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Dynamics of Public Policy on Economic Activity: The Case of Pakistan

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Abstract

The unanticipated domestic and international changes in conjunction with policy discretion become reason for shocks to overall economy that affect overall economic growth. Based on methodology by Blanchard and Perotti (2002) the study used timing of fiscal decisions in a Structural Vector Auto-Regression (SVAR) to map dynamics of shocks due to tax revenue, government expenditures and aggregate output in Pakistan. When tax decisions precede expenditure decision, the tax shocks have a volatile short run impact causing expenditures to sharply adjust. Expenditure shocks persistently increase tax revenues and government expenditures. But in the second specification, expenditure shocks reduce the tax revenue and aggregate output that reverts to equilibrium only in the long run. The response of output shocks is almost identical for both the scenarios. Therefore, growth in output increases taxes collection in Pakistan enabling better management of burden of debt and deficit.

Keywords: E62 Fiscal Policy, H21 Optimal Taxation, O11 Macroeconomic Analysis, Economic Development.

1. Introduction

Government policies are aimed to affect economic growth, development, income distribution, poverty and productive capacity of the economy. There are more discretionary powers for fiscal decision makers than others, thus requiring high degree of responsibility and caution. It is necessary because fiscal decisions have short as well as long run impacts that may last for generations. Although public policies must focus on welfare of every tier of society but fiscal policy in itself affects overall pattern of aggregate demand. It influences returns to factors of production by: allocation of resources for human capital formation, help evolving culture of research and development, higher labour force participation, and improved savings and investments. Therefore, in understanding response of overall economic wellbeing of society, comprehending behaviour of government expenditures, taxes, and budget deficit is important for Pakistan as her poor economic performance continues since independence in 1947. Tax and expenditure expenditures policy of government have tremendous impact on aggregate output which is given as:

$$Aggregate\ Output = C + I + G + (X - M) + (R - P),$$

where, $C = Consumption,\ I = Investment,\ G = Government\ Expenditure,$

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$X = Exports,\ M = Imports,\ R = Receipts\ from\ abroad, and\ P = Payments$

In this identity, $(X - M)$ is the trade balance, and $(R - P)$ is receipts balance, and in collectively indicated the balance of payments i.e. $(X - M) + (R - P)$.

Connections between economic development and fiscal policy are assessed in numerous empirical studies. There is a general consensus in such studies that the size of government tends to increase with increasing economic development. This relationship is comprehended in Wagner's Law. Secondly, with expansion in tax trends and government expenditure, the economic growth rate is either increased or remained steady at a sustainable rate to support the social development. This finding is contradictory to the conventional understanding of higher tax rated being regressive for economic growth (Stokey & Rebelo, 1995; Lindert, 2004)). There exists difference in size of government even for countries with similar levels of development. But in developing countries it is a common feature to have high tax rates and large size of government which is found to be higher as compared to developed countries when those were at lower level of development.

In developing countries, it is common to have a relatively smaller modern sector and a land intensive traditional sector. Economic development as an exogenous factor is biased towards modern sector as it draws greater benefits of structural transformation. This is also visible in the socially transformed behaviours of household, land owners, and the public sector bureaucracy. Household behaviour is transformed in terms of skills, negotiation abilities, higher savings and more options for investments. Land owners are transformed in the form of recognition of multiple uses of their wealth and abilities for value addition. Public sector also undergoes sophistication by enhancing its ability to expand tax base and creation of specialized institutions as the speed of new infrastructure development slows down by achieving higher level of economic growth. In the later stages of development the government expenditures are more inclined towards transfers and welfare expenditures.

In the developing economies, the dual private sectors (i.e. modern and traditional) are differently affected by fiscal policy. Due to underdevelopment and political influence of traditional sector, it is generally hard to tax the traditional sector hosting large number of population and finished and semi-finished farm produce. As due to limited abilities of public sector, the outreach of government purchases is mostly limited to easily accessed urban and semi-urban areas, therefore, the benefits of public programs is low in the traditional sector. But at the same time, the type of government and political intention has strong bearing on development outcomes. Countries where there is less incidence of democracy and political elites are less inclined towards market reforms for equitable solutions tend to have higher tax rates, lower level of development and regressive growth progress. This situation leads to weaker institutions giving unchecked autonomy to policy makers to create debt that also causes escalation of tax rates (Lindert, 2004). Therefore, the possible reason for perpetuation of large labour force in traditional agriculture is either the low total factor productivity in the modern sector or fiscal initiatives like high taxes and low level of government investments hampering the economic growth.

2. Materials and Methods

It is generally observed from research based economic studies that in any type of the economy – either the developed or otherwise – the discretion rested with the policy maker in

manipulating the fiscal variables to become reason of shocks to the economy. The Structural Vector Auto Regression (SVAR) model helps to comprehend the dynamic effects of the shocks to the system and provides forecasts about the future anticipated movement of variables in the system. The study is based on the research methodology developed by Blanchard and Perotti (2002) in which SVAR was identified through the event study approach about the timing of expenditures and the tax decisions in the United States. Variables for the SVAR enter the system as: $X = [TaxRevenue, GovernmentExpenditure, Output]'$. The analysis is based on the annual data (1975-2015) of public expenditures (g_t), the net taxes (t_t) and the GDP (y_t), and for the empirical reasons, the variables are taken as logarithms. The basic setup of the model is:

$$\begin{cases} BX_t = \Gamma_0 + \Gamma_1 X_{t-1} + \cdots + \Gamma_k X_{t-k} + \varepsilon_t \\ B^{-1}BX_t = B^{-1}\Gamma_0 + B^{-1}\Gamma_1 X_{t-1} + \cdots + B^{-1}\Gamma_k X_{t-k} + B^{-1}\varepsilon_t \\ X_t = \mathrm{A}_0 + \mathrm{A}_1 X_{t-1} + \cdots + \mathrm{A}_k X_{t-k} + e_t \end{cases} \quad \text{..... (1)}$$

and

$$\begin{cases} A_0 = B^{-1}\Gamma_0 \\ A_1 X_{t-1} = B^{-1}\Gamma_1 X_{t-1} \\ e_t = B^{-1}\varepsilon_t \end{cases} \quad \text{.....(2)}$$

The innovations of government expenditure (ε_{gt}) summarize unexpected shocks occurring to government expenditure. These shocks are pure structural shocks that are expected to be uncorrelated with innovations of tax revenue (ε_{tt}) and have no serial and cross correlations. The main issue is the identification of system which is achieved by comprehending timing of fiscal initiatives regarding occurrence of taxes and expenditures decisions. For this purpose elasticity of government expenditure (c_1) and taxes (c_2) with respect to output were required to estimate coefficients of following equations:

$$\begin{cases} e_{tt} = a_1 e_{yt} + a_2 \varepsilon_{gt} + \varepsilon_{tt} \\ e_{gt} = b_1 e_{yt} + b_2 \varepsilon_{tt} + \varepsilon_{gt} \\ e_{yt} = c_1 e_{tt} + c_2 e_{gt} + \varepsilon_{yt} \end{cases} \quad \text{.....(3)}$$

These coefficients need to be estimated in order to understand the dynamics of fiscal initiatives in Pakistan. The study used the elasticity for taxes in Pakistan from Bilqees (2004), while the study estimated the rest of the coefficients with the help of GMM (Table 1). For estimation, it was first assumed that the tax decisions come prior to the expenditure decision (i.e. a_2 = 0), and then the expenditure decisions precede the tax decisions (i.e. b_2 = 0). The information in innovations ε_{tt} and ε_{gt} is employed to estimate $c_1$and c_2 in regressing output on taxes and government expenditures, and then it helped in estimating values of a_2 and b_2. The study then estimated cyclically adjusted reduced form residuals of tax revenue and government expenditure as:

$$e_{tt}^{ca} = e_{tt} - a_1 y_t \quad \text{.....(4)}$$

$$e_{gt}^{ca} = e_{gt} - b_1 g_t = e_{gt}\ (since\ b_1 = 0) \quad \text{.....(5)}$$

The impulse response functions outline the time path of variables in the system when structural shocks hit the system. The impact multipliers ($\Phi_{ii}^{(i)}$) describe the effect of a unit change in structural shocks on the variables in the system (i.e. t_t, g_t and y_t).

$$\begin{bmatrix} t_t \\ g_t \\ y_t \end{bmatrix} = \begin{bmatrix} \bar{t}_t \\ \bar{g}_t \\ \bar{y}_t \end{bmatrix} + \sum_{i=0}^{\infty} \underbrace{A^i B^{-1}}_{\Phi_i} \varepsilon_{t-1} = \begin{bmatrix} \bar{t}_t \\ \bar{g}_t \\ \bar{y}_t \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} \Phi_{11}^{(i)} & \Phi_{12}^{(i)} & \Phi_{13}^{(i)} \\ \Phi_{21}^{(i)} & \Phi_{22}^{(i)} & \Phi_{23}^{(i)} \\ \Phi_{31}^{(i)} & \Phi_{32}^{(i)} & \Phi_{33}^{(i)} \end{bmatrix}^i \varepsilon_{t-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots(6)$$

Similarly, the results of variance decomposition describe the degree of change in a variable due to its own shock along with shocks of the other variables in the system. Generally, the effect of own shock dominates in the short run to explain the variance in a variable while contribution of other shocks start to increase over time (Johansen, 1998).

Table 1 Estimated Contemporaneous Coefficients

$$\begin{cases} e_{tt} = a_1 e_{yt} + a_2 \varepsilon_{gt} + \varepsilon_{tt} \\ e_{gt} = b_1 e_{yt} + b_2 \varepsilon_{tt} + \varepsilon_{gt} \\ e_{yt} = c_1 e_{tt} + c_2 e_{gt} + \varepsilon_{yt} \end{cases}$$

	c_1	c_2	b_1	a_1	b_2	a_2
Coefficients	0.14	-0.027	0.89 (3.48)	-0.027 (3.7)	0.63 (4.5)	0.30 (2.17)

b_2 = effect of 't' on 'g' when assuming a_2 = 0 (i.e. when taxes are ordered first).
a_2 = effect of 'g' on 't' when assuming b_2 = 0 (i.e. when expenditures are ordered first)
c_1= effect of 't' on 'y'
c_1= effect of 'g' on 'y'

Source: Author's own calculations

3. Results and Discussion

This study aims to comprehend the dynamic effects of the shocks of the government expenditures and the tax revenues on aggregate output in Pakistan. Fiscal policy and the discretion of policy makers to manage the economy does not always generate the anticipated outcomes. The decisions of taxes, spending and transfers have impact on aggregate performance of overall economy, and have welfare consequences. This discretion appears as a source of shocks to the expectations of the agents resulting in unanticipated outcomes having effect on aggregate output.

3.1 Impact of Tax Revenue Shock

The study first assumed that spending decisions come ahead of tax decisions (i.e. $b_2 = 0$) and then it was assumed that tax decisions are made before expenditures (i.e. $a_2 = 0$) to trace the impact of shocks to the system (Figure 1). In both specifications tax revenue shock generates a persistent positive response in *tax revenues* in Pakistan. Fiscal deficit of Pakistan reduced from 7.3 to 6.4 percent of GDP between year 2008 and 2013 due to improvement in tax collection in Pakistan (Economic Survey of Pakistan, 2013). Tax base expanded at federal and provincial levels although the major contributor in total tax revenues has been indirect taxes. Even though tax rates for individuals were scaled down and tax brackets reduced from 21 in

2008 to 11 in 2014 but the reduction in bracket creep and encouragement for self registration into to tax net by the general public could not increase the number of direct tax payers as anticipated. Still in Pakistan less than 2% of the total population is direct tax payer.

The delayed action and sluggish response to control deficits by rationalizing the expenditures indicate existence of fragmented and polarized socio-political system. This lack of consensus at federal and provincial levels becomes a source of continuous stress on public deficit that has prevailed from government to government conforming to the Inertia Theory. Therefore, it is not just the effort of one single government, but a continuous effort is required to manage the perpetual budget deficit and relieve the economy of the fiscal stress that has retarding effect on growth of overall economy.

Impulse response function shows that there is a lasting and long run positive impact of tax revenue shock on *government expenditures*. Pakistan has seen an annual growth rate of revenues collection of about 38% per annum which has improved expenditures and deficit management of public sector but still governments in Pakistan need a long term public expenditure rationalization strategy. In such an effort, the budget of ministries and divisions is reduced by 30%, subsidy on electricity and other utilities are gradually cut down, and better management of public sector enterprises running chronic deficit. It enabled the government increase development expenditures amounting up to 25% of the total public expenditures (Economic Survey of Pakistan, 2014).

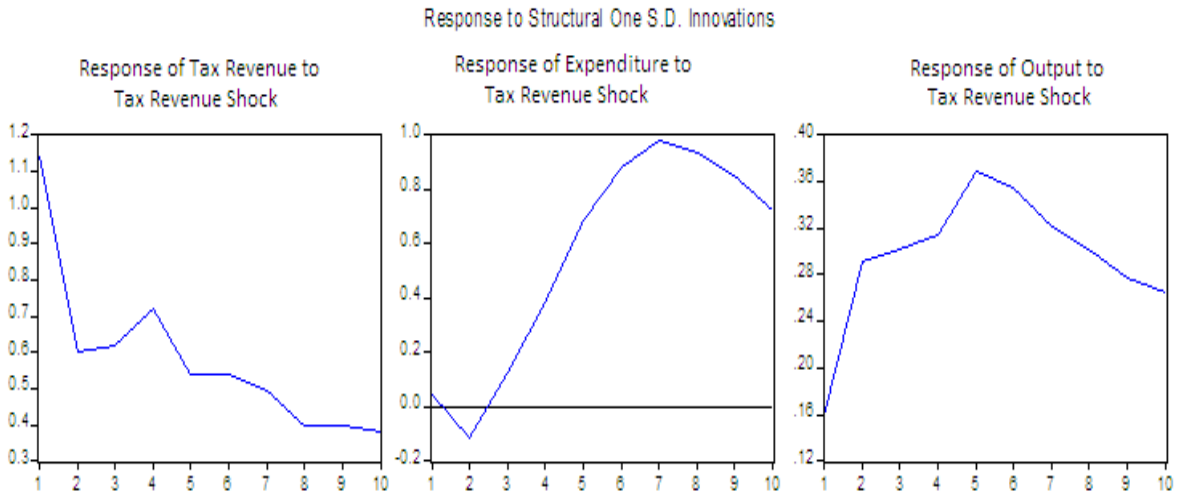
In both the specifications there is a persistence positive response of *aggregate output* due to tax revenue shocks in the long run. A similar positive response of output for Germany is found in Palley (2012) but Romer and Romer (2007) found regressive impact of higher tax rates for the US. In most of the developed countries, there is ample empirical evidence supporting that higher tax rates negatively impact the growth performance of aggregate output (Padda and Akram, 2009). But in Pakistan not many empirical studies are there to establish regressive impact of higher tax rates on output growth rate. A possible explanation can be that around 60% of the total revenues collection is through indirect taxes that are transferrable in nature mostly to the end consumer (Economic Survey of Pakistan, 2012).

Padda and Akram (2009) also found that the tax rates also have a regressive impact on per capita income but for Pakistan there are not enough empirical studies to establish such a relationship. When share of different sectors in the GDP is compared with tax contribution, it raises a lot of questions about the effectiveness of tax reforms. The share of agriculture, industry and services in GDP is 22%, 25% and 53% but the direct tax contribution is 1%, 63% and 26%, respectively.

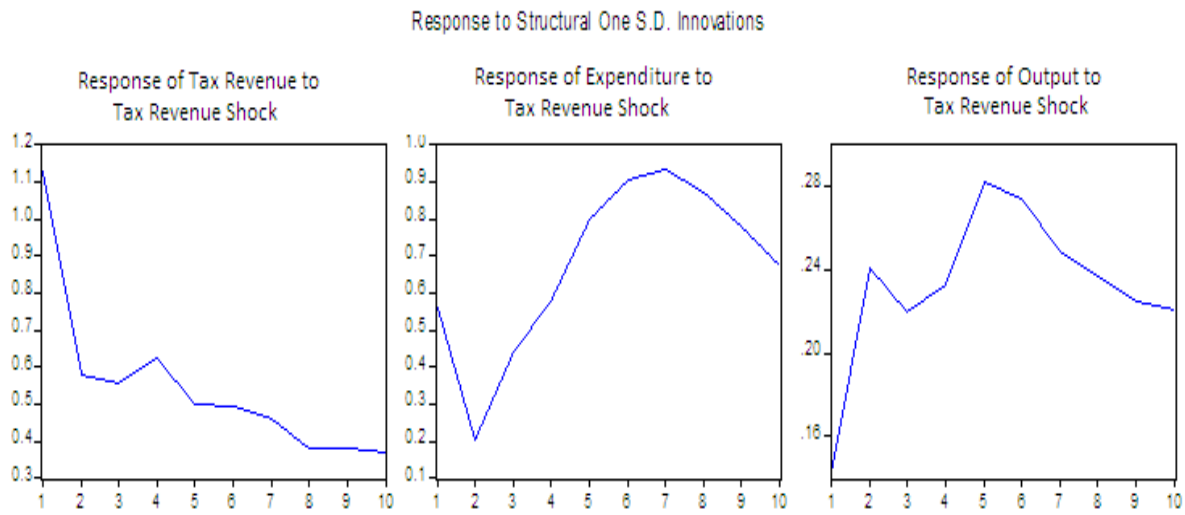
Therefore, the regime change in tax climate is borne mostly by industrial and manufacturing sectors in Pakistan. But overall manufacturing sector has its own problems as within the sector growth rate of small scale manufacturing is highest especially for agricultural products processing for live stock, poultry and food (Economic Survey of Pakistan, 2014). These small and medium sized units easily manage to remain outside the tax net and even avoid registration process. This has lead to diversion of new investment to the agricultural based production due to tax shelters or ease in tax avoidance. Therefore, tax shock in Pakistan generates a positive response in aggregate output due to mostly expansion of large, medium and small agricultural based industry.

Figure 1: Impact of Tax Revenue Shock

If spending decisions come first preceded by the tax decision (i.e. $b_2 = 0$).



If tax decisions come first preceded by the expenditure decision (i.e. $a_2 = 0$)



Source: Author's own calculations

3.2 Impact of Government Expenditure Shock

When expenditure decisions are made ahead of tax decisions (i.e. $b_2 = 0$), there occurs a positive response in *tax revenue* upon impact of government expenditure shock. Tax revenue then converges to equilibrium in third year after which becomes negative but reverts back to equilibrium and remained positive from the fourth year (Figure 2). But when tax decisions precede expenditure decisions (i.e. $a_2 = 0$), there is a negative response of tax revenues to government expenditure shocks over the entire forecast horizon which starts to recover after 4th period but adjusts to equilibrium slowly. This phenomenon calls for examining both the scenarios separately to draw plausible conclusions.

In the first specification when the expenditure decisions come ahead of the tax decisions, the positive response of the tax revenue to the independent government expenditure shock is not

volatile. This response of the taxes indicates that the expenditure shock cannot arise from a deficit financed spending shock as the value of the impact multipliers remains positive. This is in line with the theoretical expectation attached with the positive sign of the tax multipliers that indicate a rupee rise in government spending can only be financed by a rupee increase in taxes that causes the aggregate demand to rise. But if there occurs a mismatch in the values of the multipliers, the reason is financing current expenditure from deficit or debt instead of tax revenues. Therefore, the response of the tax revenues to the government expenditure shocks is not an automatic phenomenon. It indicated the relative aggregate performance of the economy that is affected by the fiscal decisions of the policy makers. The positive response of the tax revenues to the government expenditure shock also indicates the presence of wealth effect generated by the higher level of the output due to expansion in public spending (Douglas and Zhiguo, 2012).

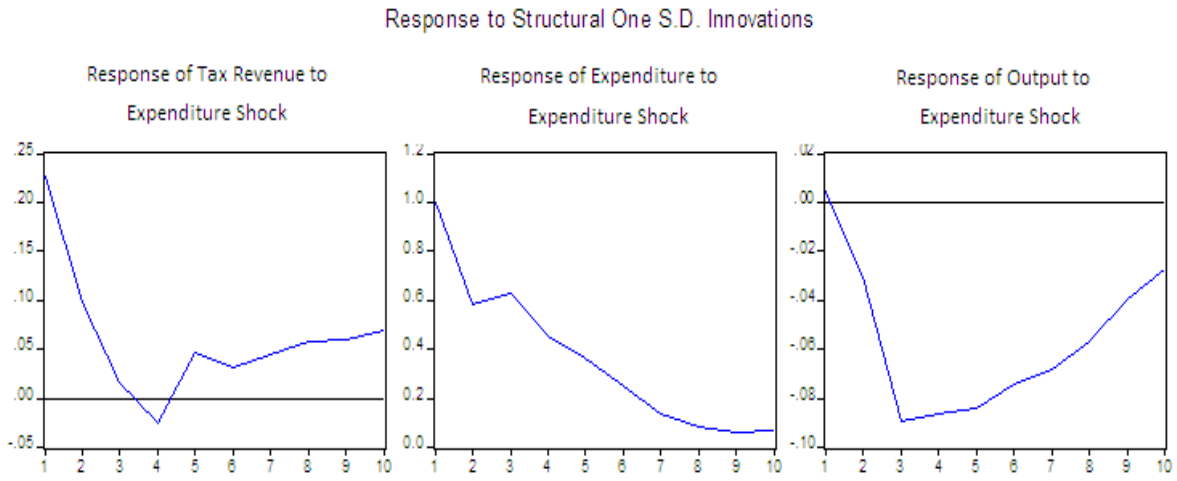
But conversely, tax evasion is triggered with pre-announced tax decisions which is indicated in the negative response of tax revenue to government expenditure shocks over the entire forecast horizon. This response also indicated that the fall in tax revenues will result in a deficit-financed expenditure shock that can have adverse effects on the economy. It may cause crowding out of private investment and put pressure on interest rates to rise. In such situations agents alter future expectations causing low level of labor supply and fall in aggregate output. In Pakistan the structural changes have lead to higher tax revenue collection in the last decade but still only about 2% population pays the direct tax (Economic Survey of Pakistan, 2012). This situation indicates absence of equitable tax structure and lack of ability of subsequent governments to bring about tax reforms making attainment of dream of self reliance a very difficult task (Zaidi, 2010).

However, when expenditure decisions are made before tax decisions (i.e. $b_2 = 0$), government expenditure shock generates a positive response in *government expenditures* that persists over long run. But when tax decisions are made first (i.e. $a_2 = 0$), there occurs a positive response in government expenditures due to expenditure shocks. But this positive response converges to equilibrium quicker compared to the first scenario. It can be inferred that the gradual fall of value of impact multiplier in both scenarios indicates presence of inertia effect (Alesina & Ardagna, 2009). The inertia effect pushes expenditures to remain persistent regardless of the capability of government to raise and maintain tax revenues due to expectations of the voters. Weak governments like in Pakistan then fall into trap of amassing new debt due to inability of increasing tax revenues.

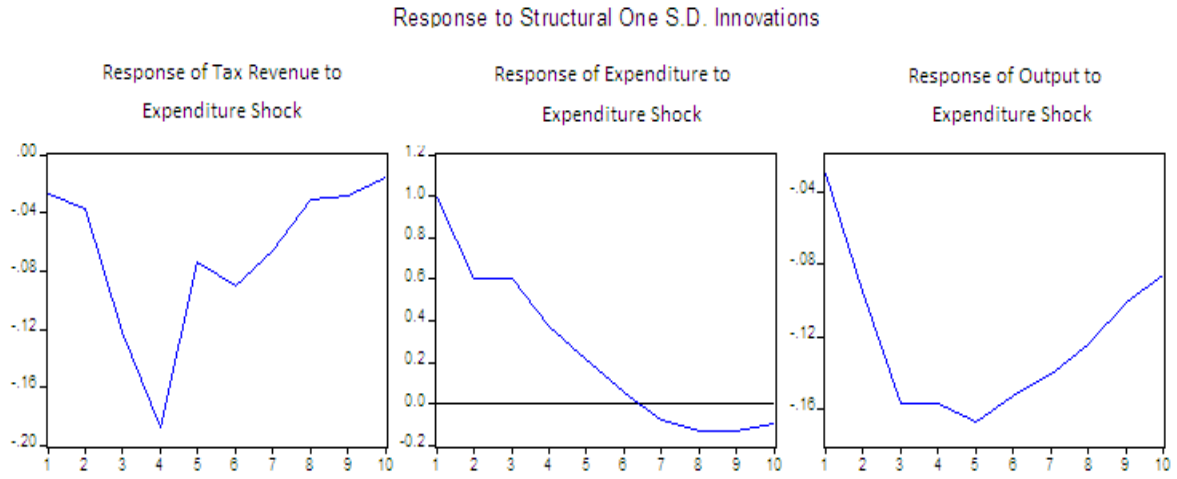
In first scenario when expenditures decisions are made ahead of tax decisions, government expenditure shock generates a small short lived positive response upon impact in *aggregate output* which then stars to decline and remained negative for rest of the forecast horizon. But when tax decisions are made first, due to government expenditure shock *aggregate output* remains negative over the entire forecast horizon. This behaviour of the aggregate output in Pakistan does not conform to the Keynesian views and indicate a dominant impact of crowding out of the private investment that offset output effect of the government spending. Similar findings are reported for Spain (de Castro & de Cos, 2006) and Germany (Ramey & Shapiro, 1999). Ramey (1998) in his neoclassical model found that if the agents can correctly assess the timing and magnitude of the future government spending shock, then this incidence of crowding out will not appear with the regressive outcome and may even cause the aggregate output to rise.

Figure 2: Impact of Government Expenditure Shock

If spending decisions come first preceded by the tax decision (i.e. $b_2 = 0$)



If tax decisions come first preceded by the expenditure decision (i.e. $a_2 = 0$)



Source: Author's own calculation.

3.3 Impact of Output Shock

In both the scenarios the response of variables in the system to output shock is almost similar with very little difference in values of impact multipliers as well. Tax revenue responds positively to output shock for about two years that with small volatility remains positive over the entire time horizon (Figure 3). The reasons of this positive impact of aggregate output shock on tax revenue are not apparent in empirical literature. Although there are numerous empirical studies that have found regressive impact of taxation on aggregate output in Pakistan (see Atif, Shahab & Mehmood, 2012; Azeem et. al., 2013; Mashkoor et al., 2010; Saqib et. al., 2014) but the study has found it to be positive. The study, therefore, used the cyclically adjusted revenue receipts to comprehend the impact of output shocks, but the overall response remained positive as found earlier.

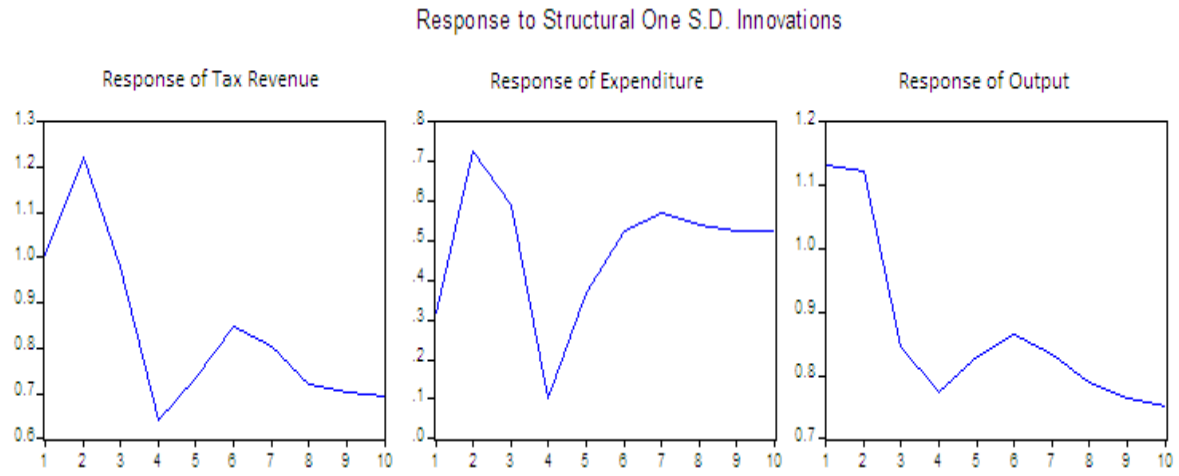
Aggregate expenditure showed a positive but volatile response throughout the forecast horizon to aggregate output shocks. The reason being underdeveloped institutions and discretion in

making fiscal policy that follows 'when it rains, it pours' behaviour. It is relatively very easy for fiscal authorities in Pakistan to borrow and generate debt to finance the current expenditures. Therefore, fiscal initiatives in Pakistan are pro-cyclical and reflect the adjustment regime according to relative position on the business cycle.

Aggregate output shock generates a strong positive response in output upon impact. This positive impact starts to die out and adjusts to equilibrium in third year, thereafter remains positive in the long run. Number of explanations can be presented for this positive reaction like: increased public investment, higher aggregate demand, improved savings, soaring capital inflows, discovery of natural resource etc. The persistent long run positive response of aggregate output to output shock Output shock synchronization in Pakistan is the sign of high intra-industry trade (Frankel and Rose, 1997; Fidrmuc, 2004). In their study Beaudry and Koop (1992) learned that negative output shock has a short run influence but lasts over a long run when it is positive. The study also found behavior of Pakistan to be in line with their findings. Every now and then Pakistan is hit by negative output shocks especially due to natural calamities, but expansion of international trade (e.g. increased by 4.2% in 2013-14) in recent past helps to offset its regressive impact (Economic Survey of Pakistan, 2014). Although volatile, but Pakistan has maintained a steady output growth rate of around 4% over the past decade. Theoretically if the impact of positive output shock persists over a long run, it becomes highly correlated with general price level. Haller (2002) and Giorno et. al. (1995) empirically showed that if this correlation is very high then the price effect dies out in the short run. Given the situation of Pakistan, the price effect does not take effect and positive impact of output shock continues over a long run.

Figure 3: Impact of Aggregate Output Shock

For both specifications (i.e. $b_2 = 0$) or (i.e. $a_2 = 0$)



Source: Author's own calculations

4. Conclusion

The study followed Blanchard and Perotti (2002) and their event study methodology to model dynamics of shocks of tax revenue, government expenditures and aggregate output. Tax revenue shocks, in both the scenarios (i.e. $a_2 = 0$ and/or $b_2 = 0$), generate almost similar positive and lasting impact on tax revenues. But tax revenue shock generates varying response in

government expenditure for both specifications. For first scenario, government expenditure has an unstable short run response, whereas in the second, expenditures adjusted sharply but then started increasing after second year. In both the specifications, the tax revenue shock generates a persistent positive response in aggregate output over a long run although the magnitudes of impact multipliers are different. In first specification, expenditure shock causes *tax revenue* to become unstable but positive in short run, but in the second scenario, become negative but converges to equilibrium in long run. Similarly, in first specification, expenditure shocks cause a positive change in *government expenditures* but in the second scenario the positive response upon impact becomes negative over short run. But in second specification, aggregate output remained negative over the entire forecast horizon.

For both specifications, variables in the system responded almost identically to the output shocks. Tax revenues increased for two years before starting to adjust in the long run. Government expenditures showed volatile response but remained positive over the forecast horizon. Impact multiplier of aggregate output to output shock is more than unity that remained positive in the long run. It is generally found that future level of tax revenues in Pakistan is positively related to aggregate output and tax revenue shocks. Expansion in aggregate output enhances the capacity to raise tax revenue which can relieve the burden of deficit and debt of the federal government. 18th constitutional amendment makes provinces financially autonomous but afterwards no concrete measures are taken by the subsequent governments to understand and adjust fiscal needs accordingly (Mustafa, 2011). Further and in depth inquiry is required whether in Pakistan the positive output shock generating positive government expenditure response is solely due to cyclical fluctuations or there are other unavoidable needs as well causing it. These may be the expenditures incurred on defense, war on terror, rehabilitation of Internally Displaced Persons (IDPs) or the like.

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