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Testing Fiscal Dominance Hypothesis in a Structural VAR Specification for Pakistan

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Abstract

This research aims to test the fiscal dominance hypothesis for Pakistan through a bivariate structural vector auto regression (SVAR) specification, covering time period 1977 – 2016. This study employs real primary deficit (non interest government expenditures minus total revenues) and real primary liabilities (sum of monetary base and domestic public debt) as indicators of fiscal measures and monetary policy respectively. A structural VAR is retrieved both for entire sample period and four sub periods (1977 – 1986, 1987 – 1997, 1998 – 2008, and 2009 – 2016). This study identifies the presence of fiscal dominance for the entire sample period and the sub period from 1987 – 2008. The estimates reveal an interesting phenomenon that fiscal dominance is significant in the elected regimes and weaker in the presence of military regimes in Pakistan. From a policy perspective, this research suggests increased autonomy of central bank to achieve long term price stability and reduced administration costs to ensure efficient democratic regime in Pakistan.

Keywords: fiscal dominance; SVAR; primary deficit; primary liabilities; Pakistan.

JEL classification: C22; E62; H62; H63.

1. INTRODUCTION

Great recession of late 2000s has ignited the policy debate about government spending, taxation, and deficit financing and at the same time, literature on the role of fiscal policy is increasingly assessing the effects of large sustained fiscal deficits on national savings, investment, interest rates, and the current account. Moreover, the introduction of new empirical techniques (like vector auto regressions - VAR, SVAR and FVAR) to evaluate fiscal policy role is another contributor to the growth of the literature on fiscal policy. According to the standard Keynesian aggregate demand model, an expansionary fiscal policy induces higher level of output and employment given that economy operates below the full employment level. In this respect, fiscal policy is considered as a stabilization tool by the Keynes general theory. However, this model has been a subject of long-standing debate about both its theoretical validity and practical importance.

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Fiscal dominance indicates the linkages between monetary and fiscal policies. Macroeconomic theory suggests money financing of fiscal deficit as a major cause of inflation and conversely controlling inflation is a major objective of monetary policy. In a fiscal dominant regime, monetary policy is fully accommodative to all government debt to finance its deficit. In this context, monetary authority increases the current or future seigniorage revenues to finance the principal and interest payments of the newly issued debt and therefore conceding on its objective to control inflation in the country (Ito *et al.*, 2011). Fiscal authorities are insensitive and irresponsive to changes in debt, they do not adjust government expenditures or tax revenues to reduce outstanding stock of government debt, and henceforth creation of base money is the only way to finance the fiscal deficit (Leeper, 1991; Sargent and Wallace, 1981). Such a situation is known as a fiscal dominant (FD) or non-Ricardian regime (Rao Aiyagari and Gertler, 1985). However, if the government adjusts its primary deficit to limit the debt accumulation and the central bank is not forced to inflate away the debt. Such a regime has been called monetary dominant (MD) or Ricardian regime (Rao Aiyagari and Gertler, 1985; Resende, 2007). Current research investigates the presence of fiscal dominance or otherwise in Pakistan through structural vector autoregression (SVAR) identification. To the best of our knowledge, there is no such study available for Pakistan using SVAR approach. This approach links the economic theory to multiple time series analysis and it is commonly used to determine the dynamic response of economic variables to various disturbances or shocks in the economy.

2. AN OVERVIEW OF MACRO ECONOMY OF PAKISTAN

In Pakistan, monetary policy is based on dual objectives of controlling inflation and output growth. However, accumulation of huge budget deficits restrains the ability of monetary policy to achieve these objectives. In Pakistan, fiscal deficit directly affects the inflation since government expenditures are the major part of the aggregate expenditures and this may induce demand-pull inflation in the economy. Since fiscal deficit is financed partly through the central bank and it can motivate an indirect impact to increase the inflation level in the country. Therefore, it is pertinent to investigate that how changes in primary deficit affect real liabilities in the country.

Pakistan, being a developing economy is characterized with macroeconomic imbalances such as large fiscal and trade deficit, high domestic and foreign debt, high nominal interest rates, very low international reserves, high inflation and low economic growth. These macroeconomic imbalances have contributed to higher unemployment and inflation with an average economic growth around 4% over 40 years (Table no. 1). Moreover, fiscal structure in Pakistan is categorized with high current expenditure and an inelastic, non-progressive tax structure with narrow tax base, which always resulted in high budget deficit. During early 1990s, financial reforms were introduced in Pakistan, which were based on dual objectives of fostering economic growth and reducing inflation rate. These reforms include privatization of commercial banks, provision of more autonomy to the central bank of Pakistan, establishing a domestic bond market, launching of Pakistani bonds in the international market and maintaining high foreign exchange reserves (Shaheen, 2013). However, financing of rising fiscal deficit through domestic borrowing and external finance resulted into large public debt and high expenses on debt servicing which in turn led to an expansionary monetary policy over the years. Henceforth, current research aims to empirically determine the type of regime in Pakistan i.e. whether it is categorized as a

monetary dominant or a fiscal dominant regime using a structural vector auto regression (SVAR) model. This research adds to the literature related to fiscal policy effects in developing economies as these countries' economic policies are aimed on dual objectives of inflation control and economic growth. In this context, rising fiscal deficit constrains monetary policy to ensure inflation control and estimates of current research reveal different sub periods of fiscal dominance in Pakistan.

Table no. 1 – Pakistan's overall macroeconomic environment

Variables/Years	1970s	1980s	1990s	2000s	2010s
Growth Rates					
GDP	5	7.1	4.4	5.22	4.2
Inflation (GDP Deflator)	12.2	7.6	10	7..3	6.9
Percent of GDP					
Savings	11.2	14.8	13.8	15.3	13.8
Investment	17.1	18.7	18.3	17.4	15.1
Budget Deficit	7.6	6.8	7.3	5.5	6.1
Current Account Balance	-5.2	-2.8	-4.1	-0.02	1.2
Gross Public Debt	61.9	64	76.9	59.4	63.7

Source: Various Issues of Economic Survey of Pakistan

3. TESTING THE TYPE OF REGIME – MONETARY VERSUS FISCAL DOMINANCE

There are two approaches to evaluate the interaction between monetary and fiscal policy. First approach employs the game-theoretic tools and considers fiscal and monetary authorities as playing a "game" against each other. Second approach analyses the interaction between monetary and fiscal authorities through the dynamic equilibrium models that have become a staple of macroeconomic theory since the real business cycle - RBC revolution. This approach implicates both fiscal and monetary interactions through a government budget constraint. Our research focuses on this second way of considering monetary-fiscal interactions. In this model, there are two agents: a fiscal authority that controls government spending and taxes, and a monetary authority that controls the money supply.

We can express the fiscal dominance theory in terms of an inter temporal budget constraint (King and Plosser, 1985) as follows;

$$\frac{M_t + B_t}{P_t} = \left[T_{t+1} + S_{t+1} - G_{t+1} + (M_{t+1} + B_{t+1})/P_{t+1}\right]/1 + r \qquad (1)$$

where G_t and T_t are real government expenditures and revenues, P_t is the price level, B_t is interest bearing debt held by the public M_t is the monetary base (government debt held by the central bank), and where $S_{t+1} = i_M / P_{t+1}$ is the forgone interest payments on the public's money holdings that accrue to the government (seigniorage), where *i* is the nominal interest rate, and *r* is the real interest ($r = [(1+i)P_{t-1}/P_t] - 1$). In equation (1), $(M_t+B_t)/P_t$ represents the net public sector liabilities in real terms. Substituting equation (1) forward over an infinite horizon, using the identities $LIAB_t = (M_t+B_t)/P_t$ and $PDEF_t = G_t - T_t - S_t$ yields the inter-temporal budget constraint:

$$LIAB_0 = -E\left\{\sum_{t=1}^{\infty} PDEF_t/(1+r)^{t-1} + \lim_{t\to\infty} LIAB_t/(1+r)^{t-1}\right\} \quad (2)$$

where $E\{\ \}$ is the expectations operator. The transversality condition is:

$$\lim_{t\to\infty} LIAB_t/(1+r)^{t-1} = 0 \quad (3)$$

Thus equations (2) and (3) represent inter-temporal solvency. In equation (3), the discounted value of government liabilities approaches zero over an infinite horizon. Although equations (2) and (3), as identities, are not directly testable, however it is possible to ask whether equation (3) would be satisfied if the relevant fiscal variables *G*, *T*, *M*, *B*, and *P* were to continue their historically observed relationships into the indefinite future. If so, equation (3) is satisfied and fiscal policy is said to be sustainable. By contrast, if fiscal policy is not sustainable, an adjustment to one or more fiscal variables will be required at some future date. Fiscal dominance occurs when government discretionally decides the government expenditures without raising taxes at same time and hence influences the current and future flows of reserve money and the inflation rate. This relationship was identified by Sargent and Wallace (1981)'s "Some Unpleasant Monetarist Arithmetic" and suggests an inter-temporal positive correlation between government budget deficits and money growth. However, in a situation when despite the active fiscal policy, monetary authority does not blink. Rather, the central bank is strong enough and committed enough to its own "independent" monetary policy then intertemporal government budget constraint must be satisfied somehow. Thus, in this case when neither regular fiscal policy nor monetary policy adjusts appropriately, then it must be the price level (P_t) adjusts to satisfy the intertemporal budget constraint, for a given level of outstanding debt.

4. LITERATURE REVIEW

Although empirical literature on the relevance of Ricardian vs non-Ricardian fiscal regimes is rather scarce but there are few studies available which describe the formal ways to test the presence of fiscal policy regime. One of the few attempts is related to those of Canzoneri *et al.* (1998, 2001), Melitz (2002), Cochrane (2001) and Sims (1995, 1997, 1998). All approaches are quite similar, since they focus on the relationship between the primary balance and the government liabilities. Joines (1985) reviews the literature on reviews the evidence for the United States and finds almost an equal number of authors finding and failing to find a positive relation between government deficits and money growth or the growth of the monetary base (Fratianni and Spinelli, 2001).

To test for the type of regime in post war period for the US, Canzoneri *et al.* (1998, 2001) examine that if the primary budget surplus as a percentage of GDP negatively influences the government liabilities, which are also as a ratio of GDP, using a bivariate VAR model. These government liabilities consist of both the public debt and the monetary base. A Ricardian regime expects an inverse relationship between the primary budget surplus and government liabilities, as any positive change in the budget surplus is used to pay back some of the outstanding public debt. The authors suggest Ricardian regime for the sample period as they do not find negative correlation between the selected variables.

Debrun and Wyplosz (1999) and Melitz (2002) estimate reaction functions of monetary and fiscal authorities for twelve European Union and OECD countries respectively. They find positive response of primary budget balance to positive innovations in the government liabilities which are consistent with the Ricardian framework. Cochrane (1999) also uses a VAR model with the following variables: public debt as a percentage of private consumption, the budget surplus-private consumption ratio, the consumption rate growth, and the real interest rate implicit in the stock of public debt. With annual data for the US, he concludes that positive changes in the budget surplus reduce the stock of public debt. Woodford (2001) reaches the same conclusions as Cochrane (1999), with the same data and variables, with the exception that the real interest rate is discarded on the basis that it should be implicit in the evolution of the other three variables, Creel and Sterdyniak (2001) follow similar approach with panel data and reaction function estimations, they mention that fiscal policy could be characterised by a Ricardian regime in Germany and in the US, and by a non-Ricardian regime in France.

Favero (2002) adopts a different approach and jointly models the effects of monetary and fiscal policies on macroeconomic variables in structural models for France, Germany, Italy, and Spain, and reports that fiscal policy reacts to increases in debt. Additionally, for the US, Sala (2003) and Favero and Monacelli (2005) report the existence of Ricardian fiscal regimes after the end (beginning) of the 1980s (1990s), while Sala concludes for the existence of non-Ricardian regime in the 1960s and 1970s. A Ricardian regime is also reported by Tanner and Ramos (2002) and Rocha and Silva (2004) for Brazil, a country where past high inflation and fiscal problems would have seemed to be a good ground for fiscal predominance. Pehlivan and Balli (2016) investigate the type of regime for the Common Wealth of Independent States (CIS), using panel data and suggest that Ricardian regime dominates in Kyrgyz Republic, Russian Federation, Tajikistan, Uzbekistan, Moldova and Turkmenistan's fiscal policies.

To examine fiscal sustainability in Pakistan, Cashin and Olekalns (2003) employ Barro's tax-smoothing model (1987) for the period 1956 -1995, and argue that Pakistan's fiscal behavior has been dominated by the stagnation of revenues, large tax-tilting-induced deficits, and the consequent accumulation of excessive and unsustainable public liabilities. In addition, studies Hussain (1982), Masood and Ahmed (1980) and Saqib and Yasmin (1987) try to investigate the relative importance of fiscal and monetary policy on aggregate economic activity in Pakistan. Therefore, there is a need to empirically discriminate between these two regimes as monetary dominant and fiscal dominant by estimating simple and parsimonious model such as structural autoregressive system proposed by Fratianni and Spinelli (2001) and Xiong (2012). Henceforth, current research fills this gap and identifies many sub periods of fiscal dominance in Pakistan for the sample period 1977 – 2016. In addition, this research finds the linkages between the political structure and type of regime. During the military regime, economic policies are more stringent to ensure the autonomy of central bank and smaller size of the government enables to constrain fiscal deficit in the economy. These findings are consistent with Parmer and Shafi Azam (2006).

5. EMPIRICAL ASSESSMENT OF FISCAL POLICY REGIME IN PAKISTAN

To assess the linkages between the primary deficit and public sector liabilities, this research follows a bivariate structural VAR approach proposed by Fratianni and Spinelli (2001) and Xiong (2012). This VAR model can be specified as follows:

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix}\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \delta_{11} & \delta_{12} \\ \delta_{21} & \delta_{22} \end{bmatrix}\begin{bmatrix} Y_{t-1} \\ X_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{xt} \end{bmatrix} \quad (4)$$

where b and δ are coefficients, ε is a white noise shock. The structure of the system allows Y_t and X_t i.e. fiscal deficits and public sector liabilities to have contemporaneous effects on each other. Let:

$$\mathbf{Z} = \begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix} \quad (5)$$

The structural VAR (4) can be transformed into a standard VAR model by pre-multiplying Z^{-1} on both sides of (5).

$$\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \begin{bmatrix} \frac{b_{10} - b_{12}b_{20}}{1 - b_{12}b_{21}} \\ \frac{b_{20} - b_{10}b_{21}}{1 - b_{12}b_{21}} \end{bmatrix} + \begin{bmatrix} \frac{Y_{11} - b_{12}\delta_{21}}{1 - b_{12}b_{21}} & \frac{Y_{12} - b_{12}\delta_{22}}{1 - b_{12}b_{21}} \\ \frac{\delta_{21} - b_{21}\delta_{11}}{1 - b_{12}b_{21}} & \frac{\delta_{22} - b_{21}\delta_{12}}{1 - b_{12}b_{21}} \end{bmatrix}\begin{bmatrix} Y_{t-1} \\ X_{t-1} \end{bmatrix} + \begin{bmatrix} \frac{\varepsilon_{yt} - b_{12}\varepsilon_{xt}}{1 - b_{12}b_{21}} \\ \frac{-b_{12}\varepsilon_{yt} + \varepsilon_{xt}}{1 - b_{12}b_{21}} \end{bmatrix} \quad (6)$$

Or $$\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \begin{bmatrix} \kappa_{10} \\ \kappa_{20} \end{bmatrix} + \begin{bmatrix} \kappa_{11} & \kappa_{12} \\ \kappa_{21} & \kappa_{12} \end{bmatrix}\begin{bmatrix} Y_{t-1} \\ X_{t-1} \end{bmatrix} + \begin{bmatrix} \upsilon_{yt} \\ \upsilon_{xt} \end{bmatrix} \quad (7)$$

The error term in the standard VAR model can be expressed as linear combination of independently distributed shocks to Y_t and X_t.

$$\begin{bmatrix} \upsilon_{yt} \\ \upsilon_{xt} \end{bmatrix} = \frac{1}{1 - b_{12}b_{21}}\begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix}\begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{xt} \end{bmatrix} \quad (8)$$

If we iterate backward the VAR model in (7) and substitute (8) into the model, in that case Y_t and X_t can be expressed in terms of current and past values of the shocks to ε_{yt} and ε_{xt}.

$$\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \sum_{t=0}^{\infty}\begin{bmatrix} \kappa_{10} \\ \kappa_{20} \end{bmatrix}\begin{bmatrix} \kappa_{11} & \kappa_{12} \\ \kappa_{21} & \kappa_{12} \end{bmatrix}^i + \frac{1}{1 - b_{12}b_{21}}\sum_{t=0}^{\infty}\begin{bmatrix} \kappa_{11} & \kappa_{12} \\ \kappa_{21} & \kappa_{12} \end{bmatrix}^i\begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix}\begin{bmatrix} \varepsilon_{yt-1} \\ \varepsilon_{xt-1} \end{bmatrix} \quad (9)$$

The second term on the right hand of (9) can be rewritten as follows:

$$\frac{1}{1 - b_{12}b_{21}}\sum_{t=0}^{\infty}\begin{bmatrix} \kappa_{11} & \kappa_{12} \\ \kappa_{21} & \kappa_{12} \end{bmatrix}^i\begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix}\begin{bmatrix} \varepsilon_{yt-1} \\ \varepsilon_{xt-1} \end{bmatrix} = \sum_{t=0}^{\infty}\begin{bmatrix} \lambda_{11}(i) & \lambda_{12}(i) \\ \lambda_{21}(i) & \lambda_{12}(i) \end{bmatrix}\begin{bmatrix} \varepsilon_{yt-1} \\ \varepsilon_{xt-1} \end{bmatrix} \quad (10)$$

Equation (10) explains that the shocks by ε_{yt-1} and ε_{xt-1} on Y_t are determined by impact multipliers $\lambda_{11}(i)$ and $\lambda_{12}(i)$. Conversely, these shocks affect X_t through $\lambda_{21}(i)$ and $\lambda_{12}(i)$, this approach to trace the impact of shocks by ε_{yt-1} and ε_{xt-1} is commonly known as impulse response function at horizon i.

However, this decomposition of residuals leads to an identification problem, since there are 10 coefficients that need to be recovered in the structural model in equation (4), but there are only nine coefficients which can be estimated from the standard VAR model in

equation (7) including var (v_{yt}), var(v_{xt}) and cov(v_{yt} v_{xt}). Therefore, we need to impose restrictions on b_{12} and b_{21} in matrix Z. to resolve the identification problem; this study uses a Cholesky decomposition approach that is commonly used to orthogonalize the shocks in VAR models. To impose restrictions, economic theory paves the way to assume $b_{12} = 0$ in equation (5) which implies that public sector liabilities have no contemporaneous effects on fiscal deficit growth. According to structural model (4), b_{21} is expected to be positive in case of fiscal dominance and an increase in fiscal deficit leads to growth of public sector liabilities.

Equation (10) can be transformed as

$$v_{xt} = \varepsilon_{xt} + b_{21}\varepsilon_{yt} \quad (11)$$

$$v_{yt} = \varepsilon_{yt} \quad (12)$$

where equation (11) explains that an innovation in public sector liabilities (v_{xt}) is caused by a shock in primary deficit ($b_{21}\varepsilon_{yt}$) and a structural shock in public sector liabilities (ε_{xt}) whereas an innovation in primary deficit (v_{yt}) is caused by only a structural shock in itself (ε_{yt}).

The fiscal dominance test examines the unidirectional causality from fiscal deficit to the growth of monetary base (Gaiotti and Rossi, 2004). Fiscal deficit is defined as the excess of non interest government expenditures over the total revenues. This study employs primary deficit and public sector liabilities to evaluate the type of regime in Pakistan covering the time period 1977-2016. The primary deficit measures the difference between total revenue and non-interest total expenditure. Pakistan's consolidated public sector includes the central government (the federal government, central bank, and social security system for private sector workers), provincial and municipal governments, and public enterprises at all three levels of government. Public sector liabilities include total domestic debt (B) and the monetary base (M). Both the variables are in log form and in real terms (adjusted with inflation). This study does not consider external debt as it has no direct linkages with domestic monetary policy.

Table no. 2 – Description of the variables

Variable	Description
Primary Deficit	Total revenue minus non-interest total government expenditure.
Public Liabilities	Total domestic debt plus monetary base.

6. EMPIRICAL RESULTS

At first step, we check the stationarity of the given data series of real primary deficit and real liabilities through the augmented Dickey-Fuller (ADF) unit roots test (Table no. 3). The test results reveal that both variables are not stationary at levels; therefore, we employ these variables at first difference to avoid the problem of spurious estimation.

Table no. 3 – Augmented Dickey Fuller - unit root test results

Variables	At level	At first difference*	Order of integration
Liabb	-1.33	-7.18	I(1)
PDEF	-1.01	-7.05	I(1)

* Note: ADF test critical values are; -3.481217, -2.883753, -2.578694 at 1%. 5% and 10 % respectively

To test for the fiscal dominance, we estimate a just identified model, which assumes that in case of fiscal dominance, fiscal deficit has positive effect on the accumulation of liabilities (monetary base plus domestic public debt). Henceforth b_{21} is expected to be positive and a fiscal dominant regime is ruled out if b_{21} is either not different from zero or significantly negative.

The estimates of equation (11) are presented for both the entire 1977 - 2016 period and for four sub periods in the Table no. 4. Estimates show that b_{21} is positive and statistically significant for the entire sample period revealing a fiscal dominant regime in Pakistan. Moreover, the estimates of b_{21} for all sub periods are also positive and statistically significant except for 2009 – 2016 period.

Table no. 4 – The structural coefficients of the just identified model when $b_{12} = 0$

Sample period	b_{21}	z statistics	Probability
1977 – 2016	0.9705	4.2364	0.0000
1977 – 1986	1.4939	2.1986	0.0279
1987 – 1997	1.3127	2.6383	0.0083
1998 – 2008	2.4082	3.0630	0.0022
2009 – 2016	0.3841	1.0142	0.3105

After retrieving the structural dynamic system given in equation (4), we compute the impulse response function and variance decomposition for the entire sample period and also for four sub periods. The variance decomposition shows the percentage of error variance at various forecast horizons that is attributed to each of the individual structural shocks. Whereas impulse response function indicates the dynamic responses of the selected variables to one standard deviation shocks to the structural innovations. The variance decomposition of growth in public sector liabilities due to the changes in primary deficit is presented in the Table no. 5.

Table no. 5 – Variance decomposition of real liabilities explained by real primary deficit

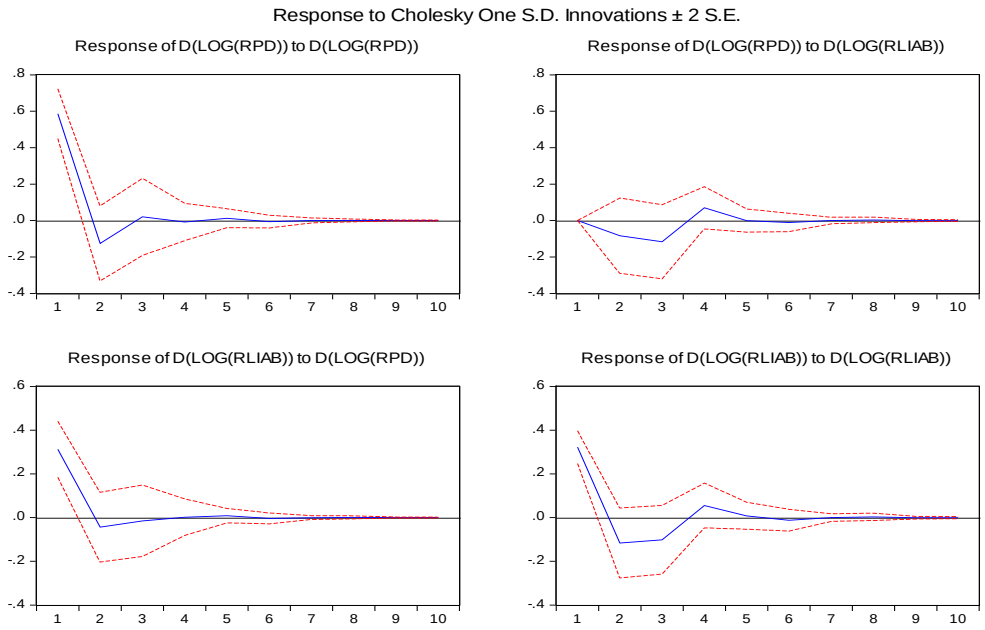
Year	1977 - 2016	1977 - 1986	1987 - 1997	1998 - 2008	2009 - 2016
1	48.510	69.058	63.280	85.294	12.858
2	45.925	16.259	68.954	82.855	18.007
3	43.892	15.783	68.319	79.550	26.315
4	43.312	15.821	65.859	80.423	26.118
5	43.318	16.343	54.481	80.423	26.369
6	43.294	15.576	53.954	80.412	25.800
7	43.294	15.733	48.762	80.395	25.771
8	43.292	15.781	49.571	80.385	25.647
9	43.292	15.791	49.038	80.387	25.610
10	43.292	15.758	48.032	80.387	25.593

Table no. 5 shows that for sample period 1977 -2016, annual forecast error variance of the changes in primary liabilities is significantly affected (around 49%) by the changes in primary deficit at a time horizon of two years. This finding further confirms the fiscal dominance in Pakistan for the sample period. However, for the sample period 1977 – 1986, changes in primary deficit account for only 16% of the variation in primary liabilities at a

time horizon of two years. Table no. 5 also reveals strong fiscal policy for the time period 1987 – 2008.

Figure no. 1 presents the impulse response functions for the entire sample period and four sub periods. An impulse response function describes the effect of one standard deviation shock to one of the endogenous variables on the current and future values of all variables in the system. The solid line shows the point estimate of impulse response functions and dotted lines indicate the upper and lower bounds by adding and subtracting two times standard errors of the point estimator. In a structural VAR model, impulse response functions are orthogonalised using a Cholesky decomposition of the residual covariance matrix and ordering of variables in the model plays a significant role. Accordingly, we impose shocks to primary deficit (RPD) and public sector liabilities (RLIAB). After a structural shock, speed of adjustment is measured through the number of periods before the impulse response functions cross the zero line. This research measures the size of shock as one standard deviation shock of the structural error (equals to 2.5 percent).

Figure no. 1 shows that a one standard deviation shock to the primary deficit leads a contemporaneous increase in primary liabilities by 0.31 per cent for the entire sample 1977 – 2016 and sustains its impact on primary liabilities only for one year and in the second years, this impact systematically approaches to zero. However, in third year it becomes slight positive but approaching to zero again. Also during the time period 1987 – 2008, a positive shock to primary deficit endures its impact on primary liabilities for longer time for approximately three years at most (Figure no. 1).



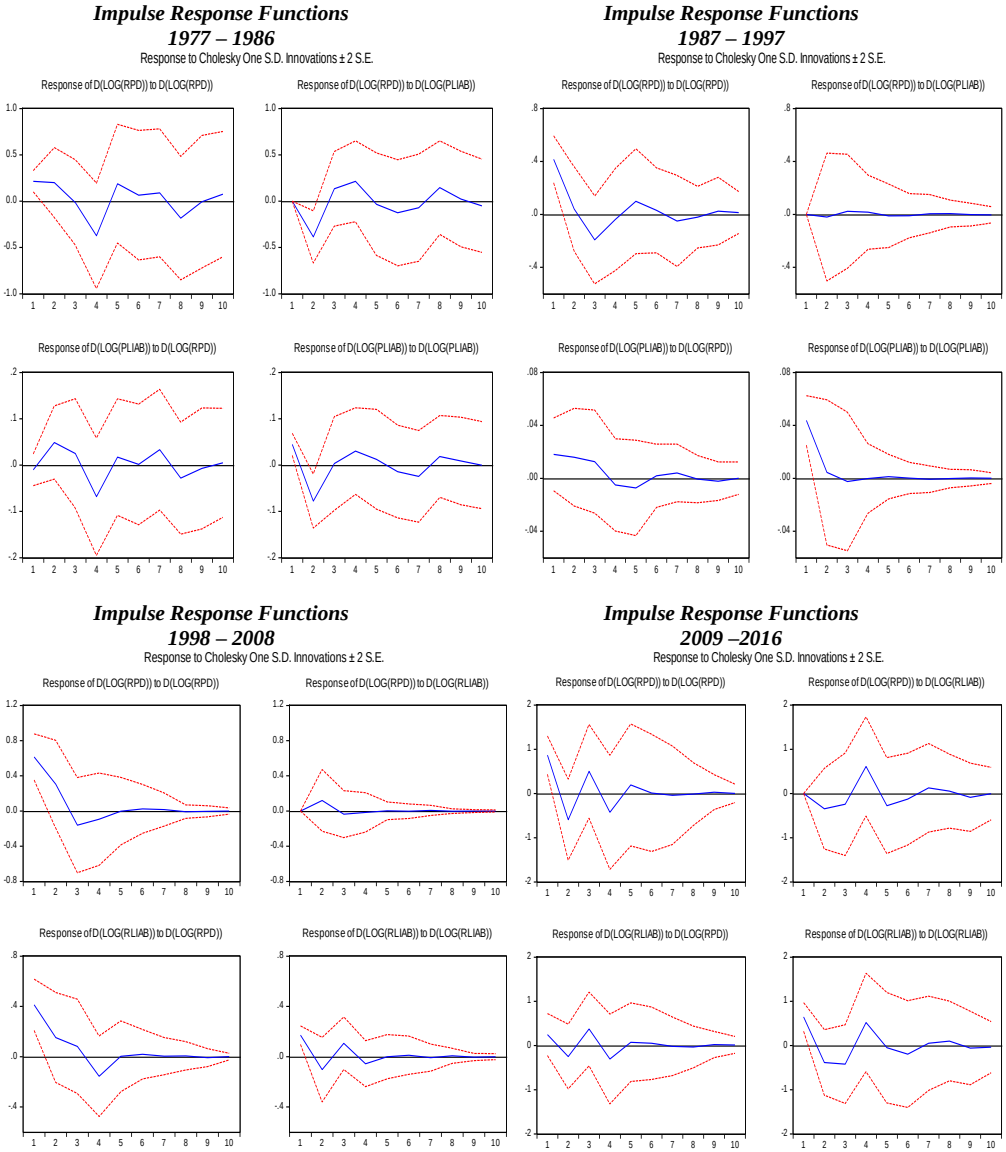


Figure no. 1 – Impulse response functions 1977 – 2016

Henceforth, Figure no. 1 indicates that a shock in primary deficit stimulates a significant response to primary liabilities. This implies the presence of fiscal dominance in Pakistan during the sample period 1977 – 2016. The findings suggest that in case of a military regimes *i.e* 1977 – 1986 and 2009 – 2013, intensity of fiscal dominance is relatively lower than the elected regimes in Pakistan (1987 – 2008). These findings are consistent with Parmer and Shafi Azam (2006). In Pakistan, elected government are categorized with large size of cabinet and excessive administrative expenditures, which in turn increase the budget deficit, and monetary policy tends to accommodate these fiscal pressures (Anwar and Ahmad, 2012).

7. CONCLUSIONS

This paper investigates the fiscal dominance hypothesis for Pakistan covering the time period 1977 – 2016 while using structural vector auto regression (SVAR) approach. This study employs a bivariate SVAR model which includes primary deficit an primary liabilities (both are expressed in real terms). Primary deficit is defined as the excess of non-interest total expenditure over total revenues; whereas primary liabilities' include monetary base and total domestic public debt. Fiscal dominance exists if an increase in primary deficits leads to an accumulation of primary liabilities. The study estimates the SVAR model for the entire sample period of 1970 – 2016 and also for four sub periods; 1977 – 1986, 1987 – 1997, 1998 – 2008 and 2009 – 2016). The estimated coefficients reveal a positive and statistically significant relationship for the sample period 1977 –2016, estimated coefficients are positive for all sub periods but statistically significant from 1987 – 2008. These findings are further confirmed by variance decomposition and impulse response functions generated through the just identified SVAR model. These findings identify a political phenomenon that during the military regimes in Pakistan, country witnessed a lower intensive fiscal dominance as compared to elected regimes which can be attributed to the fact that elected governments tend to have larger size of cabinet and higher administration costs as compared to military governments. These findings are consistent with earlier studies like Parmer and Shafi Azam (2006) and Anwar and Ahmad (2012). This can further be explored by some future research.

From a policy perspective, this research identifies fiscal dominance for the sample period that implies a subordinated monetary policy, compromising on its primary objective of inflation targeting. Henceforth, reduction in fiscal dominance is required to achieve long term price stability in Pakistan. Furthermore, this research provides an insight to reduce size of cabinet and other public administration costs to attain economic efficiency for an elected government in Pakistan.

References

Anwar, M., and Ahmad, M., 2012. Political Determinants of Budget Deficit in Pakistan: An Empirical Investigation. *Pakistan Journal of Social Sciences, 33*(1), 1-9.

Barro, R. J., 1987. Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom 1701-1918. *Journal of Monetary Economics, 20*(2), 221-247. doi: http://dx.doi.org/10.1016/0304-3932(87)90015-8

Canzoneri, M., and Diba, B., 1998. Fiscal constraints on central bank Independence and price Stability. In J. Malo de Molina, J. Vinals and F. Gutierrez (Eds.), *Monetary Policy and Inflation in Spain*: MacMillan.

Canzoneri, M. B., Cumby, R. E., and Diba, B. T., 2001. Is the price level determined by the needs of fiscal solvency? *The American Economic Review, 91*(5), 1221-1238. doi: http://dx.doi.org/10.1257/aer.91.5.1221

Cashin, P. N. H., and Olekalns, N., 2003. Tax smoothening Tax tilting and Fiscal sustainability in Pakistan. *Economic Modelling, ooo*, 20.

Cochrane, J., 1999. A frictionless view of US inflation. In B. Bernanke and J. Rotemberg (Eds.), *NBER, volume (13)*.

Cochrane, J., 2001. Long-term debt and optimal policy in the Fiscal Theory of the Price Level. *Econometrica, 69*(1), 69-116. doi: http://dx.doi.org/10.1111/1468-0262.00179

Creel, and Sterdyniak, 2001. "La theorie budgetaire du niveau des prix, un bilan critique," Revue d'economie politique. *Dalloz, 111*(6), 909-939.

Debrun, X., and Wyplosz, C., 1999. Onze gouvernments et une Banque centrale. *Revue d'Economie Politique, 3*, 387-420.

Favero, C. A., 2002. *How do European monetary and fiscal authorities behave?* Working papers. IGIER (Innocenzo Gasparini Institute for Economis Research), Bocconi University. IGIER (Innocenzo Gasparini Institute for Economis Research), Bocconi University. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.195.2818&rep=rep1&type=pdf

Favero, C. A., and Monacelli, T., 2005. Fiscal Policy Rules and Regime (In)Stability: Evidence from the U.S. *Working Paper 282*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.548.4966&rep=rep1&type=pdf.

Fratianni, M., and Spinelli, F., 2001. Fiscal dominance and money growth in Italy: The long record. *Explorations in Economic History, 38*(2), 252-272. doi: http://dx.doi.org/10.1006/exeh.2000.0753

Gaiotti, E., and Rossi, S., 2004. Theoretical and Institutional Evolution in Economic Policy: The Case of Monetary Regime Change in the Early 1980s. *Storia del Pensiero Economico, 2*, 20-27.

Hussain, M., 1982. The Relative Effectiveness of Monetary and Fiscal Policy: An Econometric Case Study of Pakistan. *Pakistan Economic and Social Review, 20*, 159-181.

Ito, A., Watanabe, T., and Yabu, T., 2011. Fiscal Policy Switching in Japan, the US, and the UK. *Journal of the Japanese and International Economies, 25*(4), 380-413. doi: http://dx.doi.org/10.1016/j.jjie.2011.09.001

Joines, D. H., 1985. Deficits and money growth in the United States 1872-1983. *Journal of Monetary Economics, 16*(3), 329-351. doi: http://dx.doi.org/10.1016/0304-3932(85)90040-6

King, R., and Plosser, C., 1985. Money, deficits, and inflation. *Carnegie-Rochester Conference Series on Public Policy, 22*(1), 147-195.

Leeper, E. M., 1991. Equilibria under 'Active' and 'Passive' Monetary and Fiscal Policies. *Journal of Monetary Economics, 27*(1), 129-147. doi: http://dx.doi.org/10.1016/0304-3932(91)90007-B

Masood, and Ahmed, 1980. The Relative Importance of Autonomous Expenditures and Money Supply in Explaining the Variation in Induced Expenditures in the Context of Pakistan. *Pakistan Economic and Social Review, 18*, 84-99.

Melitz, J., 2002. Some Cross-Country Evidence about Debt, Deficits and the Behaviour of Monetary and Fiscal Authorities *CEPR Discussion Papers, 1653*. http://www.cepr.org/active/publications/discussion_papers/dp.php?dpno=1653.

Parmer, V., and Shafi Azam, S. M., 2006. A Comparative Analysis of Economic Performance in Two Eras: Democratic Era (FY 89 – FY99) & Military Rule (FY00 – FY05) *Journal of Independent Studies and Research, 4*(2), 18-25.

Pehlivan, and Balli, 2016. Testing the Existence of Ricardian or Non- Ricardian Regimes for CIS Countries, Expert. *Journal of Economics, 4*(1), 9-13.

Rao Aiyagari, S., and Gertler, M., 1985. The backing of government bonds and monetarism. *Journal of Monetary Economics, 16*(1), 19-44. doi: http://dx.doi.org/10.1016/0304-3932(85)90004-2

Resende, C., 2007. Cross-country estimates of the degree of fiscal dominance and central bank independence. *Working Papers of Bank of Canada, 07*(36).

Rocha, F., and Silva, E., 2004. Teoria fiscal do nivel e precos: Um teste para a economia brasileira no periodo 1966-2000. *Pesquisa e Planejamento Economico, 34*, 419-435.

Sala, L., 2003. *Testing the fiscal theory of the price level", mimeo*: IGIER.

Saqib, and Yasmin, 1987. Some Econometric evidence in the Relative importance of the Monetary and Fiscal Policy. *Pakistan Development Review, 26*(4), ooo.

Sargent, T. J., and Wallace, N., 1981. Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*(Fall), 1-17.

Shaheen, R., 2013. *An empirical evaluation of monetary and fiscal policy in Pakistan.* (Doctoral thesis), Loughborough University.

Sims, C., 1995. Econometric implications of the government budget constraint. https://pdfs.semanticscholar.org/3f35/eaa9bffe5ef4d51b636a5b7e0b5f01041c68.pdf.

Sims, C., 1997. *Fiscal foundations of price stability in open economies, mimeo*: Department of Economics, Princeton University.

Sims, C., 1998. *The Precarious Fiscal Foundations of EMU, mimeo*: Department of Economics, Princeton University.

Tanner, E. C., and Ramos, A. M., 2002. Fiscal Sustainability and Monetary Versus Fiscal Dominance : Evidence From Brazil, 1991-2000. *IMF Working Papers, 02*(05), 859-873.

Woodford, M., 2001. Fiscal requirements for price stability. *Journal of Money Credit and Banking, 33*(3), 669-728.

Xiong, W., 2012. Measuring the monetary policy stance of People Bank of China: An ordered Probit analysis. *China Economic Review, 23*(3), 512-533. doi: http://dx.doi.org/10.1016/j.chieco.2011.04.002

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