Lecturer, Department of Management Sciences & Commerce
Bacha Khan University, Charsadda
Corresponding author: arshad@bkuc.edu.pk

Abstract

The dynamic effect of fiscal policy shocks on Pakistan's output gap is investigated in this paper, moreover, this paper attempts to assess the output gap by employing the production function technique. The goal of this research is to learn how fiscal policy instruments affect the output gap for long and short-run. This study employed a five-variable Structural Vector Auto-Regressive hereinafter SVAR) model that covered the years 1975 to 2019. Blanchard and Perotti's recursive technique and Blanchard and Perotti's identification approach are used to solve the SVAR model's identification challenge. Interestingly, this research reveals that impulse responses from both identification methods behave similarly, yet the coefficients calculated by Blanchard and Perotti (2002) approach are quite significant. This research demonstrates that both government spending and taxation have a substantial role in explaining changes in the production gap. Based on the findings, this study suggests that increasing government expenditure is a good policy choice during a recession period.

Keywords: Output Gap, potential output, Fiscal Policy, and SVAR

1. Introduction

Sustainable economic growth is a critical challenge for all countries, particularly developing countries like Pakistan, which confront several economic obstacles, such as operating at a lower production level than the industrialized ones. The production level of developing countries is often less than the efficient level of production which can be achieved by employing all the factor inputs. The discrepancy between actual and potential production is directly tied to business cycle volatility and reflects the country's macroeconomic management. According to past studies, the actual level of output in Pakistan has been frequently deviating from the potential output (Iqbal et al., 1999; Sherbaz et al., 2009; Asjed et al., 2014). The difference between actual and potential output, is known as output gap, and it indicates the inflationary or deflationary tensions in the economy.

As a result, most of economists and policymakers regard the output gap as a key indicator that may assist policymakers in keeping the economy on a path of sustainable economic development

and stable inflation. Even though there is a widespread agreement on the relevance and efficacy of macroeconomic policy variables in reducing the output gap, there exists a significant debate on the relative strengths and level of effectiveness of various policies in reducing output divergence from the potential level.

Depending on how well macroeconomic policies are implemented and how efficiently the institutions are performing, the growth of output might be positive or negative. The long-run movement of growth is estimated by potential output, whereas the difference between current output and potential level of production is an indicator of short-run fluctuations in the economy (Taylor, 2000). The actual level of production is positive whenever the economy faces demand pressure, which is known as inflationary pressure. In order to alleviate this pressure, restrictive monetary and fiscal policy is needed. While in times of negative growth, it is essential to stimulate the production activities in the economy by expanding demand through lower taxes and more government expenditure or by employing expansionary monetary policy measures. Both the monetary and fiscal policies are crucial in gaining macroeconomic stability; nevertheless, the two significant schools of thought, that is, Keynesians and Monetarists have been debating the relative efficacy of fiscal and monetary policy.

The Monetarists school of thought believes that monetary policy measures effectively lead to economic expansion and ensures economic stability, whereas Keynesians argue that fiscal policy is more effective in accelerating economic activities and enhancing stability. To ensure full employment and price stability, the economic environment necessitates the smallest feasible fluctuations in domestic prices and international currency rates. According to Keynesian, fiscal policy may be used to investigate inflation since inflationary pressure arises in the economy when foreign expenditure and spending by the private sector on consumption goods and investment surpass the full-employment level. Donders and Kollau (2002) are of the view that fiscal policy variables have a direct impact on the potential production and output gap.

In developed countries, fiscal instruments are used to sustain full employment and retain the pace of economic activities, but in developing ones with a high debt burden, the objective of fiscal policy is to stimulate growth. According to UNCTAD, following the COVID-19 outbreak, developing nations' foreign debt stocks hit a record high of US\$10.6 trillion whereas global debt reached a new high of \$226 trillion in 2020. The cost of debt servicing for low- and middle-income countries can be substantial. According to Shabbir and Yasin (2015), Servicing accumulated external debt leads to the absorption of a large portion of limited resources generated through remittances and exports. This, in turn, necessitates more borrowing and increases the budget deficit that ultimately affects the development projects such as education, health, and infrastructure. For debt relief, the UN proposes that highly indebted countries set a limit on the amount of fiscal revenue that may be used to cover the external debt. Pakistan is one of the countries that rely heavily on external debt and foreign aid to meet its macroeconomic objectives. In 2001, the World Bank classified Pakistan as a country with huge debt due to its dire economic situation and massive public debt. According to a report¹, gross public debt in Pakistan was around Rs40 trillion by June 2021, with roughly one-third external and two-thirds domestic debt.

¹ Public Debt Bulletin & Annual Debt Review (2020-21)

Since Pakistan's external debt is growing, and the country is having to borrow more dollars to pay off its debt, it indicates that Pakistan is caught in a debt trap. One of the reasons for the rising external debt is the exchange rate, now that the dollar has risen beyond Rs170, the external debt has grown.

Although Pakistan has sufficient resources in terms of labour and raw material, the economy is not able to produce at the full employment level. The gap between actual and potential output has resulted in unemployment and inflation in the country. Fiscal instruments, that is, taxes and government expenditure can affect economic activities and output level by affecting aggregate demand. According to the Pakistan Economic survey (2019-2020), the total revenue to GDP is 11.2 out of which around 72 percent is generated through taxes. The total expenditure is 15.3 percent of GDP while the share of development expenditure and net lending in total expenditure is only 12.4 percent. All key government entities, such as the Pakistan International Airlines, Pakistan Railways, and the Pakistan Steel Mill, fails to generate income and rely on government bailout packages, which wreak havoc on current spending.

The unmanageable budgetary imbalances slow down the development process and affect the social sector of the economy also. The low investment in the health and education sector affects the productivity of labour leading to a low level of production. Thus, an inefficient allocation of fiscal resources widens the gap between actual and potential output. So, keeping in view the above discussion this study seeks to explore the effect of Fiscal measures, that is, taxation and government spending on the Output Gap in the economy of Pakistan by employing SVAR analysis.

2. Literature Review

There are different macroeconomic approaches that deal with the consequences of fiscal shocks, with different perspective. Keynesians believe that positive shocks to government expenditures boost economic activities, thereby labor demand, and wages whereas New Keynesian approach supports fiscal policy while considering rigidity in price and wages. Regarding the effectiveness of fiscal instruments, to prove that positive shocks to government expenditure raise the real wage, Mankiw (1998), Guo & Lansing (2002) and Costa & Dixon (2011) develop a model with imperfect competition and increasing returns to scale. Ravn et al. (2006) extend the case of the imperfect market using the deep habits assumption and reveals that wages and private consumption would rise as a result of a rise in government expenditure. However fiscal expansion leads to borrowings and a rise in the interest rate and thus results in crowding out of the private sector. It is also observed that the nature of policy, that is, temporary or permanent change, also affects the output level differently (Obsfeld & Peri, 1998 and Mahfouz et al. 2002).

Many researchers claim that the consequences of fiscal actions are determined by their size and duration because both are important in altering the signaling effect of the fiscal policy actions (Mohl et al. 2019; Bunyan et al. 2020 and Romer, 2021). The economic situation also does have a role in how effective fiscal policy is in accelerating production activities. According to a few studies, impacts of fiscal policy are greater in the time recessions than during expansions (Auerbach and Gorodnichenko, 2017 and Boiciuc, 2015). Studies have also discussed the role of fiscal and monetary policy in times of negative output gaps and severe unemployment. Taylor

(2018) used the DSGE approach to examine how fiscal instruments are effective in stimulating aggregate demand in the time of recession and found fiscal policy effective in the time of crisis. On the other hand, Blanchard and Leigh (2013) indicate that fiscal consolidation in EU nations has been linked to lower-than-expected growth, particularly in the early stages of the crisis. Corsetti et al. (2013) propose that fiscal policy has non-linear effects, with particularly significant fiscal multipliers following severe recessions. According to Christiano (2011) and Eggertsson (2011) fiscal policy is most successful when interest rates are very low (as they are expected to be during a recession).

In developing markets, expansionary fiscal shocks have less impact on economic growth. Mirdala (2009) examines the fiscal policy dynamics of six rising economies and finds positive but small fiscal multipliers. In a similar study, Cuaresma et al. (2011) found small but mixed signs of multipliers. Paula and Pires (2013) demonstrate that there is a large body of evidence proving that fiscal expansion promotes economic growth and that contractionary fiscal packages reduce production and employment over the short run. Conenen et al. (2012) show that when monetary policy does not respond to price changes, the government expenditure multiplier may be quite big, especially when the nominal interest rate is very near zero and the estimate of the government spending's multiplier is smaller than one when the central bank follows the Taylor rule. Blanchard and Perotti (2002) show that over the post-war period, shocks in government expenditure were linked with increased production in the US economy, with a multiplier close to one. Fiscal stimulus based on tax cuts, according to Alesina and Ardagna (2010) and Crossley et al. (2014), is more probable to boost GDP than fiscal expansion based on expenditure increases.

Ramey and Zubairy (2018) looked at whether government expenditure multipliers in the United States are stronger during periods of economic slack or when interest rates are near the zero lower limits. They computed multipliers that are below unity regardless of the amount of slack in the economy. Several scholars have attempted to quantify the potential production and output gap during the previous few decades. Although the idea of potential production is important for macroeconomic strategies, there has been very little research on the subject in Pakistan. In the case of Pakistan, Shaheen et al. (2015) calculates the output gap using the production function while Tahir (2014) measured the output gap using the LSM index. In a study, Haider and Safdar Ullah (2008) using the production function and HP filter method estimated the gap in output and found actual output oscillates around the potential output.

3. Methodology

Since the objective of this study is to analyze the effect of fiscal policy instruments on the output gap, the basic model of this research takes the following form,

$$\text{OGap}_t = \alpha_0 + \alpha_1 \text{FV}_t + \alpha_2 \text{X}_t + \varepsilon_t \quad (1)$$

Where,

OGap=Output Gap

FV= Fiscal Variables (Revenue and Government spending)

X_t= Vector of Control variables

ε_t = Disturbance term

Since the objective of this study is to analyze the role of fiscal policy in reducing output gap, we have used the fiscal instrument tax revenue and government expenditure whereas the control

variables include inflation and interest rate. Inflation and interest rate affect the saving-consumption pattern of the individuals which ultimately affects the aggregate demand and thus the output level. Due to the structural break of 1971, we have taken data for the smooth years only, that is, from 1970 to 2019.

When an economy's output is at full employment, the disparity between the actual and the potential output is zero, and the economy is balanced.

$$\text{OGap} = \text{OP}^a - \text{OP}^p = 0 \quad (2)$$

Where

OP^a = Actual output

OP^p = Potential output

The production when the country is working at full capacity is referred to as the potential output level. The production function method is used in this study to evaluate potential output.

$$\text{OP}_t = A_t L_t^\alpha K_t^\beta \quad (3)$$

Where OP is GDP, which signifies actual output, A_t is the productivity, L_t is labour while K_t is the level of capital stock. α is the labour elasticity of output and β is the capital elasticity of output and the sum of these elasticities is assumed to be unit. For assessing potential output, we must quantify potential inputs such as capital, labour and total factor productivity (TFP). To evaluate possible total factor productivity, we employed the Hodrick Prescott (HP) filter approach. This study uses the perpetual inventory approach to determine the capital stock.

$$K_t = I_t + (1 - \delta)K_{t-1} \quad (4)$$

According to prior research, for investment, formation of gross fixed capital is used, whereas the depreciation rate is set at 5% for Pakistan. The following formula is used to estimate potential labour.

$$L_t = \text{WP} * \text{PRT} * (1 - \text{NAIRU}) * H \quad (5)$$

In equation 5, NAIRU is assessed using an approach used by Ball-Mankiw (2002). WP is working-age population, PRT participation rate and H is the working hours measured by labour force worked per year whereas HP filter approach is used to determine participation rate.

3.1 Econometric Techniques

In this paper, the SVAR approach is employed to assess the parameters of equation (1). Variables of the model are arranged in the following order to estimate SVAR: government spending, government revenue, gap in output, price rises, and interest rate, with the first variable being viewed as the most exogenous and no other variables having a contemporaneous influence on it. Government spending is considered to be the highly exogenous variable, whereas interest rate is considered to be the highly endogenous variable.

$$\begin{bmatrix} 1 & \lambda_{12} & \lambda_{13} & \lambda_{14} & \lambda_{15} \\ \lambda_{21} & 1 & \lambda_{23} & \lambda_{24} & \lambda_{25} \\ \lambda_{31} & \lambda_{32} & 1 & \lambda_{34} & \lambda_{35} \\ \lambda_{41} & \lambda_{42} & \lambda_{43} & 1 & \lambda_{45} \\ \lambda_{51} & \lambda_{52} & \lambda_{53} & \lambda_{54} & 1 \end{bmatrix} \begin{bmatrix} E_t \\ R_t \\ \text{OGAP}_t \\ \text{INF}_t \\ \text{IR}_t \end{bmatrix} = \begin{bmatrix} \gamma_{10} \\ \gamma_{20} \\ \gamma_{30} \\ \gamma_{40} \\ \gamma_{50} \end{bmatrix} +$$

$$\begin{bmatrix} \sigma_{11} & \sigma_{12} & \sigma_{13} & \sigma_{14} & \sigma_{15} \\ \sigma_{21} & \sigma_{22} & \sigma_{23} & \sigma_{24} & \sigma_{25} \\ \sigma_{31} & \sigma_{32} & \sigma_{33} & \sigma_{34} & \sigma_{35} \\ \sigma_{41} & \sigma_{42} & \sigma_{43} & \sigma_{44} & \sigma_{45} \\ \sigma_{51} & \sigma_{52} & \sigma_{53} & \sigma_{54} & \sigma_{55} \end{bmatrix} \begin{bmatrix} E_{t-1} \\ R_{t-1} \\ OGAP_{t-1} \\ INF_{t-1} \\ IR_{t-1} \end{bmatrix} + \begin{bmatrix} e_{et} \\ e_{rt} \\ e_{ogap_t} \\ e_{inf_t} \\ e_{ir_t} \end{bmatrix} \quad (6)$$

The matrix of the equation (6) is as follows

$$BX_t = \Pi_0 + \Pi_1 X_{t-1} + \varepsilon_t \quad (7)$$

In equation (7), B is coefficients matrix which has 1 in the diagonal while the off-diagonal values describe the contemporaneous effect of variables. The vector of control variable

$$X_t = [E_t, R_t, OGAP_t, INF_t, IR_t] \quad (8)$$

Whereas:

E = Government Spending

R = Tax Revenue

$OGAP$ = Gap in output

INF = Inflation

IR = Interest rate

To obtain the reduced form of structural model, equation (7) is multiplied by B^{-1} .

$$X_t = B^{-1}\Pi_0 + B^{-1}\Pi_1 X_{t-1} + B^{-1}\varepsilon_t \quad (9)$$

We can rewrite equation (9) as

$$X_t = A_0 + A_1 X_{t-1} + e_t \quad (10)$$

Where

$$A_0 = B^{-1}\Pi_0$$

$$A_1 = B^{-1}\Pi_1$$

And

$$e_t = B^{-1}\varepsilon_t$$

4. Results and Discussion

This study uses two approaches to handle the identification problem, namely, the recursive approach and Blanchard and Perotti approach.

4.1 Recursive Approach

Sims (1980) was the one who came up with the recursive method. To estimate the parameters of SVAR model, this method employs Cholesky decomposition. The recursive method involves an informal arrangement of the model's variables. The variables are ordered as follows in this study: Government expenditures is listed first, followed by tax revenue, output gap, inflation, and finally interest rates. The variable ordering reveals a link between the error term of structural model and error term of reduced form model.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ \varphi_{gr,ge} & 1 & 0 & 0 & 0 \\ \varphi_{ogap,ge} & \varphi_{ogap,gr} & 1 & 0 & 0 \\ \varphi_{inf,ge} & \varphi_{inf,gr} & \varphi_{inf,ogap} & 1 & 0 \\ \varphi_{dir,ge} & \varphi_{dir,gr} & \varphi_{dir,ogap} & \varphi_{dir,inf} & 1 \end{bmatrix} \begin{bmatrix} u_{et} \\ u_{rt} \\ u_{ogap_t} \\ u_{inf_t} \\ u_{ir_t} \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 \\ 0 & 0 & 0 & 0 & b_{55} \end{bmatrix} \begin{bmatrix} e_{et} \\ e_{rt} \\ e_{ogap_t} \\ e_{inf_t} \\ e_{ir_t} \end{bmatrix} \quad (11)$$

The traditional VAR's recursive method has been heavily criticised by numerous economic analysts. According to them, identifications enforced on the basis of Cholesky decomposition lack a theoretical foundation and hence are incompatible with economic theory. This form of shock, according to Cooley and LeRoy (1985), is not a complete shock however rather a linear accumulation of structural disturbances. As a result, accessing the dynamic consequences of the variables is quite difficult using this method. We also used Blanchard and Perotti's technique, which imposes limits based on economic theory, to counteract this critique.

4.2 The Blanchard Perotti approach

The identification technique, according to Blanchard and Perotti (2002), should be based on conventional knowledge about taxes and the counting and time of collection of tax and the transfer systems in order to estimate the intrinsic responsiveness of economic activity to government spending and taxes. This research employs Perotti's (2005) identification method, in which he examines the effects of fiscal shocks on production and inflation. The following is the link between structural errors e_t and errors of the reduced form u_t :

$$\begin{aligned} u_{et} &= \alpha_{e,r}u_{rt} + \alpha_{e,ogap}u_{ogap_t} + \alpha_{e,inf}u_{inf_t} + \alpha_{e,ir}u_{ir_t} + e_{et} \\ u_{rt} &= \alpha_{r,e}u_{et} + \alpha_{r,ogap}u_{ogap_t} + \alpha_{r,inf}u_{inf_t} + \alpha_{r,ir}u_{ir_t} + e_{rt} \\ u_{ogap_t} &= \alpha_{ogap,e}u_{et} + \alpha_{ogap,r}u_{rt} + \alpha_{ogap,inf}u_{inf_t} + \alpha_{ogap,ir}u_{ir_t} + e_{ogap_t} \\ u_{inf_t} &= \alpha_{inf,e}u_{et} + \alpha_{inf,r}u_{rt} + \alpha_{inf,ogap}u_{ogap_t} + \alpha_{inf,ir}u_{ir_t} + e_{inf_t} \\ u_{ir_t} &= \alpha_{ir,e}u_{et} + \alpha_{ir,r}u_{rt} + \alpha_{ir,ogap}u_{ogap_t} + \alpha_{ir,inf}u_{inf_t} + e_{ir_t} \end{aligned} \quad (12)$$

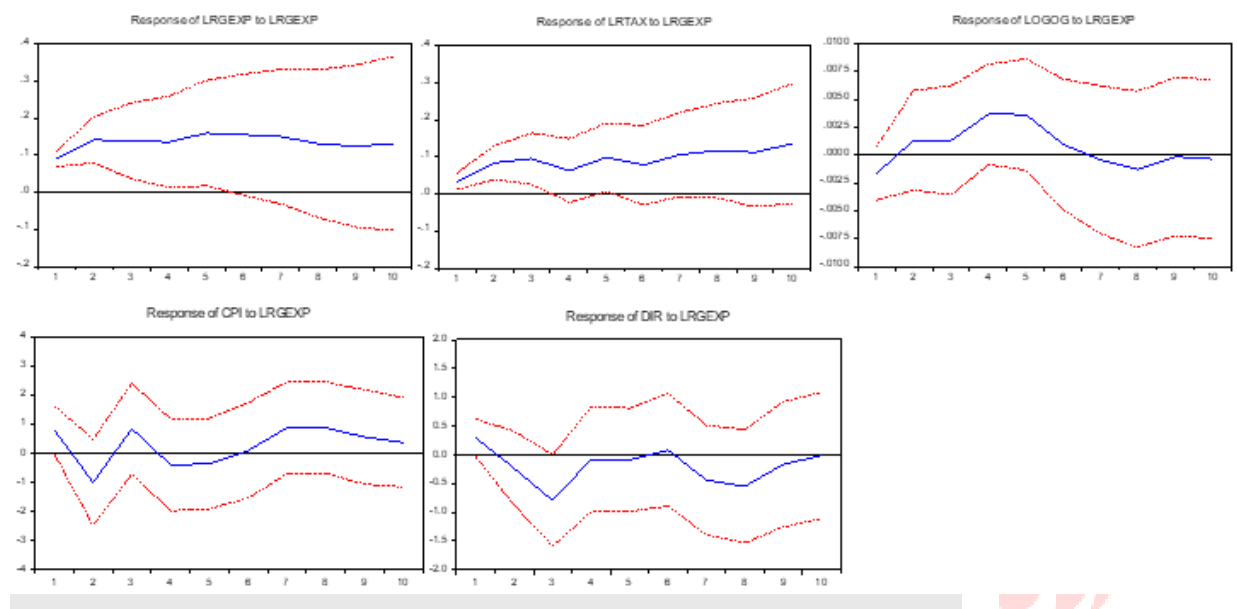
In the long run, we assume that the partial elasticity of change in government spending, tax revenue, output gap, and inflation owing to changes in the nominal interest rate is zero. We set $\varphi_{ogap,e} = 0$ since government spending does not respond mechanically to changes in the output gap. Inflationary shocks are likely to affect government spending. The price elasticity of government spending, according to Perotti (2005), is -0.5 and we have used the same elasticity in this study. This paper uses tax elasticity of output gap as 0.96 and tax elasticity of inflation as 0.71, followed by the study of Bilquees (2004). Finally, we put $\varphi_{r,e} = 0$, indicating that

government spending decisions come before revenue decisions. After applying these constraints, the relationship between structural error term and reduced form may be expressed as

$$\Pi U_t = B U_t$$

Where U_t is the vector having orthogonal shocks. Finally, this study created an impulse response function to track a variable's dynamic response to a one-standard-deviation shock in another variable.

Figure 1: Effect of Government Spending Shock



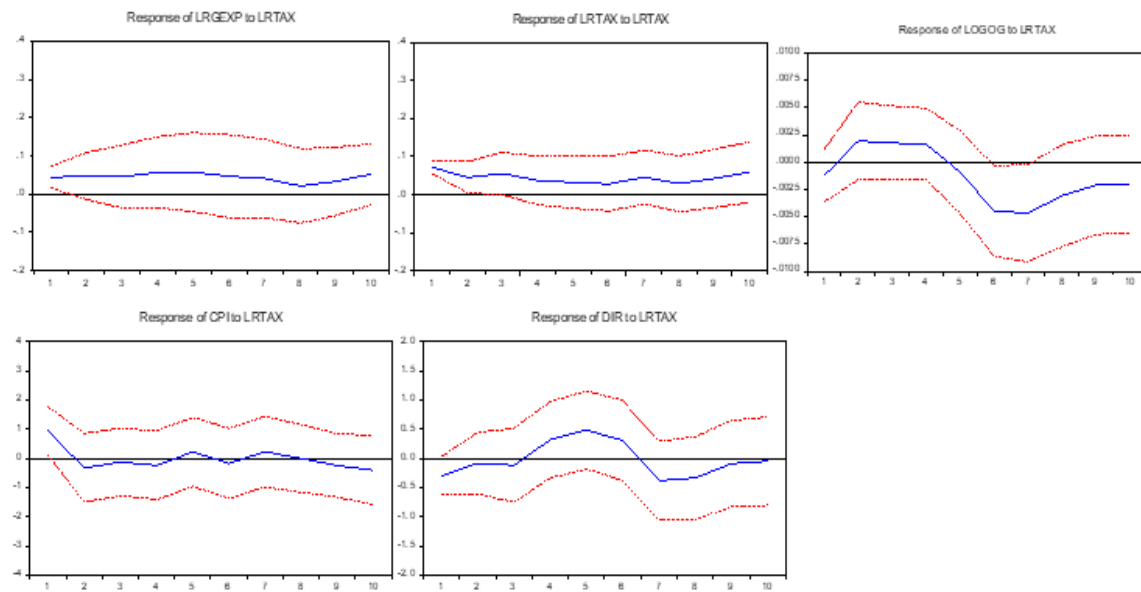
The IRFs in figure 1 indicates that, owing to its own shock, government spending initially exhibits a positive and rising trend up to the second year. It becomes steady during the second year, resulting in a permanent impact. The tax revenue's response to the shock in spending done by the government is positive, and it continues to rise until the third year. After the third year, revenue begins to decline somewhat, followed by an increasing trend in government revenue, which is positive and continues for the rest of the time. Because substantial government revenues are necessary to pay government spending, these findings are conceptually coherent.

In the initial phase, imbalanced production gap results from a shock in government spending. The first reaction of the output gap is positive, with a rising tendency until the fourth year, after which it stabilises for a year and the result is consistent with the findings of Galí et al. 2007 and Dauti & Elezi (2022). Following that, the output gap response is negative and downward, eventually becoming zero. This result is consistent with the theoretical foundation of Keynes, that is, increase in government expenditure through increase in aggregate demand put inflationary pressure thus output gap also increases in short run. However, increase in development

expenditures affects output positively in the long run. Due to a rise in aggregate demand, the positive gap shows that actual production exceeds potential. However, in the long term, the economy achieves equilibrium.

Regarding the response of inflation, a unit shock in government spending causes inflation to fall in the first year, but then rise slightly in the second year. This result is consistent with the study of Jørgensen & Ravn (2022). According to Keynes, when the government adopts an expansionary fiscal policy, inflation rises in the short run but then stabilises over the long run. However, considering interest rates, the IRF shows that a unit shock to government spending causes interest rates to fall at first. In the first two years, the reaction of the interest rate will be negative and downward, then it will converge to the zero. It decreases after six years and then converges to zero after eight years. Interest rates fall in most of the period due to increased government spending but remain unchanged in the remaining period. When the government borrows more money to fund public expenditure, interest rates rise, resulting in the crowding out of the private sector.

Figure 2: Effect of Shocks to Tax Revenue



The reaction of the variables to a positive shock in tax revenue is depicted in figure 2. Initially the reaction of government spending is increasing. The reaction of government spending to shocks revenue is positive and lasting from the 7th to the 8th period, with a little fall that is not substantial. Our findings support Keynes' theory of balanced budget, which states that there exists a long-run positive connection between government tax revenue and spending because as revenue rises, the government has greater discretionary spending power. The effect of a positive shock to revenue on its own value is positive and lasts for a long time, resulting in a permanent effect.

In the first phase, a positive shock in government revenue causes a rise in the output gap. The output gap's initial reaction is positive, with a consistent trend over the three and a half years. Afterwards it follows a downward pattern and remains negative until the fifth year, after which it becomes steady for one year before gradually increase. Initially, when taxes rise, aggregate demand falls, and so output falls, resulting in a negative output gap. The initial reaction of inflation to a revenue shock is negative and declining, but the response after that is small. It converges to the zero after the first year, therefore it only has a momentary influence on inflation. The result of the IRFs is confusing because the theoretical framework indicates that raising tax revenue has a lower impact on inflation while results indicates that the impact of tax revenue on inflation is negligible. Regarding interest rates, shock to revenue causes interest rates to rise at first, then fall to near zero for three years. Following that, the interest rate response increased until the sixth year, after which it began to decline. Interest rates began to rise after eighth year, and by the tenth year, it convergesto zero.

5. Conclusion and Policy Recommendation

On the basis of results of recursive approach, we conclude thatthe influence of tax on output gap shows a slight increasing effect, and that the values of tax and inflation are found to be significantly positive, which is related to the fact that government revenues are most often derived through indirect taxes. Positive and substantial results in the case of interest rates imply that there is a link between government revenue and interest rates. We chose Blanchard and Perotti (2002) technique since the coefficient values in the model derived using recursive approach were insignificant and a few of the identification restrictions were not making any economic sense. Analysis based on Blanchard and Perotti's (2002) approach reveals that government revenue and spending have a positive and significant influence in explaining change in inflation and output gap in Pakistan.

Shocks to government spending appear to have a favourable impact on inflation, interest rates, and the output gap, according to the statistical findings. A positive shock to government expenditure widens the output gap and raises inflation. In the short-run, these government spending shocks also raise the interest rate. Government spending does not have a long-term influence on the output gap because demand-side shocks do not have a long-term influence on GDP. It has been noted that a shockto government spending has a long-term influence on revenue, indicating that taxes is used to fund the majority of public expenditures in Pakistan. Positive shocks in government tax collection, on the other hand, lead to greater inflation and a wider output gap over a six-year period. In the short-run, an increase in government tax income transmitted into a high level of interest rate. Overall, this research finds that changes in fiscal policy have a considerable influence on the output gap and inflation. The following is the recommendations based on empirical findings: Since in most of the developing countries, fiscal authorities control economic activity through tax policies, but discretionary expenditure programmes are more favourable for boosting economic growth and have a corresponding bigger influence when the output gap is negative.

Thus, in a recession, government expenditure is required to improve output level in the long run. Since shocks to tax collections is found to affect inflation positively, this study suggests that for revenue collection, there is a need to increase tax base rather than increasing the tax rate. The

future research may focus on the effect of disaggregated government expenditures and taxes on output gap to understand exactly what type of government spending and tax structure is needed to reduce output gap.

References

- Alesina, A., & Ardagna, S. (2010). Large changes in fiscal policy: taxes versus spending. *Tax policy and the economy*, 24(1), 35-68.
- Asjed, R., Asghar, N., & Ali Jaffri, A. (2014). An Empirical Investigation of Global Output Gap Hypothesis in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 34(2).
- Auerbach, A. J., & Gorodnichenko, Y. (2017). *Fiscal stimulus and fiscal sustainability* (No. w23789). National Bureau of Economic Research.
- Bilquees, F. (2004). Elasticity and Buoyancy of the Tax system in Pakistan. *The Pakistan Development Review*, 73-93.
- Blanchard, O. J., & Leigh, D. (2013). Growth forecast errors and fiscal multipliers. *American Economic Review*, 103(3), 117-20.
- Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *the Quarterly Journal of economics*, 117(4), 1329-1368.
- Boiciuc, I. (2015). The effects of fiscal policy shocks in Romania. A SVAR Approach. *Procedia Economics and Finance*, 32, 1131-1139.
- Bunyan, S., Duffy, D., Filis, G., & Tingbani, I. (2020). Fiscal policy, government size and EMU business cycle synchronization. *Scottish Journal of Political Economy*, 67(2), 201-222.
- Christiano, L. J. (2011). Comment on "What Fiscal Policy is Effective at Zero Interest Rates?". In *NBER Macroeconomics Annual 2010, Volume 25* (pp. 113-124). University of Chicago Press.
- Coenen, G., Erceg, C. J., Freedman, C., Furceri, D., Kumhof, M., Lalonde, R., & Trabandt, M. (2012). Effects of fiscal stimulus in structural models. *American Economic Journal: Macroeconomics*, 4(1), 22-68.
- Cooley, T. F., & LeRoy, S. F. (1985). Atheoretical macroeconometrics: a critique. *Journal of Monetary Economics*, 16(3), 283-308.
- Corsetti, G., Kuester, K., Meier, A., & Müller, G. J. (2013). Sovereign risk, fiscal policy, and macroeconomic stability. *The Economic Journal*, 123(566), F99-F132.
- Costa, L. F., & Dixon, H. D. (2011). Fiscal policy under imperfect competition with flexible prices: An overview and survey. *Economics*, 5(1).
- Crossley, T. F., Low, H. W., & Sleeman, C. (2014). *Using a temporary indirect tax cut as a fiscal stimulus: evidence from the UK* (No. W14/16). IFS Working Papers.
- Cuaresma, J. C., Eller, M., & Mehrotra, A. N. (2011). The economic transmission of fiscal policy shocks from western to eastern Europe.
- Dauti, B., & Elezi, S. (2022). Economic growth in the Central East European Union and the Western Balkan countries in the course of Stability and Growth Pact and COVID-19. *Zbornik Radova Ekonomski Fakultet u Rijeka*, 40(1), 29-61.
- Donders, J., & Kollau, C. (2002). The Cyclically Adjusted Budget Balance: The Brussels Methodology. *Division of General Financial and Economic Policy of the Ministry of Finance*.

- Eggertsson, G. B. (2011). What fiscal policy is effective at zero interest rates?. *NBER Macroeconomics Annual*, 25(1), 59-112.
- Galí, J., López-Salido, J. D., & Vallés, J. (2007). Understanding the effects of government spending on consumption. *Journal of the European Economic Association*, 5(1), 227-270.
- Guo, J. T., & Lansing, K. J. (2002). Fiscal policy, increasing returns, and endogenous fluctuations. *Macroeconomic Dynamics*, 6(5), 633-664.
- Haider, A., & Safdar Ullah, K. (2008). Estimating output gap for Pakistan economy: Structural and statistical approaches.
- Iqbal, M., Ahmad, M., & Jehangir, W. A. (1999). An assessment of livestock production potential in Pakistan: Implications for livestock sector policy [with comments]. *The Pakistan Development Review*, 615-628.
- Jørgensen, P. L., & Ravn, S. H. (2022). The inflation response to government spending shocks: A fiscal price puzzle?. *European Economic Review*, 141, 103982.
- Mahfouz, M. S., Hemming, M. R., & Kell, M. M. (2002). The Effectiveness of Fiscal Policy in Stimulating Economic Activity: A Review of the Literature. *IMF Working Papers*, (2002/208).
- Mankiw, N. G. (1988). Imperfect competition and the Keynesian cross. *Economics Letters*, 26(1), 7-13.
- Mirdala, R. (2009). Effects of fiscal policy shocks in the European transition economies. *Journal of Applied Research in Finance (JARF)*, 1(02), 141-155.
- Mohl, P., Mourre, G., & Stovicek, K. (2019). *Automatic Fiscal Stabilisers in the EU: Size and Effectiveness* (No. 045). Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.
- Obstfeld, M., & Peri, G. (1998). Regional non-adjustment and fiscal policy. *Economic Policy*, 13(26), 206-259.
- Paula, L. F. D., & Pires, M. C. D. C. (2013). The effects of fiscal policy after the global recession: assessing the evidences. *Brazilian Journal of Political Economy*, 33, 315-321.
- Perotti, R. (2005). Estimating the effects of fiscal policy in OECD countries. Available at SSRN 717561.
- Ramey, V. A., & Zubairy, S. (2018). Government spending multipliers in good times and in bad: evidence from US historical data. *Journal of political economy*, 126(2), 850-901.
- Ravn, M., Schmitt-Grohé, S., & Uribe, M. (2006). Deep habits. *The Review of Economic Studies*, 73(1), 195-218.
- Romer, C. D. (2021). The fiscal policy response to the pandemic. *Brookings Papers on Economic Activity*, 89-110.
- Shabbir, S., & Yasin, H. M. (2015). Implications of public external debt for social spending: a case study of selected Asian developing countries. *The Lahore Journal of Economics*, 20(1), 71.
- Shaheen, F., Haider, A., Jabeen, S., & ul Husnain, M. I. (2015). Estimating Potential Output for Pakistan: A Production Function Approach. *Journal of Economics, Management and Trade*, 1-13.
- Sherbaz, S., Amjad, F., & Khan, N. Z. (2009). Output Gap and its Determinants: Evidence from Pakistan (1964-05). *Journal of Economic Cooperation & Development*, 30(3).
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 1-48.

- Taylor, J. B. (2018). Fiscal stimulus programs during the great recession. Economics Working Paper, 18117.
- Taylor, J. B. (2000). Reassessing discretionary fiscal policy. Journal of economic Perspectives, 14(3), 21-36.

