

# **The Coordination of Fiscal and Monetary Policies in Pakistan**

## **(An Empirical Analysis 1975-2011)**

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### **Abstract**

The role of macroeconomic policies is very important for the achievement of a stable path in the economy. There are two major groups of policies, fiscal side policies which mainly focus to regulate aggregate demand in the economy and monetary side policies which are mainly responsible to stabilize prices in the economy. But the objectives and measures taken for the achievement of the goals of the two sides are often conflict with each other, so there is a need for coordination among two policies to achieve the set objective. The study focuses on the behavior of fiscal and monetary policies integration in Pakistan by using the time series data from 1975 to 2011. It finds that there is a weak coordination between monetary and fiscal authorities. We can infer that fiscal policy continuous to substantially influence the monetary policy even SBP is enjoying sufficient amount of independence.

## **1.Introduction**

Fiscal policy concerned with the government's choice regarding the optimal use of taxation and government spending to control and adjust the aggregate demand in the economy. Monetary policy refers to the central bank's control regarding the availability of credit in the economy to achieve the objective of price stability and this control can be exerted through money supply and interest rate channel. The ultimate objective of the both policies is to maximize the overall welfare of the society which can be achieved by keeping the inflation rate low and employment at its potential level.

There are number of channels in which fiscal policy can impinge on monetary policy. An expansionary fiscal policy leads to an expansionary monetary policy, which may in turn fuel inflation and appreciate the domestic currency and that cause deterioration in the balance of payments. On the other hand if government finances the deficit through the markets (in a non-monetary way) then the fear of crowding out of the private sector arise in the economy. On external side when a country is depending on foreign funding of domestic debt, this results in deterioration in the exchange rate and balance of payment. Another more direct channel of fiscal policy is the impact of indirect taxes on price level. Besides this, perceptions and expectations of the general public about the large and ongoing budget deficits and resultant borrowings requirements may prompt a lack of confidence in the economic prospects. At the same time when people realize that government is borrowing for its own good, they will conclude that this can lead to higher taxation levels in future and consequently they consume less and save more, that is so called Ricardian equivalence.

Even when the central bank is enjoying independence, and hence is not submitted to the fiscal needs of the government, the need to balance out the impact of expansionary fiscal policy on aggregate demand and inflation in the economy could prompt the central bank to tighten monetary policy, by raising interest rates or reducing credit in the financial system. The resulting increase in the interest rates could dampen economic activity; attract short-term and easily reversible capital inflows thus adding to inflation and appreciation pressures on the currency, and at the end of the day damaging macroeconomic and financial stability.

Severe budgetary problems sometimes may even lead the economy into crises. The lengths to which the monetary authority will go to control inflation depend on how monetary and fiscal policies are coordinated and conducted, and thus, the concepts of fiscal dominance and monetary dominance take on added importance. The economy is under fiscal dominance when the fiscal authority independently determines the current and future budget, defining the share of revenues from bonds and seigniorage. Whereas under the monetary dominance, government fine-tunes primary deficit to limit the debt accumulation and central bank does not monetize debt, (Sargent & Wallace 1981). Fiscal deficit causes inflation because governments that face long episodes of fiscal deficits find money creation as solution to finance the deficits leading to inflation as a monetary phenomenon (Mishkin 2007). So it can be inferred that fiscal policy and monetary policy both are complex policy instrument with contradicting objectives and there is a strong need for policy integration and coordination for welfare maximization.

In Pakistan there was hardly any concept of coordination between these two important policies before the financial sector reforms which were initiated in 1989-90. Before that SBP was not

independent and monetary policy was compliant to fiscal policy practically. This financial reforms and restructuring process compelled the monetary and fiscal policy coordination and a monetary and fiscal coordination board has been established in 1994. Its main objectives include the coordination among key policies i.e fiscal policy, monetary policy and exchange rate policy and also to safeguard the possible consistency among macroeconomic targets of growth, inflation, fiscal, monetary and external accounts see Hanif & Arby (2007). In Pakistan there are few studies which highlighted this issue of fiscal and monetary policy coordination including Agha & Khan (2006), Arby & Hanif (2007), Arby & Hanif (2010), Nasir et al (2010). The present study will attempt to explore the issue of coordination between two important macroeconomic policies in the recent time period and predominantly the focus is on investigating the monetary and fiscal policy responses to shocks in output and inflation.

The study is organized as follows: section 2 presents the literature review of the selected studies briefly. Section 3 discussed the model and methodology and section 4 presents the data sources and variables construction. Section 5 presents the detailed results and section 6 concludes the study.

## **2. Literature Review:**

Sargent and Wallace (1981) are among the first to spotlight the potential difficulties of conducting monetary policy in an environment where fiscal policy dominates the coordination game played between two (monetary and fiscal) authorities. When the central bank is independent from the fiscal authority, it decides how much seigniorage revenue can be raised by setting its policy prior to the fiscal policy. The first mover central bank should enforce discipline on the fiscal authority, forcing it to select a sequence of primary surpluses (and debt) that is consistent with the sequence of money supplied by the monetary authority in terms of satisfying

the government's consolidated intertemporal budget constraint. Sargent and Wallace's analysis suggests that fiscal variables do not matter for price determination and, consequently, central banks committed to price stability can certainly deliver price stability regardless of fiscal policy. On the other hand, in a fiscal dominance regime, the fiscal authority moves first and defines the path of the primary surplus. Any adjustments made by the authority to avoid explosive debt paths must come in the form of seigniorage revenues. Given the predetermined path for the primary surplus, tight monetary policy can potentially result in higher, instead of lower inflation. Standard monetary policy responses to inflationary shocks will have perverse effects: monetary tightening today prompts higher interest rates, increases interest payments on the government's debt, and requires expansionary monetary policy in the future to generate additional seigniorage revenue. So what will happen, rational agents anticipate increase in money creation in future and bid the price level up today. This is Sargent and Wallace's *unpleasant monetarist arithmetic*.

The notion that different combinations of potentially interdependent policy rules, implemented by fiscal and monetary authorities, may end up with distinctive equilibrium paths for nominal variables and affect the ability of monetary policy to control inflation is presented by Aiyagari and Gertler (1985) and also Leeper (1991). Both studies showed the fact that the presence of passive central banks following monetary policies that are subservient to the fiscal authority's behavior leads to higher average inflation. The degree of interdependence between monetary and fiscal policy may also have its roots in institutional arrangements. To the extent that highly independent central banks may be less likely to care about the government's fiscal needs in order to set its policy, central bank independence indices (Cuckierman 1992; Cuckierman, Webb, and

Neyapti 1992; Alesina and Summers 1993; and Sturn and de Haan 2001) may be correlated with the degree of fiscal dominance and thus provide important insights regarding inflation outcomes.

The empirical relevance of the issue of the coordination between two policies has been examined in several papers. For instance in case of G-7 countries, the form of interdependence between fiscal and monetary policies interdependence was asymmetric across countries. Monetary policy was found to act in response of fiscal expansion in the US and the UK but no evidence of the same kind is found for France, Italy, and Germany (see Muscatelli et. al 2002) rather fiscal policy is prompted by monetary policy and also observed some regime changes in the interaction between them in France and Germany Semmler and Zhang(2003). In case of emerging economies of Brazil and Argentina Zoli (2005) found the evidence of fiscal dominance. For Pakistan Agha and Khan (2006) indicated that inflation is a fiscal phenomenon and highlighted the fact that fiscal policy considerably influences the conduct of monetary policy. Arby and Hanif (2010) & Nasir et. Al (2010) found conflicting results that the integration between the two policies is weak and they have been executed independently.

### **3. Model and Methodology:**

To test the issue empirically for Pakistan the methodology developed by Nordhaus (1994) is adopted for the period 1975 to 2011. The approach used the unrestricted VAR model which consists of four variables, two macroeconomic variables which is represented by output or unemployment and inflation and other two are policy variables which described the monetary and fiscal policy stance. The theoretical framework of the VAR model is derived from the objectives of monetary and fiscal policies. Objectives of the both policies are functions of inflation, unemployment and potential output gap, but weights assigned to them are different by

the both policies. Monetary and fiscal authorities have different preferences; over the time period monetary policy is more concerned about low level of inflation and has no preference for fiscal deficit. Fiscal authority is more concerned about the low level of employment even at the cost of high inflation while neither of the two policies has a specific preferred level of interest rate. In this study it is assumed that monetary policy instrument is represented by interest rate  $r$  whereas fiscal instrument is indicated by  $S$ , fiscal surplus ratio.

Using the above mentioned assumptions, to employ Nordhaus (1994) methodology, the starting point of the analysis is the utilities functions of the two authorities, given below:

$$U^M = Z^M (u, p, g) \text{ ----- } 1$$

$$U^F = Z^F (u, p, g, S) \text{ ----- } 2$$

Where  $U$  is the utility function of the authority whereas unemployment rate, inflation and potential output is indicated by  $u$ ,  $p$  and  $g$  respectively. According to Nordhaus (1994) unemployment rate the measuring the utilization of resources in the economy and represented by output gap which is also function of the two macroeconomic policies ( $r$  and  $S$ ).

$$U = u (r, S) \text{ ----- } 3$$

Inflation is assumed to be a function of output gap and expected rate of inflation is as:

$$P = P (u) + P^e \text{ ----- } 4$$

Expected inflation is depending on a backward looking component and actual inflation rate in the economy is given by the following expression:

$$P^e = \omega P + (1-\omega)P^B \text{ ----- } 5$$

By combining the expression 4 and 5

$$P = P(u)/(1-\omega) + P^B \quad 0 \leq \omega < 1$$

When  $\omega = 1$  then inflation does not depend on backward looking price behavior and unemployment rate is always at natural rate of unemployment that is  $P = P(U^N)$ .

The potential growth indicated by  $g$  depend on investment ratio, which is equal to the sum of private and government saving ratio. But for simplification we assume that private saving is unaffected by monetary and fiscal policies.  $g=g(S)$  is a function of government saving rate by doing the mathematical manipulation and combining the terms from 1 to 5

$$U^M = U^M \{ u = u(r, S\dots), P(u)/(1-\omega) + P^B, g(S) \}$$

$$U^F = U^F \{ u = u(r, S\dots), P(u)/(1-\omega) + P^B, g(S), S \}$$

Now we see that monetary and fiscal policies depend on unemployment, inflation and fiscal surplus.

As far as empirical analysis of the interaction between two is concerned we will use the VAR model in the study consisting of the four mentioned variables. Our simple VAR model will have the following structure:

$$\begin{aligned} u_t &= \sum\{a_{11\eta}u_{t-\eta} + a_{12\eta}P_{t-\eta} + a_{13\eta}S_{t-\eta} + a_{14\eta}r_{t-\eta}\} + \varepsilon_{1t} \\ P_t &= \sum\{a_{21\eta}u_{t-\eta} + a_{22\eta}P_{t-\eta} + a_{23\eta}S_{t-\eta} + a_{24\eta}r_{t-\eta}\} + \varepsilon_{2t} \\ S_t &= \sum\{a_{31\eta}u_{t-\eta} + a_{32\eta}P_{t-\eta} + a_{33\eta}S_{t-\eta} + a_{34\eta}r_{t-\eta}\} + \varepsilon_{3t} \\ r_t &= \sum\{a_{41\eta}u_{t-\eta} + a_{42\eta}P_{t-\eta} + a_{43\eta}S_{t-\eta} + a_{44\eta}r_{t-\eta}\} + \varepsilon_{4t} \end{aligned}$$



We analyse the responses of the different variables by using the Impulse Response Function from the VAR model

#### **4. Data and Variables**

The data sources for the study are International Financial Statistics and World Development Indicators. The study used time series data from 1975 to 2011. We have used interest rate as monetary policy variable and fiscal surplus ratio as fiscal policy variable. Surplus is defined by dividing the Surplus by GDP where Gross Domestic Product, GDP is the sum of gross value added by the resident producers in the economy. Consumer price index is used to measure inflation with the base year 2005 and whereas for interest rate we have taken central bank discount rate in the analysis. Finally unemployment is defined as the ratio of the employed persons actively seeking employment to total labor force.

## 5. Estimation and Results:

### Vector Autoregression Estimates

Sample (adjusted): 1981 2011

Included observations: 31 after adjustments

Standard errors in ( ) & t-statistics in [ ]

	P	r	S	u
P(-1)	0.688874 (0.16391) [ 4.20265]	11.59749 (10.6623) [ 1.08771]	7.168141 (6.12075) [ 1.17112]	-4.925907 (4.67524) [-1.05362]
r(-1)	0.001294 (0.00191) [0.67704]	0.788249 (0.12434) [ 6.33923]	-0.066333 (0.07138) [-0.92928]	0.094298 (0.05452) [ 1.72950]
S(-1)	-0.005087 (0.00421) [-1.20722]	-0.345499 (0.27409) [-1.26055]	0.383085 (0.15734) [ 2.43475]	0.116997 (0.12018) [ 0.97350]
u(-1)	-0.004782 (0.00406) [-1.17740]	-0.371554 (0.26418) [-1.40644]	0.508498 (0.15165) [ 3.35301]	0.777971 (0.11584) [ 6.71598]
C	0.096293 (0.04310) [ 2.23411]	5.623453 (2.80365) [ 2.00576]	-6.219299 (1.60946) [-3.86422]	1.277754 (1.22936) [ 1.03937]
R-squared	0.569623	0.706820	0.649566	0.794855
Adj. R-squared	0.388026	0.661715	0.595653	0.763294
Sum sq. resids	0.020665	87.43864	28.81470	16.81174
S.E. equation	0.028192	1.833855	1.052738	0.804118
F-statistic	9.755425	15.67066	12.04841	25.18486
Log likelihood	69.36899	-60.05982	-42.85402	-34.50249
Akaike AIC	-4.152838	4.197408	3.087356	2.548548
Schwarz SC	-3.921550	4.428696	3.318644	2.779836

The results of VAR test shows, that there is evidence of weak coordination between fiscal and monetary policy. Previous period's surplus negatively affects discount rate but it is insignificant, as surplus increases the demand for loanable funds decreases by the government that pushes down the discount rate. Previous period's discount rate negatively affects the

surplus, as discount rate increases due to the crowding out investment, employment and output also declines, there is a need to increase in the government expenditures, so that surplus should decline.

### Pairwise Granger Causality Tests

Sample: 1980 2011

Lags: 1

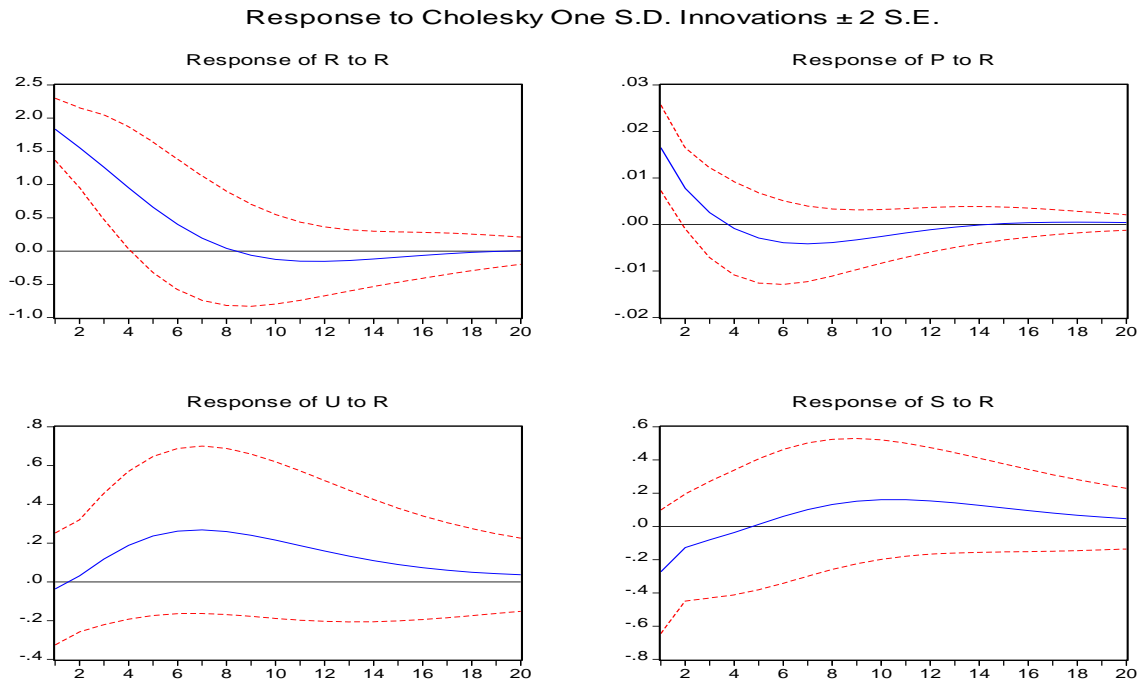
Null Hypothesis:	Obs	F-Statistic	Probability
r does not Granger Cause P	31	1.23793	0.27533
P does not Granger Cause r		1.84141	0.18563
S does not Granger Cause P	31	0.61360	0.44001
P does not Granger Cause S		0.19177	0.66481
u does not Granger Cause P	31	0.35857	0.55412
P does not Granger Cause u		0.10383	0.74967
S does not Granger Cause r	31	0.13273	0.71835
r does not Granger Cause S		0.00503	0.94396
u does not Granger Cause r	31	1.03643	0.31737
r does not Granger Cause u		1.43146	0.24156
u does not Granger Cause S	31	10.1108	<b>0.00358</b>
S does not Granger Cause u		0.26032	0.61390

Results of Granger Causality Test showed that there is no evidence of causality between fiscal and monetary policy rather there is unidirectional causality running from unemployment to fiscal surplus, as unemployment increases it shows that government has decreased the expenditures, especially development expenditures, and increased the revenue through tax receipts, by using the contractionary fiscal policy.

## Impulse Response Functions:

The responses of different variables through impulse response functions are obtained from a shock of one standard deviation.

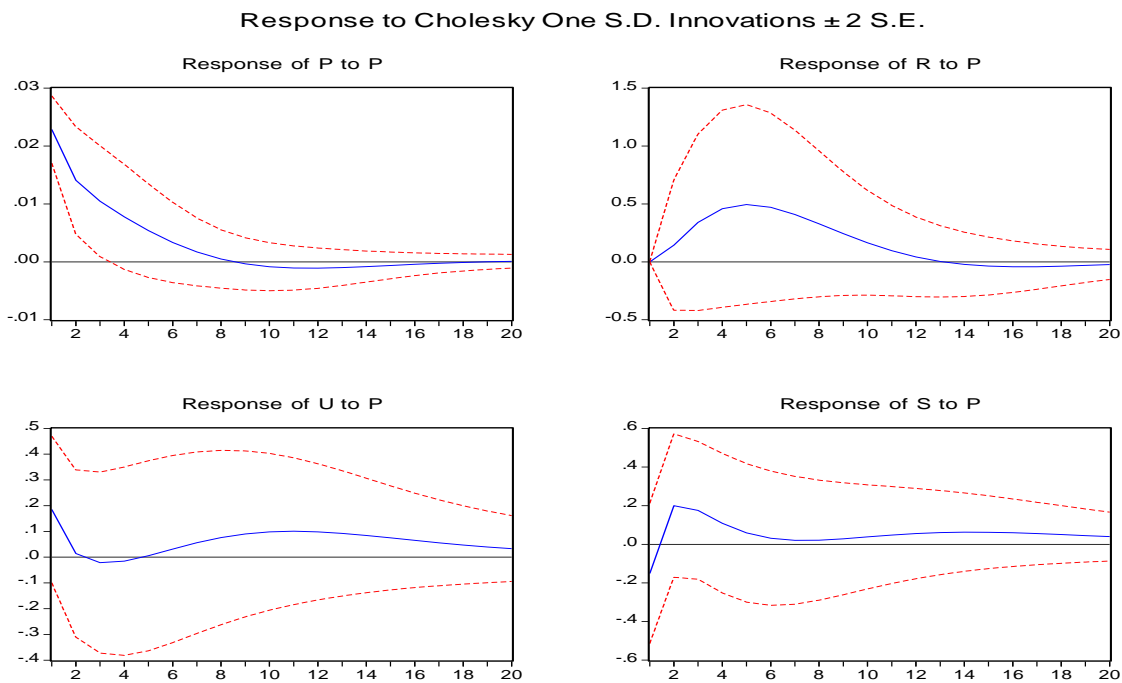
### Response to Interest Rate Shock



Interest rate takes sixteen years to completely absorb its own shock. It shows the contractionary monetary policy. When interest rate increases capital inflow brings down the interest rate. Also the demand for loanable funds decrease which puts downward pressure on interest rate. Initially interest rate shock affects prices negatively because it reduces aggregate demand and output so prices go down but after some time we see slight increase in prices because due to higher interest rate cost of capital increases so in order to keep their profits unaffected producers will increase the prices. Prices will converge towards their long run equilibrium after twelve years. In response to interest rate shock unemployment increases due to

crowding out hypothesis. Unemployment starts to converge towards long run equilibrium after sixteen years. Fiscal policy reacts pro-cyclically in response to interest rate shock. As a result, GDP increases and surplus ratio falls. Over long run GDP falls due to crowding out so surplus ratio increases. Fiscal surplus absorb the shock of interest rate after eighteen years.

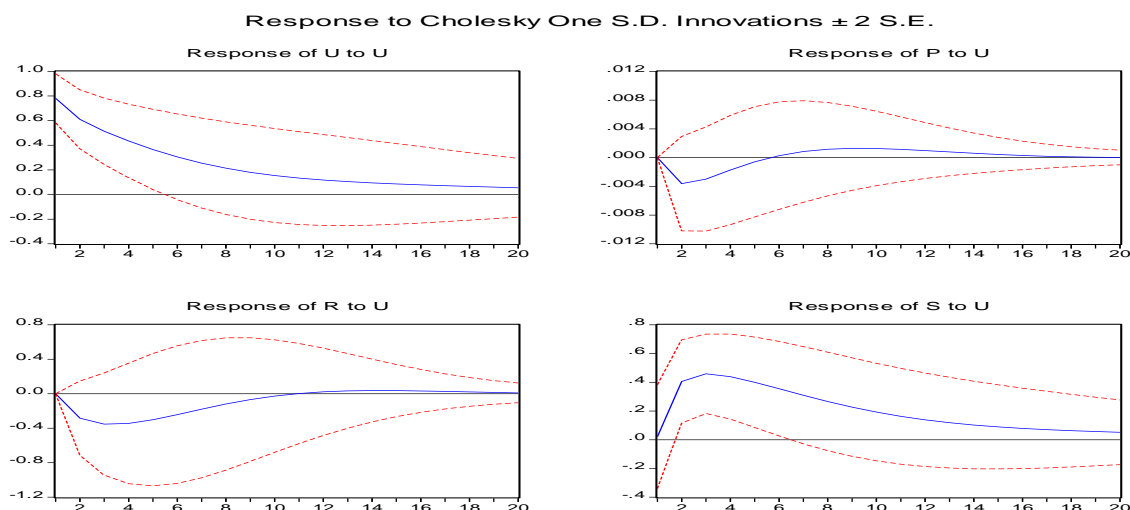
### Response to Price Shock



Price absorb its own shock in sixteen years. When prices increase aggregate demand reduces which further decrease the price level. Producers respond by less supply in the next period so in the next period prices increase due to excess demand. In response to price shock monetary policy reacts strongly in a counter-cyclical manner by raising the policy rate. It takes twelve years for interest rate to settle back to its original level. Unemployment shows fluctuating behavior in response to price shock. Firstly unemployment decreases because real interest rate decreases that

induces investment. Latter in long run price shock reduces the purchasing power of money and hence output and employment. It takes more than eighteen years for unemployment to absorb price shock. It takes more than eighteen years for fiscal surplus ratio to completely absorb the price shock. Fiscal policy reacts in a pro-cyclical manner in response to price shock. Firstly, fiscal surplus ratio rises as inflation starts to affect output adversely, surplus tends to rise however, after some time, inflationary pressures induce GDP to grow causing ratio to fall.

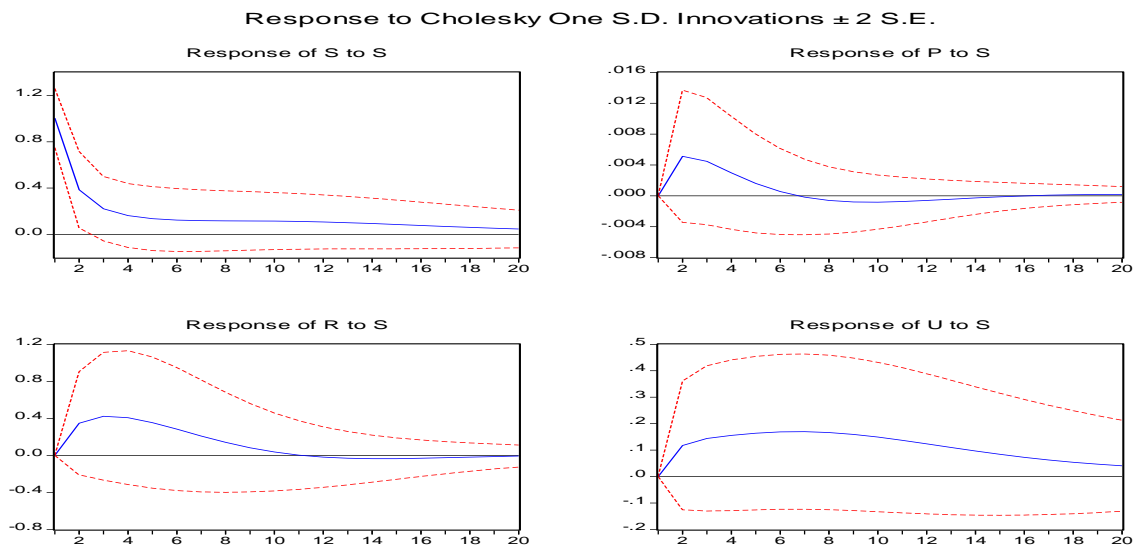
### Response to Unemployment Shock



A shock to unemployment takes more than eighteen years to converge back to its long run path. A shock in unemployment decreases aggregate demand that in turn further increases unemployment. Government, through active fiscal policy respond to unemployment shock which results in increase in output and employment, and thus, convergence is achieved in the long run. Prices initially show adverse effect of unemployment shock because due to the unemployment shock aggregate demand reduces which brings the prices down. It takes seventeen years to

completely absorb the unemployment shock. Like prices interest rate shows the same behavior in response to unemployment shock. Initially interest rate declines because due to unemployment savings, investment, output and aggregate demand is low. Less demand for loanable funds brings interest rate down which eventually rises due to expansionary policy of the government. Convergence is achieved after ten years. The fiscal surplus ratio converges back to its long run path after eighteen years. Downward trend in fiscal surplus ratio can be explained with the reason that to tackle high unemployment, the government responds through expansionary fiscal policy which reduces the surplus.

### Response to fiscal Surplus Ratio Shock



A positive shock to fiscal surplus ratio may be due to a contractionary fiscal policy. The effect of the shock remains for more than eighteen years. The shock in surplus ratio is the result of contractionary fiscal policy; it decreases the prices in the economy. Prices converge to their long run equilibrium path after fourteen years. Like prices the surplus shock also reduces the interest

rate because the demand for loanable funds by the government decreases due to the contractionary fiscal policy, pushing down its price. Long run equilibrium is achieved after ten years. Due to the fiscal surplus shock unemployment increases initially then it moves to the long run equilibrium path. The increase in surplus may be the result of less resource utilization for investment purposes, which result in rising unemployment in the economy. Unemployment absorbs the surplus shock completely in more than eighteen years.

## **6. Conclusion**

The objective of the paper is to test the empirical evidence of fiscal monetary coordination using annual data for Pakistan from 1980-2011. We have developed a VAR model. The results of the VAR model showed the evidence of weak coordination between the two institutions as both the fiscal and monetary policy variables affect each other but are insignificant. Further the results of the Granger Causality test provide no evidence of causality running from fiscal to monetary variables or from monetary to fiscal variables. Results of the Impulse Response Function showed that there is weak response of monetary shock to fiscal variables and also of fiscal shock to monetary variables. Interest rate adjusts to its original level almost after one decade and interest rate shock continues to affect fiscal surplus for about twenty years. The variables converge to their long run equilibrium after a very long time. Hence it may be concluded that there is weak or very little coordination among the policy makers. Arby and Hanif (2010) & Nasir et. Al (2010) also found similar results that the integration between the two policies is weak and they have been executed independently.

Fiscal and monetary policy are the two tools that run the economy, there should be coordination between two policies. Both need to be formulated in a coordinated way. For this purpose, more



coordinated approach among the policy makers is needed in order to stabilize the economy and insulate it from external shocks to different variables.

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