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Nexus between Fiscal Deficits, Money Supply and Price Level in India: A VAR Approach

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Abstract

This paper examines the dynamic relationship between fiscal deficits, money supply, and price level in India during the period 1960-61 to 1999-2000. Using vector autoregression (VAR) econometric methodology, which allows variables to be treated as potentially endogenous, the study finds that fiscal deficits and money supply are both influenced by each other. Further, it reveals that the price level does not influence either the fiscal deficit or money supply but rather is being influenced by both the variables.

Introduction

Achieving overall macroeconomic stability calls for harmonization of monetary and fiscal policies. Otherwise, the inconsistent behaviour of some of the macroeconomic variables would have a negative impact not only on other variables but also on the overall economy. Indeed, it shows that during the last few decades many developing countries have experienced the growth in money supply and rapid increase in the price level. The monetarists argue that the problem is mainly due to widening government deficits, which result in increasing money supply, which in turn causes inflation. In fact, the high government deficits financed by sales of bonds exert upward pressure on the interest rates. Since the monetary authorities usually conduct monetary policies by controlling interest rates rather than money supply, they have to increase money supply to stabilize the interest rate. As a result, higher government deficits cause increase in money supply and ultimately produce a higher

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rate of inflation in the economy. According to Friedman, the leading monetarist, monetary authorities can control the inflation rate, especially in the long run, by controlling the money supply. Deficits can lead to inflation, but only to the extent that they are monetized. However, Miller (1983) argued that government deficits are generally inflationary in nature, irrespective of whether the deficits are monetized or not. He stated that deficit finance used to produce inflation even if not monetized. It is possible through private monetization and/or crowding out. Indeed, non-monetized deficits lead to higher interest rates. Higher interest rates would crowd-out private investment and reduce the growth rate of real output with a given money supply, resulting in a higher price level.

Most of the discussion in the literature on relationships between deficits and price level focuses on the role of deficits causing inflation in the economy. However, the relationships between these two macroeconomic variables may be other way around in some developing countries that experienced high fiscal deficits due to higher inflation. The argument runs like this: on the one hand, government expenditure adjusts at the faster rate to inflation due to the government's desire to maintain real expenditure at the planned level, and on the other hand, revenue collections lag behind. Thus, inflation results in a larger fiscal deficit, which is financed by the banking system, particularly the central bank, leading to a further increase in the money supply and the price level (Olivera 1967).

The nexus between money supply and price level is widely debated in the literature. The classical school clearly recognized the relationship between the two and showed that increase in money supply causes the upward movements of price level. Hence, it strongly advocated, controlling money supply as the only reasonable way to reduce the inflationary spiral in the economy. Friedman, the frontrunner of monetarism argued that inflation is always and everywhere a monetary phenomenon. The neo-classical school also supported the proposition of the monetarists. However, the business school argued that monetary policy does not play any constructive role in price stability; rather it generates instability merely because of random changes in the production technology. It is important to note that this school also argued in favour of reverse causation i.e. from price level to money supply. The possibility of reverse causation is quite feasible if the economy experienced inflation due to cost-push. Thus, the theoretical literature suggests that there is a nexus between fiscal deficits, money supply and price level. This paper attempts to verify this relationship in the Indian case.

It is necessary to review the trends of these three macroeconomic variables in India before establishing the empirical relationship among these variables. In India, the persistent high level of fiscal deficits along

with higher money supply, is the prime source of economic instability. This is evident from the higher percentage increase of fiscal deficits in the '70s and '80s in comparison with that in the '60s (Figure 1). However, this trend could not be maintained in the '90s, rather fell by nearly 7 per cent in comparison with the '80s (Table 1). In the case of money supply, it shows a higher growth rate over the four decades registering an average of 13 per cent during these periods. The inflation rate shows an upward trend during the second half of the '60s and the two oil crises in 1973-74 and 1979-80. The average inflation rate during the four decades shows that it was higher in the '70s than in the '60s. In fact, it declined during the '80s to 7.8 per cent from 9.0 per cent during the '80s. The analysis of the trend of these three macroeconomic variables shows that the higher fiscal deficits along with money supply have kept the price level high in India during the last three decades. In recent years, despite sustained efforts by the central government and monetary authorities to contain the fiscal deficits at a sustainable level, it still remains at higher level along with money supply and price level. In this context, this paper attempts to estimate the mutual relationship between these three principal macroeconomic variables within the framework of Vector Autoregressive (VAR) model.

Empirical Reviews

Some attempts have been made in the literature to test the proposition of different schools of thought on the mutual relationship between fiscal deficit, money supply and price level/inflation. The present study attempts to review some of the empirical works on this issue in the context of both developed and developing countries, including India.

The theoretical argument suggests that government deficits can be inflationary while at the same time they are being influenced by changes in the price level. Studies by Levy (1981), Hamburger et al. (1981,1982), Dewald (1982), Dwyer (1982), and Allen et al. (1983) found evidence of government deficits that generated more money supply and inflation. However, other studies like Barro (1978) and Niskanen (1978) found no evidence of government deficits systematically related to money growth and inflation.

Using the data over the period between 1954 and 1970, Barro (1978) tested the interrelationship among deficits, money supply growth and inflation for the US economy. The results showed that it is government expenditure rather than deficits that influenced monetary growth [Hamburger et al. (1981)]. Using similar time series data in the context of the US, Niskanen (1978) tested the propositions that high Federal deficits have contributed (i) to the rapid increase in Federal

spending and (ii) to the higher rate of inflation. The results of the study show that government deficits have significantly increased the level of Federal spending but do not have any significant effects on the inflation rate operating either through growth rate of money or independent of it. Re-examining the findings of Niskanen's study, Hamburger *et al.* (1981) concluded that growth of money supply is strongly influenced by government expenditures rather than deficits.

A study by McMillin *et al.* (1980) examined the impact of fiscal policy on money supply and the role of Federal Reserve to fiscal deficits in the US context over the period 1953:03 to 1976:04. The study applies Three-Stage Least Square method to estimate the money supply equation in a reduced form for two cases. In the first case, federal reserve behaviour used as an exogenous factor and the same used as an endogenous factor in the second case in the model. The results of the study show that fiscal deficits have strong influence in the second case in comparison to first one. It implies that the Federal Reserve reaction function is responsible for the considerable larger multiplier.

In another study, Mcmillin *et al.* (1982) re-examined the findings of Hamburger and Zwick (1981) by testing the relationship between Federal deficits and growth rate of money supply in the context of the US. The study tested the relationship for two-sample periods i.e. from 1961-1974 and 1961-1978. Applying the Hildreth-Lu technique, it found that in neither period money supply significantly influenced by budget deficits.

Hoffman *et al.* (1983) tested the proposition that government deficits are inflationary in the context of the US. In order to derive such a conclusion, the study tested the relationship between budget deficits and money supply. Applying the OLS method, it found that except for a few years, there seems to be a strong positive relationship between budget deficits and money supply. Further, the study argued that an increase in budget deficits generates higher inflation in the economy due to the accommodation of fiscal policy followed by the Federal Reserve during the given period.

Employing the trivariate autoregressive framework, Ahking and Miller (1985) examined the mutual relationship between deficits, money growth and inflation for the US economy. The study examined the interrelationship during the three periods i.e., 1960s, 1970s, and 1980s, and found no consistent results. It reported that the bi-directional causality between the deficits and growth of money supply is only visible during 1950s but not during 1960s and 1970s. However, the study found evidence of unidirectional causality from deficits to money supply only during 1960s. With respect to deficits and inflation, it found that there is evidence of bi-directional causality between the two during 1950s and 1970s but not during 1960s.

Giannares and Kolluri (1985) examined the monetarists' proposition that higher budget deficits lead to more money supply and inflation in the context of ten industrialized countries such as US, Canada, Japan, UK, West Germany, France, Italy, Netherlands, Belgium and Switzerland. Testing the two-equation econometric model consisting of money supply growth and inflation with the help of OLS method, the study found that government budget deficit is neither a determinant of money supply growth nor of inflation (directly or indirectly). In fact, it found evidence of direct and indirect effects of budget deficits on inflation only in the case of the US.

The study by Catao *et al.* (2001) attempts to estimate the strength and statistical significance of the long run relationship between fiscal deficit and inflation in a broad cross-country panel of 23 emerging market countries during 1970-2000. From the empirical results, it found that 1 per cent reduction in the ratio of fiscal deficit to GDP, typically lowers long run inflation by 1.5 to 6 per cent depending on the size of the inflation tax base. As far as the impact of other variables on inflation is concerned, it found that world inflation and oil price changes proved to be significant as independent determinants.

In the Indian context, Sarma (1982) examined the interrelationship among inflation, money supply and government deficits. Estimating the structural equations of price level, government expenditure, revenue and money supply, the study reported that government expenditure adjusts at a faster rate than government revenue to inflation leading to higher budget deficits and, as a consequence, increasing money supply and price level.

A study by Madhur *et al.* (1982) examined the impact of budget deficit on certain key macroeconomic variables such as money credit and inflation using a model of fiscal and monetary sectors. Using the OLS method, the study estimated both fiscal and monetary sectors' equations. The study finds evidence that fiscal deficits lead to increase in money and price level and attributes it to a deviation of actual tax collection from those estimated.

Rangarajan and Arif (1990) verified the relationship among money supply, output, and prices by formulating an econometric model in the Indian context. The empirical results show that the price effect of an increase in money supply is stronger than the output effect. Further, they found that since government revenue collections do not keep pace with government expenditures, as nominal income rises, it widens the resource gap and hence influences the price level. The results of policy simulations show that while a substantial increase in government capital expenditure increases output, its impact on output and prices depends upon the extent of the resource gap met by borrowing from the Reserve

Bank. The increase in borrowing from the RBI worsens the trade-off between output and price level.

Jadhav and Singh (1990) examined the short-term dynamics of budget deficit, money supply, inflation and economic growth in the Indian context. The study first assessed the validity of the hypothesis that inflation induced more budget deficits, which raises money supply. The results showed that increase in the price level produces more budget deficits, which ultimately increases money supply.

Using the OLS method, Khundrakupam (1996) attempted to measure the impact of inflation on the ratio of fiscal deficit to GDP. The empirical findings revealed that both the output and the price level have a significant influence on government receipts and expenditure. Further, the results show that the real output tends to reduce the absolute amount of fiscal gap as the inflationary rate widens it. This could be due to the differences between the elasticity of receipts and expenditures with respect to price.

Most of the existing studies in India have examined the interrelationship between money supply and price level with budget deficits. Hardly any studies in the Indian context have examined the relationship between the money supply and price level along with fiscal deficits. In fact, the budget deficit in India does not fully reflect the indebtedness of the government as it excludes the total borrowings of the government. Indeed, the fiscal deficits portray the real situation of the government deficits. It includes the monetized deficit, which is a major part of total borrowing, and had a significant influence on the price level via increase in the money supply in the '70s and '80s. In fact, the Government of India also initiated fiscal reform measures in 1991, which helpful to drastically reduce the monetized deficit. However, fiscal deficits still remain high which could have major implications in determining the money supply and price level. In this context, it is pertinent to study the relationship between the money supply and the price level along with fiscal deficits in India. Further, examining the dynamic relationship between these three macroeconomic variables within the framework of a vector autoregressive model is an addition to the existing literature. Thus, the main objective of this paper is to examine the relationship between fiscal deficits, money supply and price level and its policy implications.

Methodology and Data Source

In order to examine the dynamic interrelationships among fiscal deficits, money supply and the price level, the present study employs Vector Autoregressive (VAR) methodology. The VAR model contains

simultaneous equations in which all the variables are considered to be endogenous. However, each endogenous variable is explained by its lagged or past values and the lagged values of the other endogenous variables included in the system. The VAR model estimated in the present study is as follows:

$$FD_t = b_{20,0} + b_{11,s} \sum_{s=1}^{6} FD_{1-s} + b_{12,s} \sum_{s=1}^{6} MS_{1-s} + b_{12,s} \sum_{s=1}^{6} WPI_{1-s} + \varepsilon_{1t}$$

$$MS_t = b_{20,0} + b_{21,s} \sum_{s=1}^{6} FD_{1-s} + b_{22,s} \sum_{s=1}^{6} MS_{1-s} + b_{23,s} \sum_{s=1}^{6} WPI_{1-s} + \varepsilon_{2t}$$

$$WPI_t = b_{30,0} + b_{31,s} \sum_{s=1}^{6} FD_{1-s} + b32,s \sum_{s=1}^{6} MS_{1-s} + b_{33,s} \sum_{s=1}^{6} WPI_{1-s} + \varepsilon_{3t}$$

where, FD_t, MS_t, WPI_t are fiscal deficits, money supply and price level in time period 't' respectively. ε_{1t}, ε_{2t}, and ε_{3t} are white-noise disturbances.

The VAR model, which is based on the atheoretical framework, involves certain steps for estimation. The first step is to choose a proper ordering of the variables in the model. The study chooses to order the variables as fiscal deficit, money supply, and price level. Indeed, before selecting this order, alternative orderings are also tested and no substantial change in the result is found. The second step is to verify the stationarity of the variables. The VAR model assumes that all the variables should be stationary. In this context, the present study uses three unit root tests such as Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) to verify whether the variables possess unit root or not. The third step is to fix the lag-length of variables in the system. The study fixes lag-length at one, which is derived through Akaike Information Criteria (AIC) and the Schwarz Bayesian Criteria (SBC). It is imperative to note that the coefficients obtained from the VAR regression cannot be interpreted directly. Hence, the present study uses Innovation Accounting Techniques, which contains both impulse response functions and variance decomposition. The impulse response functions trace out the dynamic responses of the endogenous variables to one standard deviation innovation in each of the variables in the system. On the other hand, variance decomposition shows the extent to which a variable is explained by the innovations or shocks in all the variables in the system. It could be explained by the forecast error variance decomposition, which is the proportion of the movements in the sequence due to its 'own' shocks versus shocks to the other variable.

The present study uses annual data from the period 1960-61 to 1999-2000. The variables considered in the above model are gross fiscal deficit (FD), money supply (M_1) and wholesale price index (WPI, 1981-82 =100). It is important to note that due to unavailability of broad money during the 60's, the study chooses M_1 for the analysis. All the data are collected from the *Handbook of Statistics*, RBI, (1999-2000) and various issues of *Report on Currency and Finance*, RBI.

Empirical Results

The estimation of the VAR model is suitable if all the variables included in the system are stationary. The result of unit root tests is given in the Table 2. It shows that all the variables are non-stationary at their log level. However, they are stationary at their first difference and are integrated of order one that is I (1). Confirming the variables are stationary at their first difference, the VAR model is estimated with the first difference of all variables. The analysis included computation of 12-step ahead impulse responses and variance decomposition for the VAR analysis.

The results of the impulse response function are presented in Table 3. As far as impulse responses to shocks in FD is concerned, it shows that in 1-step ahead horizon, a one- standard-deviation shock in FD (equal to 0.016 units) induces a contemporaneous increase in MS and WPI by 0.053 units and 0.026 units respectively. In 2-step ahead horizon, a one-standard-deviation increase in FD (equal to 0.037 units) increases MS at lower value by 0.035 units and increases WPI by 0.029 units. However, in 3-step ahead, a one-standard-deviation shock in FD (equal to 0.029) leads to lower units increase in MS and WPI by 0.032 and 0.023 respectively. It is important to note that from period 3 to 12, the results show a similar kind of behaviour as in period 3. In 12-step ahead horizon, .007 units change in FD leads to .008 and .006 units change in MS and WPI respectively. The response of MS and WPI to shocks in FD is also visible from Figure 2. The figure shows that WPI responses to shocks in FD up to 2-step ahead horizon, thereafter FD does not have a contemporaneous influence on WPI or MS, whereas, the responses decay towards zero. Indeed, the results show that MS responses more than WPI to shocks in FD.

The result of variance decompositions is reported in Table 4. The results of fiscal deficits (FD) variance decomposition show that fiscal deficit is largely explained by its own shocks and then by money supply and very less by price level. The analysis of 1-step ahead horizon indicates that fiscal deficits are fully explained by its own. Whereas, in the 3-step ahead horizon, the percentage of fiscal deficits to total variance declines due to the total variance is marginally more explained by the

money supply (5.77 per cent) and the price level (1.14 per cent). Similar results are also evident up to the 6-step ahead horizon. However, in the 7-step ahead horizon, the percentage of fiscal deficit to total variance increased even though there is a marginal increase in the percentage of money supply and price level. Interestingly, after 7-step ahead horizon, there is a continuous decline in the percentage of fiscal deficit to total variance due to a marginal increase in both money supply and price level. Nevertheless, after 12-step ahead horizon, more than 88 per cent of the variance is explained by its own shock. The above results show that only money supply has a marginal role in explaining the fiscal deficits. It implies that there is evidence to show that fiscal deficits are influenced to some extent by money supply but not by the price level.

The analysis of impulse responses to shocks in MS show that a one-standard-deviation shock in MS (equal to 0.036 units) produces 0.040 units change in FD and 0.033 units in WPI in the 1-step ahead horizon (Table 3). It is important to note that from period 2 to 12, there is continuous decline in units change of FD and WPI with a one-standard-deviation shock in MS. In 3-step ahead horizon, a one-standard-deviation shock in MS (equal to 0.029 units) induces a contemporaneous change in FD and WPI by 0.027 units and 0.021 units respectively. Similarly, in 12-step ahead horizon, 0.067 units change in MS leads to 0.006 units change in FD and 0.005 units change in WPI. The response of FD and WPI to shocks in MS is illustrated in Figure 3. It is evident from the figure that the response of FD and WPI to shocks in MS decays continuously from 1-step ahead horizon. In fact, it shows that the response of FD to shocks in MS is more than to the response of WPI.

The analysis of forecast error variance decomposition of MS shows that it is largely explained by its own shocks as well as fiscal deficits. In 1-step ahead horizon, MS explains by its own innovations (72.69 per cent) and FD by 27.31 per cent. The results also show that even after 12-step ahead horizon, the forecast error variance is more explained by MS (49.38 per cent) and FD (46.72 per cent). It is important to note that there is a negligible impact of the price level on money supply. From the above results we may conclude that money supply is not influenced by price level. This runs counter to the view of the business school. On the other hand, money supply responds to changes in fiscal deficits. This supports the hypothesis of the monetarists. The analysis suggests that a shock in money supply leads to a change in the fiscal deficits but maintains a marginal change in price level in India.

As far as an impulse response to shock in WPI is concerned, it shows that a 1-step ahead horizon, a one-standard-deviation shock in WPI (equal to 0.010 units) results in a 0.020 unit change in FD and a 0.014 unit change in MS (Table 3). It could be evident that from period

2 to 12, there is a continuous decline in units change of FD and MS with a one-standard-deviation shock in MS. In period 5, a one-standard-deviation increase in WPI (equal to 0.006 units) result FD changes by 0.007 unit and MS by a 0.008 unit. Similarly, in 12-step ahead horizon, a one-standard-deviation shock in WPI produces a 0.002 unit change in FD and a 0.003 unit change in MS. The response of FD and MS to shocks in WPI is shown in Figure 4. It shows that the response of FD and MS to shocks in WPI decays continuously after 1-step ahead horizon.

The results of forecast error variance decomposition in WPI show that in 1-step ahead horizon, it is largely explained by its own shocks as well as by money supply. However, after 3-step ahead horizon, the total variance is more explained by money supply and then fiscal deficits but less by price level itself (Table 4). In 1-step ahead horizon, WPI explains by its own innovations (84.15 per cent) and FD and MS by 0.17 per cent and 15.68 per cent respectively. In contrast, in 5-step ahead horizon, FD explains 33.60 per cent and MS explains 37.61 per cent, whereas WPI explains only 28.79 per cent of total variance. Similar results are found in 12-step ahead horizon. The results support the monetarist proposition that higher fiscal deficits produce more money supply and hence higher inflation.

Summary and Conclusion

This paper has attempted to establish the long-run dynamic relationship between fiscal deficits, money supply, and price level in the Indian context during the period 1960-61 to 1999-2000. Using the Vector Autoregressive (VAR) technique, the present study finds that both fiscal deficits and money supply influence the price level, which supports the proposition of monetarists. The study also finds that fiscal deficit and money supply are both influenced by each other. However, the study fails to support the proposition that increase in price level/inflation induces more fiscal deficits, which contrasts the findings of earlier studies (Sarma, 1982, Jadhav, et al., 1990). This is because the earlier studies have evaluated the relationship between inflation and fiscal deficits by indirectly viz., by measuring the elasticities of government revenue and expenditure. Further, the findings of the study suggest that increase in the price level has no influence on money supply, which contrasts with the view of the business school. The above results suggest that fiscal deficit is one of the main factors, which generates higher inflation in India through monetized deficits. However, during the last few years, there has been a continuous decline in the inflation rate in India despite the high level of fiscal deficits and money supply. This may be on account of supply-side factors like output expansion. In recent years, especially in 1991, RBI has undertaken stringent economic measures to reduce the monetized deficit. The withdrawal of ad-hoc issue of Treasury Bills in

1997 is one such measure. It would be better to continue such policy measures to control monetized deficits and, hence, maintain price stability. However, reduction of such low interest-bearing borrowing would force the government to resort to more market borrowing, which generates higher interest burden. Hence, it is wise on the part of the government may go for moderate monetized deficits, and at the same time focus on productive activities to increase output in order to maintain price stability.

Table 1: Average Growth Rate of Gross Fiscal Deficits, Money Supply (M1), and Price Level

Periods	Fiscal Deficit	Money Supply	Price Level
1960's	12.0	9.3	6.4
1970's	17.1	12.4	9.0
1980's	19.1	15.1	7.8
1990's	13.5	15.6	8.1

Table 2: Unit Root Tests

Variables	Levels			First Difference		
	DF	ADF	PP	DF	ADF	PP
LFD	-0.042	0.138(1)	-0.039(1)	-7.514	-5.701	-7.548 (1)
LMS	1.962	2.316(1)	2.354(1)	-7.063	-4.389	-7.073(1)
LWPI	0.033	-0.579(1)	-0.021(1)	-4.367	-5.375	-4.426(1)

Note: All variables are in logs.
FD = Fiscal Deficits,
MS = Money Supply,
WPI = Wholesale Price Index.

Table 3: Impulse Responses

		Responses to		
Due to shock in	Steps	DLFD	DLMS	DLWPI
DLFD	1	0.016	0.053	0.026
	2	0.037	0.035	0.029
	3	0.029	0.032	0.023
	5	0.021	0.023	0.017
	9	0.011	0.012	0.009
	12	0.007	0.008	0.006
DLMS	1	0.040	0.036	0.033
	2	0.031	0.034	0.025
	3	0.027	0.029	0.021
	5	0.019	0.021	0.016
	9	0.010	0.011	0.008
	12	0.006	0.067	0.005
DLWPI	1	0.020	0.014	0.010
	2	0.011	0.013	0.009
	3	0.010	0.011	0.008
	5	0.007	0.008	0.006
	9	0.004	0.004	0.003
	12	0.002	0.003	0.002

Note: All variables are expressed in log first difference. FD = Fiscal Deficits, MS = Money Supply, WPI = Wholesale Price Index.

Table 4: Variance Decomposition

		By innovations in		
Variables Explained	Steps	DLFD (%)	DLMS (%)	DLWPI (%)
DLFD	1	100.00	0.00	0.00
	3	93.09	5.77	1.14
	5	90.56	8.30	1.14
	7	89.34	9.07	1.59
	10	88.54	9.77	1.69
	12	88.32	9.97	1.71
DLMS	1	27.31	72.69	0.00
	3	44.16	53.04	2.80
	5	45.72	50.82	3.46
	7	46.30	50.00	3.70
	10	46.63	49.51	3.86
	12	46.72	49.38	3.90
DLWPI	1	0.17	15.68	84.15
	3	27.69	35.99	36.32
	5	33.60	37.61	28.79
	7	35.71	38.16	26.13
	10	36.92	38.46	24.62
	12	37.23	38.55	24.22

Note: All variables are expressed in log first difference. FD = Fiscal Deficits, MS = Money Supply, WPI = Wholesale Price Index.

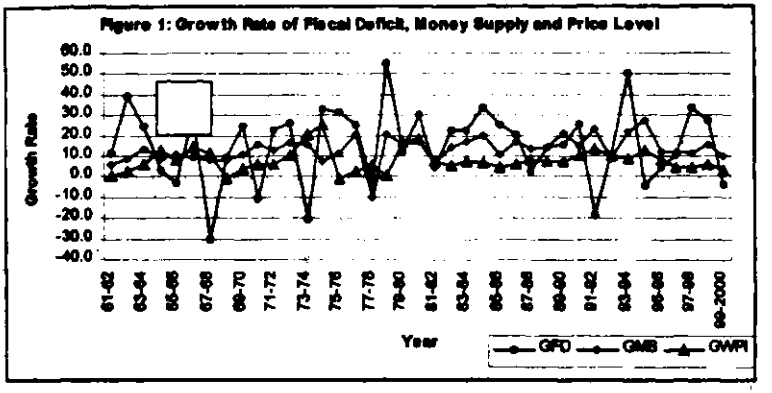
Figure 1: Growth Rate of Fiscal Deficit, Money Supply and Price Level
Growth Rate
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
61-62
63-64
65-66
67-68
69-70
71-72
73-74
75-76
77-78
79-80
81-82
83-84
85-86
87-88
89-90
91-92
93-94
95-96
97-98
99-2000
Year
GFD
GMS
GWPI

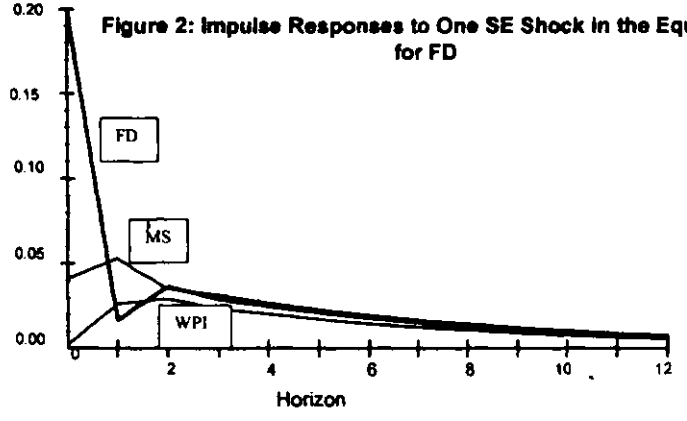
Figure 2: Impulse Responses to One SE Shock in the Equation for FD
0.20
0.15
0.10
0.05
0.00
FD
MS
WPI
0
2
4
6
8
10
12
Horizon

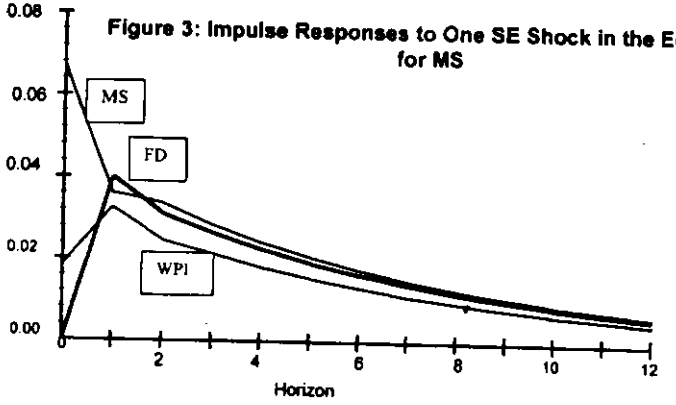

Figure 3: Impulse Responses to One SE Shock in the Equation for MS

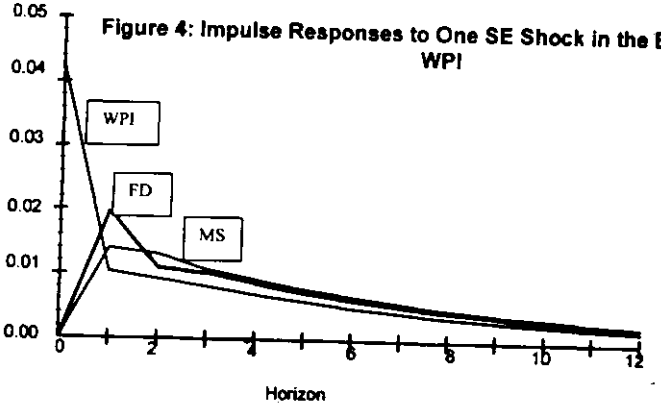

Figure 4: Impulse Responses to One SE Shock in the Equation for WPI

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