

The Coordination of Fiscal and Monetary Policies in Pakistan: An Empirical Analysis 1980–2011

ZUBARIA ANDLIB, AZRA KHAN, and IHTSHAM UL HAQ

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 maximise 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 on going budget deficits and resultant borrowings requirements may prompt a lack of confidence in the economic prospects. At the same time when people realise 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

Zubaria Andlib <zandlib@yahoo.com> is Lecturer, School of Economics Sciences, Federal Urdu University of Arts, Science and Technology, Islamabad. Azra Khan <azraphd@gmail.com> is Lecturer and PhD Scholar, School of Economics Sciences, Federal Urdu University of Arts, Science and Technology, Islamabad. Ihtsham Ul Haq <ihtsham91@yahoo.com> is Assistant Professor, School of Economics Sciences, Federal Urdu University of Arts, Science and Technology, Islamabad.

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 monetise debt, see Sargent and 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 maximisation.

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 and Arby (2007). In Pakistan there are few studies which highlighted this issue of fiscal and monetary policy coordination including Agha and Khan (2006), Arby and Hanif (2007), Arby and 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 organised 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

The pioneer study done by Sargent and Wallace (1981) 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 behaviour 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 may be correlated with the degree of fiscal dominance and thus provide important insights regarding inflation outcomes, see Cuckierman (1992) Cuckierman, Webb, and Neyapti (1992), Alesina and Summers (1993) and Sturn and de Haan (2001).

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 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, 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) and 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 1980 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:

$$U^M = U^M(u, p, g) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$$U^F = U^F(u, p, g, S) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

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 utilisation of resources in the economy and represented by output gap which is also function of the two macroeconomic policies (r and S).

$$U = u(r, S) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

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

$$P = P(u) + P^e \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

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

$$P^e = \omega P + (1 - \omega)P^B \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

By combining the expressions 4 and 5

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

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

The potential growth indicated by g depends 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 1980 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. Finally unemployment is defined as the ratio of unemployed persons actively seeking employment to total labour force.

5. ESTIMATION AND RESULTS

5.1. Vector Autoregression Estimates

	P	r	S	u
P(-1)	0.713328 (0.17618) [4.04883]	30.12570 (9.07138) [3.32096]	8.155491 (6.58443) [1.23860]	-4.307838 (5.20860) [-0.82706]
r(-1)	0.001944 (0.00257) [0.75670]	0.571096 (0.13231) [4.31649]	-0.092790 (0.09603) [-0.96623]	0.079719 (0.07597) [1.04938]
S(-1)	-0.005384 (0.00409) [-1.31757]	0.363579 (0.21039) [1.72808]	0.400155 (0.15271) [2.62028]	0.078729 (0.12080) [0.65171]
u(-1)	-0.005374 (0.00394) [-1.36347]	-0.240532 (0.20293) [-1.18527]	0.477978 (0.14730) [3.24495]	0.822681 (0.11652) [7.06038]
C	0.100945 (0.04385) [2.30198]	4.816930 (2.25786) [2.13340]	-6.005507 (1.63886) [-3.66444]	1.160977 (1.29642) [0.89553]
R-squared	0.471902	0.733143	0.650477	0.780549

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

5.2. Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Probability
r does not Granger Cause P	31	0.84128	0.36687
P does not Granger Cause r		11.2839	0.00227
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	1.00170	0.32547
r does not Granger Cause S		0.16262	0.68982
u does not Granger Cause r	31	0.16239	0.69003
r does not Granger Cause u		0.37802	0.54363
u does not Granger Cause S	31	10.1108	0.00358
S does not Granger Cause u		0.26032	0.61390

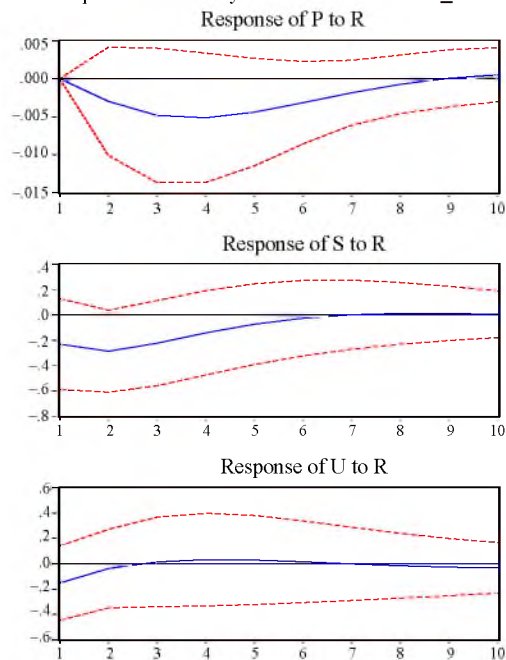
Results of Granger Causality Test showed that there is no evidence of causality between fiscal and monetary policy rather there is unidirectional causality running from unemployment to fiscal surplus, as unemployment increases it shows that government has decreased the expenditures, especially development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

5.3. Impulse Response Functions

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

5.3.1. Response to Interest Rate Shock

Response to Cholesky One S. D. Innovations ± 2 S. E.

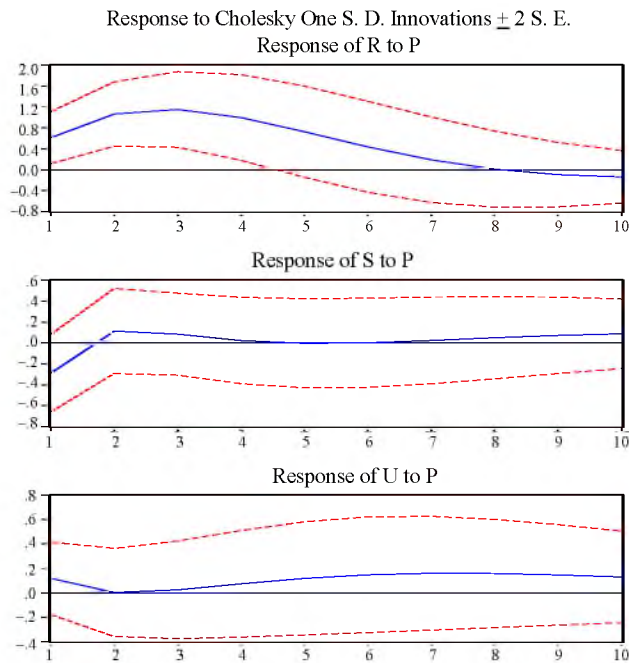


Initially interest rate shock affects prices negatively because it reduces aggregate demand and output so prices go down but after some time we see slight increase in prices, due to higher interest rate cost of capital increases so in order to keep their profits unaffected producers will increase the prices. Prices will converge towards their long run equilibrium after eight 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 six years.

In response to interest rate shock unemployment increases due to crowding out hypothesis. Unemployment starts to converge towards long run equilibrium after six years.

5.3.2. Response to Price Shock

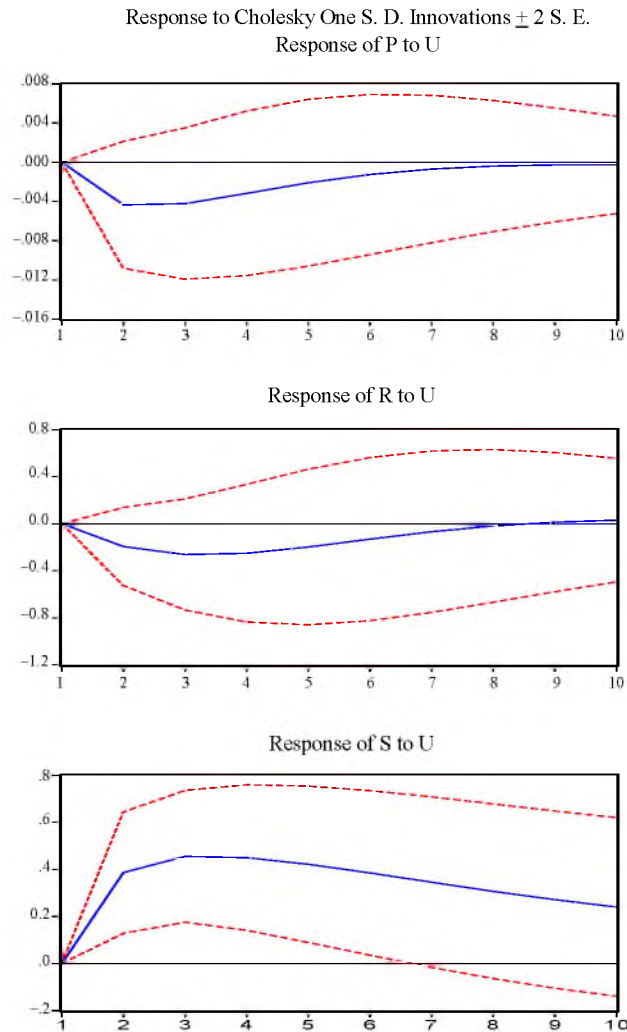


In response to price shock monetary policy reacts strongly in a counter-cyclical manner by raising the policy rate. It takes eight years for interest rate to settle back to its original level.

It takes four 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.

Unemployment shows fluctuating behaviour 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 eight years for unemployment to absorb price shock.

5.3.3. Response to Unemployment Shock



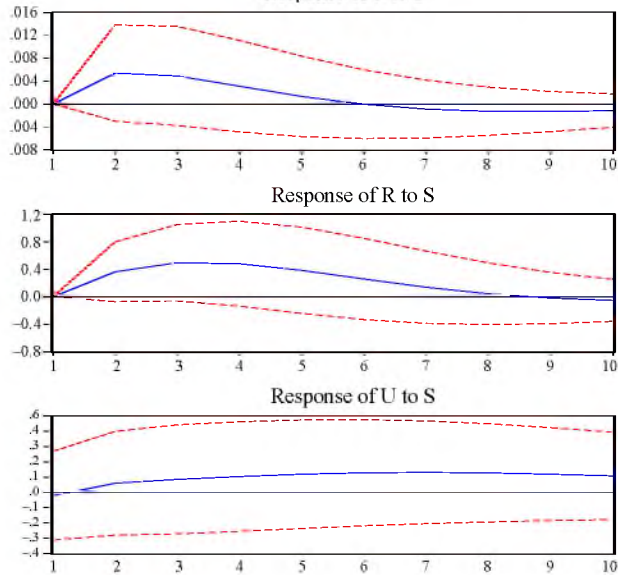
Prices initially show adverse effect of unemployment shock because; due to the unemployment shock aggregate demand reduces which brings the prices down. It takes seven years to completely absorb the unemployment shock.

Like prices interest rate shows the same behaviour 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 seven years.

The fiscal surplus ratio converges back to its long run path after ten 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.

5.3.4. Response to Fiscal Surplus Ratio Shock

Response to Cholesky One S. D. Innovations ± 2 S. E.
Response of P to S



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 five 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 seven 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 utilisation for investment purposes, which result in rising unemployment in the economy. Unemployment absorbs the surplus shock completely in more than ten 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. 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) and 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 stabilise the economy and insulate it from external shocks to different variables.

REFERENCES

- Agha, A. I. and M. S. Khan (2006) An Empirical Analysis of Fiscal Imbalances and Inflation in Pakistan. *SBP Research Bulletin* 2:2.
- Aiyagari, S. R. and M. Gertler (1985) The Backing of Government Bonds and Monetarism. *Journal of Monetary Economics* 16, 19–44.
- Alesina, A. and L. H. Summers (1993) Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence. *Journal of Money, Credit and Banking* 25, 151–62.
- Cuckierman, A., S. B. Webb, and B. Neyapti (1992) Measuring the Independence of Central Banks and Its Effects on Policy Outcomes. *The World Bank Economic Review* 6:3, 353–398.
- Cukierman, A. (1992) *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*. Cambridge: The MIT Press.
- Farooq, A. and M. N. Hanif (2007) Monetary and Fiscal Coordination. *SBP Research Bulletin*.
- Farooq, A. and M. N. Hanif (2010) Monetary and Fiscal Coordination: Pakistan's Experience. *SBP Research Bulletin* 6.
- Hansen, G. D. (1985) Indivisible Labour and the Business Cycle. *Journal of Monetary Economics* 16:3, 309–327.
- Leeper, E. M. (1991) Equilibria Under 'Active' and 'Passive' Monetary and Fiscal Policies. *Journal of Monetary Economics* 12, 129–48.
- Mishkan, F. (2007) *Economics of Money Banking and Financial Markets*. Eight Edition, Pearson Publishers.
- Muscattelli, V., A. Patrizio Tirelli, and C. Trecroci (2002) Monetary and Fiscal Policy Interactions Over the Cycle: Some Empirical Evidence. (Manuscript).
- Nasir, M., A. Ahmad, A. Ali, and Faiz-Ur-Rehman (2010) Fiscal and Monetary Policy Coordination: Evidence from Pakistan. *International Research Journal of Finance and Economics* 35, 202–213.
- Nordhaus, W. D. (1994) Policy Games: Coordination and Independence in Monetary and Fiscal Policies. *Brookings Papers on Economic Activity* 2, 139–216.
- Sargent, T. J. and N. Wallace (1981) Some Unpleasant Monetarist Arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review* 5, 1–17.
- Semmler W. and W. Zhang (2003) Monetary and Fiscal Policy Interactions: Some Empirical Evidence in the Euro-Area. (Manuscript).
- Sturn, J. E. and J. Haan (2001) Inflation in Developing Countries: Does Central Bank Independence Matter? New Evidence Based on a New Data Set. (CCSO Working Paper No. 200101: 1-14).
- Zoli, E. (2005) How Does Fiscal Policy Affect Monetary Policy in Emerging Market Countries? Bank for International Settlements. (BIS Working Papers 174).