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**RESEARCH PAPER**

# Fiscal Policy Analysis of Pakistan: a Structural Vector Autoregression Analysis

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**ABSTRACT**

This paper is based on the analysis of impact of fiscal policy indicators on the economy of Pakistan. The analysis is conducted by incorporating the debt feedback in analyzing fiscal policy shocks and using structural vector autoregression (SVAR) model. The findings of the study are mainly focused on estimating the impact of government expenditure and tax shock on the macroeconomic conditions in Pakistan, while keeping the intertemporal budget constraint in consideration. The results of the study reveal that government expenditure has a positive impact on output and growth in the country, however this also generates inflationary pressure. On contrary, tax shock has a negative impact on output and insignificant impact on inflation. The study further emphasizes that in the developing countries like Pakistan, fiscal policy should be designed keeping in view the debt dynamics of the country, that is also essential for economic growth and fiscal sustainability of the country.

**KEYWORDS** Fiscal policy, Debt dynamics, SVAR

## Introduction

Fiscal policy has been considered an integral part of the macroeconomic policies, to achieve economic growth and maintaining macroeconomic stability. It has the potential to stimulate economic growth by boosting aggregate demand and increase in employment opportunities (Foster, 2009). However, the opponents of fiscal policy point out that during economic depressions, reliance on fiscal policy can lead to higher fiscal deficits and public debt, and will also diminish the overall positive impact of the fiscal policy (Badurina et al., 2012; Nickel & Tudyka, 2014). Majorly in the developing countries, fiscal expansion financed by borrowing is considered a bad economic decision, where higher debt levels are linked to sluggish economic performance. Accordingly, due to an established inverse relationship between debt accumulation and fiscal balance in Pakistan, fiscal policy is required to be designed keeping in view the debt dynamics and fiscal sustainability of the country.

Government spending and taxation have a significant impact on public debt, while public debt, in turn, also influence fiscal policy decisions. Fiscal policy shocks through intertemporal budget constraint influence the future fiscal policy scenarios too. There is rich economic literature employing Structural Vector Autoregression (SVAR) models to investigate impact of fiscal shocks on the macroeconomic conditions as Fatas & Mihov, 2001; Giordano et al., 2007; Claus et al., 2006. However, traditional SVAR analysis overlook the role of debt dynamics in the processing of fiscal policy, this leads to mis-specified models that lacks debt feedback approach (Favero & Giavazzi, 2007). The primary goal of this paper is to address this gap by examining the impact of fiscal policy on macroeconomic conditions in Pakistan while keeping the debt dynamics in review.

Fiscal policy has played a vital role for stimulating economic development and growth in Pakistan. However, due to address the issue of huge fiscal deficit, Fiscal Responsibility and Debt Limitation Act, 2005 was introduced to institutionalize fiscal

discipline and enhance fiscal transparency, through constraining the debt to GDP ratio (Qasim et al., 2012). Despite this legislative measure, implementation of this fiscal discipline remained poor, and the public debt to GDP ratio remained constantly increasing (SBP Annual Report, 2019–20). Furthermore, the fiscal policy scenario of Pakistan has always been encircled by the issues of higher current expenditures, a narrow and regressive tax system, and fiscal deficits (Pasha, 2014). The reliance on the domestic and foreign borrowing for fiscal expansion in Pakistan, further risked fiscal sustainability through debt accumulation and rising cost of debt services (Yasin, 2001).

This study is mainly aimed to conduct a comprehensive analysis of Pakistan's fiscal policy by incorporating debt feedback into SVAR model, following Favero and Giavazzi (2007). The analysis is based on Blanchard and Perotti(2002) identification strategy, with further addition of essential variables such as inflation and cost of debt servicing. The addition of an intertemporal budget constraint into the analysis, enhances the depth of the model's analytical and policy relevance. Following this comprehensive approach, the study provides visions into how fiscal policy shapes economic outcomes in Pakistan.

There are several earlier studies that confirmed the positive impact of fiscal policy on economic growth in Pakistan, however, these studies overlooked the critical role of debt management in the country. The studies by Qayyum, 2007; Khalid & Satti, 2016 and Javaid & Arif, 2009 have also analyzed the fiscal policy using SVAR frameworks in Pakistan, however, the fiscal policy analysis lacked the incorporation of debt dynamics into their models. This study fills this gap and provides comprehensive fiscal policy analysis by adopting a debt-augmented SVAR approach, to investigate the relation between fiscal variables and debt dynamics in Pakistan.

The empirical results of this study confirm that government expenditure lifts aggregate demand and output, whereas tax increases tend to negatively affect the economic growth in the country. However, expansionary government spending leads to inflationary pressure that fades over time. Tax shock on contrary have insignificant influence on inflation. It is further examined that both tax and government spending shocks fail to have a significant impact on debt interest payments, indicating the weak link between revenue collection and debt management in pakistan. Finally, these findings establish the importance of assimilating debt dynamics into fiscal policymaking, to attain economic development and fiscal sustainability.

The paper is structured as follows: Section 2 reviews fiscal policy trends in Pakistan; Section 3 surveys existing literature; Section 4 outlines the methodology, including the enhanced SVAR model and data sources; and Section 5 and 6 presents the findings and concludes with policy recommendations, respectively.

## Literature Review

Blanchard and Perotti (2002) utilized institutional features of fiscal systems and examined that tax increases negatively affect productivity, while higher government spending supports output. Notably, concurrent increases in both taxes and government spending tended to suppress private investment. Ilzetzki et al. (2011) observed that tax cuts, particularly on personal income, tend to stimulate output more effectively in developing countries than reductions in corporate or consumption taxes. Erceg et al. (2014) highlighted that temporary increases in government expenditure can be more effective during recessions, although their multiplier effect diminishes at higher spending levels and in short-lived liquidity traps.

The effectiveness of government expenditure shocks is shaped by several factors, including debt levels and the prevailing policy environment. Leeper et al. (2010) found that fiscal shocks financed by debt can result in long-term economic distortions and varying

multipliers over time. Ilzetzki et al. (2013) concluded that fiscal interventions in heavily indebted economies often yield minimal or even negative effects. Cherif and Hasanov (2012), building on Favero and Giavazzi (2007), analyzed that while austerity measures temporarily reduced the debt ratio, the effect faded over time, returning the ratio to its original path. Afonso and Sousa (2009) found that government spending shocks tend to decrease GDP by curbing private consumption and investment, while revenue shocks similarly reduce GDP and price levels. Fotiou (2020) showed that in high-debt countries, tax hikes could worsen the debt-to-GDP ratio, whereas cuts in public spending had no clear effects on economic activity but helped stabilize debt. According to Auerbach and Gorodnichenko (2012), omitting debt dynamics from fiscal analysis can lead to overestimated fiscal multipliers.

In Pakistan, Javid and Arif (2009) employed SVAR models to evaluate fiscal policy, finding that spending increases reduced output and consumption, while raising interest rates. Although short-run borrowing helped lower the debt ratio, the long-term impact was a rise in debt levels. Similar findings emerged from Rahaman and Gonzalez (2021) for Bangladesh, and from Dungey and Fry (2009), who showed that tax and debt shocks had more pronounced macroeconomic effects than spending shocks. For Tunisia, Lahouel et al. (2023) found that investment-related government spending had a stronger impact than consumption-related expenditures, with weaker multipliers during recessions.

Padda et al. (2022), found that spending shocks boost output, while tax shocks dampen economic performance and inflation. Ali and Ahmad (2010) observed that fiscal deficits hinder growth, often due to inefficient spending. Ismail and Hussain (2012) argued that in Pakistan, public spending has minimal impact on macroeconomic indicators, underscoring the need for cost-benefit analysis of debt-financed programs. Shahid et al. (2016) found fiscal shocks affect inflation and interact significantly with monetary policy, stressing the need for coordination. Soharwardi et al. (2022), however, emphasized the stronger role of monetary policy in driving economic growth. Hayat et al. (2017) highlighted that public spending helps manage inflation, interest rates, and debt. The study by Kakar (2011) suggested that fiscal policy has more prominent role in the long run, Riaz and Munir (2016) investigated the case of South Asian counties and found that fiscal policy has negative impact on growth.

Hussain et al. (2022) examined the relation between fiscal adjustments and debt to GDP ratio in pakistan and suggested the importance of public expenditure cuts for debt management in the long run. Teles and Mossoulini (2014) also found that higher rates of public debt constrain the positive impact of fiscal policy in the country, due to high public debt service. In contrast, Kamiguchi and Tamai (2023) suggested that in inefficient economies with high public capital productivity, debt-financed investments could support growth. Turan and Iyidogan (2023) found that while public debt may not directly reduce growth, excessive debt levels harm public investment and credit availability.

**Fiscal SVAR with Debt Feedback**

Structural Vector Autoregression (SVAR) models are widely utilized for policy analysis and to uncover stylized facts consistent with economic theory. This approach helps identify the structural shocks that drive changes in macroeconomic variables by modeling the dynamic interactions among them. The reduced-form SVAR model with k lags is given as under:

$$Y_t = \sum_{i=1}^{k} C_i Y_{t-i} + U_t \qquad (1)$$

The vector of endogenous variables $Y_t$ includes government spending, taxes, output, inflation and debt interest payments. $C_i$ is the coefficient matrix and $U_t$ contains the vector of reduced form residuals. Equation (1) does not incorporate the debt-to-GDP ratio, this

provides that the influence of debt feedback will be formulated into the error terms. Following Favero and Giavazzi (2007), in this paper incorporates debt analysis. Accordingly, equation (1) transformed as under

$$Y_t = \sum_{i=1}^{k} C_i\, Y_{t-i} + \sum_{i=1}^{l} \gamma\, d_{t-i} + U_t \qquad (2)$$

where $d_{t-i}$ are vectors representing debt feedback to endogenous variables in $Y_t$. The debt identity formulating the evolution of the debt to GDP ratio is explained as under:

$$d_t = \frac{1+i_t}{(1+\pi_t)(1+y_t)} d_{t-1} + \frac{\exp(g_t)-\exp(T_t)}{\exp(y_t)} \qquad (3)$$

In the debt identity (3), $d_t$ is the debt to GDP ratio, i is the average cost of debt servicing, $y_t$ is real GDP growth rate and $\pi_t$ is the inflation rate. The system of equations presented in this paper is defined by equations (2) and (3). For estimation purposes, only equation (2) is required. Equation (3), on the other hand, plays a crucial role in tracking the evolution of debt dynamics and in computing the impulse response functions.

**SVAR Identification of Restrictions**

The SVAR model consists of five equations and the reduced form error terms $U_t$in equation (2) are interconnected and not fully exogenous. To overcome this issue, the identification method developed by Blanchard and Perotti (2002) is used. The identification restrictions are used to check structural shocks to government expenditure and taxes by using restrictions on A and B matrices in the AB model defined as under:

$$Au_t = Be_t$$

$$\begin{bmatrix} u_t^g \\ u_t^t \\ u_t^y \\ u_t^p \\ u_t^i \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 \\ 0 & 0 & 0 & 0 & b_{55} \end{bmatrix} \begin{bmatrix} e_t^g \\ e_t^t \\ e_t^y \\ e_t^p \\ e_t^i \end{bmatrix}$$

Here $(e_t^y, e_t^p, e_t^i)$ are non-fiscal shocks and $e_t^g$ and $e_t^t$ are the government expenditure shock and tax shock respectively, with the assumption of cov $(e_t^t, e_t^g) = 0$. Following Blanchard and Perotti (2002) restrictions have been imposed on the parameters to identify fiscal shocks. Since $\alpha_y^g$, $\alpha_p^g, \alpha_i^g, \alpha_y^t, \alpha_p^t$ and $\alpha_i^t$ are identified using external information and then15 parameters are left to be estimated. Following (Bilquees, 2004) and Shaheen and Turner (2010) it is assumed that $\alpha_y^t = 0.96$ and $\alpha_p^t = 0.7$. Following Blanchared and Perotti(2007) $\alpha_y^g = 0$, $\alpha_p^g = -0.5$, $\alpha_i^g = 0$ and $\alpha_i^t = 0$. Finally, following (Perotti, 2007) and Shaheen and Turner (2010) it is set that $b_{12} = 0$ because public expenditures decisions are taken ahead of decisions about taxes.

**Data and Estimation**

This paper employs quarterly data spanning over the period 2001Q1-2023Q4. The data for public expenditures, taxes and GDP are seasonally adjusted. Following Favero and Giavazzi (2007) average cost of debt is formulated by dividing the debt interest payments by the public debt held at time (t – 1). Since quarterly GDP data for Pakistan is not available therefore the studies of Kemal and Arby (2005), Arby (2008), and Hanif et al. (2013) are used to construct the necessary GDP time series data. The Augmented Dickey-Fuller (ADF) unit root test provided that all variables are non-stationary at levels. However, the primary goal of this paper is to examine the relationship between fiscal policy variables rather than examining the magnitude of the shock's impact between the variables (Surjaningsih et al.,

2012). Canova (2007) and Sims et al. (1990) have also explained that the VAR model provides consistent outcomes even in presence of unit-root. Due to the presence of an intertemporal budget constraint a different method for computation of impulse response is used than that of the standard VAR models. Following Akaike Information Criteria (AIC) two lags of the variables are used.

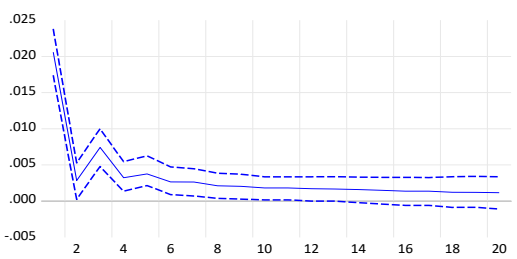
## Empirical Results

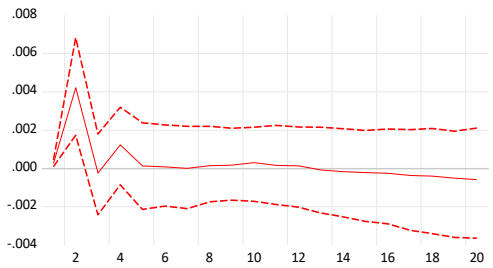
### Government Spending Shock

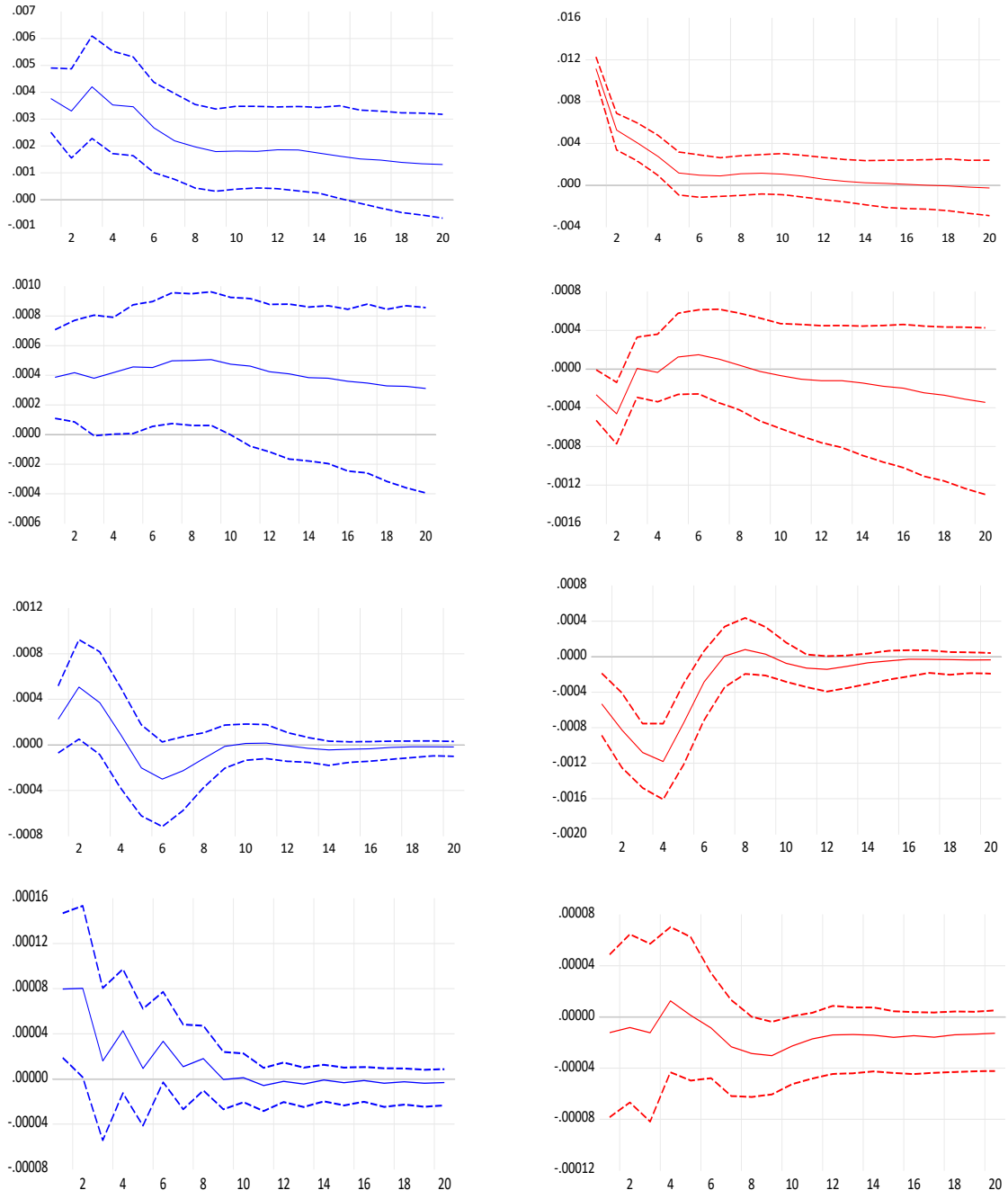
Figure 1 (a) represents the impact of positive government expenditure shock on the variables. Due to this shock, the impact over government spending is positive and persistent, this result is aligned with the SVAR studies (Blanchard and Perotti 2002; Perotti 2007; Parkyn and Vehbi 2013). The impact of increase in government expenditure over taxes remains positive and significant. The consistent increase in government spending contributes to enhanced economic activity, largely driven by the allocation of public funds toward infrastructure development and public investment. This finding supports the notion that a positive government expenditure shock can serve as an effective tool for stabilizing Pakistan economy and to enhance the suppluy of goods and services. Parkyn and Vehbi (2013) and Munir and Riaz (2019) also examined that an increase in government expenditure corresponds to a proportional increase in GDP. Initially, the government expenditure shock exerts upward pressure on prices, leading to a smooth increase in inflation due to heightened demand. However, after the fourth quarter, inflation begins to decline and remains statistically insignificant throughout the remainder of the forecast horizon. The impact over the average cost of debt servicing is positive due to rise in government expenditure.

### Government Revenue Shock

Figure 1(b) shows the impact of positive tax shock over the endogenous variables. The empirical results indicate that, in response to a positive tax shock, the effect on tax revenue is positive and persistent, though comparatively less significant than the response observed following an expenditure shock. Due to tax shock, the impact on government spending shows fluctuations and becoming negative after the fifth quarter. The positive tax shock fails to positively affect the economy, with its impact on output being largely negative and statistically insignificant. Moreover, the results indicate that tax shocks do not effectively translate into higher public spending or improved economic performance in the case of Pakistan. Government expenditure has a negative effect on inflation and this further become the ground of low economic activities and regressive output. The impact of tax shock on the debt interest payments is also negative and insignificant.





**(a)** **(b)**

Figure 1 (a) and 1(b) column show response to shocks in government expenditure and taxes respectively. The repurposes reported along the rows refer, respectively, to the effects on government spending, taxes, output, inflation and interest spending.

**Forecast Error Variance Decomposition Analysis**

The analysis of Forecast Error Variance Decomposition (FEVDs) over 10 quarters for government expenditure is displayed in Table 1(a) and for tax shocks in Table 1(b). The analysis portrays that major variation in the government expenditure shock is explained by its own lags. Output is also effective in explanation of major variation in government expenditure. results further explain that the variation explained by inflation and interest rate is negligible and decreases gradually. As per table 1(b) most of the variation in taxes is explained by itself and public expenditure. However, inflation fails to explain the variation in taxes.

**Table 1(a)**
**Variance Decomposition of government expenditure**

| Period | S.E. | L_GG | L_TT | L_YY | INFL_Q | I |
|---|---|---|---|---|---|---|
| 1 | 0.105824 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 0.111071 | 94.75000 | 4.609493 | 0.210353 | 0.203353 | 0.226698 |
| 3 | 0.122168 | 93.66575 | 3.804664 | 1.676500 | 0.217357 | 0.640326 |
| 4 | 0.126954 | 91.05596 | 5.086042 | 3.023838 | 0.203413 | 0.613750 |
| 5 | 0.132110 | 88.89789 | 4.947669 | 4.751388 | 0.412342 | 0.989210 |
| 6 | 0.135342 | 86.36613 | 5.306473 | 6.941388 | 0.442348 | 0.941360 |
| 7 | 0.135690 | 84.12370 | 5.246430 | 8.943220 | 0.553609 | 1.117643 |
| 8 | 0.141648 | 81.61704 | 5.304166 | 11.45386 | 0.545314 | 1.073315 |
| 9 | 0.144536 | 79.45544 | 5.247846 | 13.60763 | 0.553338 | 1.133834 |
| 10 | 0.147422 | 77.09326 | 5.242466 | 16.03371 | 0.533091 | 1.093769 |

**Table 1(b)**
**Variance Decomposition of taxes**

| Period | S.E. | L_GG | L_TT | L_YY | INFL_Q | I |
|---|---|---|---|---|---|---|
| 1 | 0.062427 | 9.632186 | 90.36781 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 0.074020 | 16.36294 | 82.84207 | 0.202195 | 0.578279 | 0.006009 |
| 3 | 0.085126 | 19.77249 | 77.95203 | 0.452281 | 0.474571 | 1.342226 |
| 4 | 0.092287 | 23.30222 | 74.14422 | 0.847241 | 0.446243 | 1.260323 |
| 5 | 0.098926 | 25.26290 | 70.42132 | 1.901029 | 0.444022 | 1.972655 |
| 6 | 0.103208 | 27.00262 | 67.74230 | 2.913227 | 0.441276 | 1.895228 |
| 7 | 0.108229 | 27.83205 | 64.95207 | 4.481428 | 0.546352 | 2.179026 |
| 8 | 0.112823 | 28.58204 | 62.83243 | 5.907626 | 0.570226 | 2.095242 |
| 9 | 0.116825 | 28.85268 | 60.67250 | 7.656120 | 0.617869 | 2.190768 |
| 10 | 0.120404 | 29.12218 | 58.89360 | 9.258214 | 0.611034 | 2.111579 |

## Conclusion

This study investigates the effects of fiscal policy on key macroeconomic variables, placing particular emphasis on the evolving nature of public debt in Pakistan. The key contribution of this research lies in assessing the effects of fiscal policy shocks on macroeconomic indicators while explicitly incorporating public debt feedback, following the framework suggested by Favero and Giavazzi (2007). Ignoring these feedback effects can lead to biased estimates of the fiscal policy's dynamic impact. Specifically, understanding how fiscal shocks influence interest rates necessitates close attention to the progression of public debt. The findings of this study provide that increase in government spending has a positive impact on output and economic growth, while the tax shock has a negative impact on economic activities. However, the government expenditure shock leads to inflation, interestingly, tax shock has no significant impact of inflation. The findings of this study also highlight the importance of integrating debt dynamics in the fiscal policy analysis in Pakistan.

## Recommendations

Pakistan is a developing country and its economic growth is mostly attributed to be consumption led growth. In this regard and as per the results of this study, it is recommended to increase the government expenditures, to enhance the aggregate demand and overall economic activities of the country. Furthermore, it is emphasized that increased government expenditure has a growth-enhancing impact on the economy, however, the negative and insignificant impact of tax shock provides that the tax structure system should be improved and the available resources should be used for productive economic activities and development perspective. The tax system of pakistan is riddled with a lot of issues, at one side there is shortage of resources and low tax to GDP ratio and on the other hand the

tax burden is not evenly distributed. Therefore, the tax system should be improved and instead of increasing the tax rate, the government should expand the tax base and include all the sectors of the economy in the tax structure, with effective implementation of tax system. This study further empowers that developing countries should carefully evaluate their debt dynamics before implementing an economically beneficial fiscal plan that can boost economic development and attain fiscal sustainability and debt management.

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