BUDGET DEFICITS AND OTHER MACROECONOMIC VARIABLES IN INDIA

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Abstract

This paper tries to study the interaction of budget deficit of India with other macroeconomic variables such as Nominal effective exchange rate, GDP, Consumer Price Index and money supply (M3) giving special emphasis on the budget deficit-exchange rate relationship using Cointegration approach and Variance Error Correction Models (VECM) for the period 1970-2002. The results reveal that the variables under study are cointegrated and there is a bi-directional causality between budget deficit and nominal effective exchange rates. However, we have not observed any significant relationship between budget deficit and GDP, Money supply & consumer price index. It is also observed that the GDP Granger-causes budget deficit where as budget deficit does not.

*JEL Classification***:** E0, E4
Keywords: budget deficits, nominal effective exchange rates, vector error correction

1. Back Drop of the paper

It is an entrenched fact that every country eternally strives to achieve high employment, high growth and low inflation. Yet very few succeed in striking a balance between micro and macroeconomic objectives. Hence, arises the question: "Why some countries are poor, why some are rich? Or, why some countries grow faster than others?" The answers to these questions are not far to seek. The balance between microeconomic objectives - efficiency and equity and macroeconomic objectives - price stability, full employment and

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growth often remain a distant dream. Thus, the concept of budget deficit has become a major social and political issue. The policy makers of the developing countries like India should be very careful in the formulation of the policies in turn in the formulation of budget.

The major issues of policy makers are: How to stimulate investment? How to bring about an increase in the level of savings to fund increased investment needs? How to attract foreign flows and maintain bilateral investment? How to improve the quality of life of the poor? How to manage the economic issues, policy responses? How to administer growing population and employment? How to manage international trade and the issues related to international trade? How to maintain optimal level of interest rates? How to optimal level of exchange rates? How to manage optimal level of Interest rates? How to control inflation to maintain price stability?

These questions have not suddenly risen and the need for growth and equity in distribution is as old as civilization. If a country faces the problem of budget deficit, it results in deficit represents negative public savings; reduces national savings- both public and private.

Hence budget deficit reduces the supply of loanable funds, driving up the interest rates and crowds out investment. In an open economy, the reduced supply of loanable funds will lead to higher interest rates and lead to fall in net foreign investment since the savings kept at home now earns higher rates of return and investing abroad is less attractive, and domestic residents buy fewer foreign assets.

Higher interest rates also attract foreign investors, who want to earn higher returns. Hence budget deficits raise interest rates (both domestic and foreign) causing net foreign investment to fall. Because net foreign investment is reduced, people need less foreign currency to buy foreign assets and hence the real exchange rate appreciates. Hence in an open economy, government budget deficits raise real interest rates, crowd out domestic investment, and cause the other currencies to appreciate vis-à-vis the domestic currency and further deteriorate the trade deficit.

In India, the presentation of annual budget by the Central Government is one of the celebrated events. As against most developed countries, in India, ordinary citizens, investors and corporate bodies look at the tax rates (income tax, corporate tax etc.) and economists and academia look at the budget deficits. In this regard, this paper tries to study the interaction of budget deficit with other macroeconomic variables, giving particular emphasis on the budget deficit-exchange rate relationship.

The present study empirically analyzes the long run relationship between budget deficit and exchange rates, together with the GDP, consumer price index and money supply (M3) using annual data from 1970-71 to 2001-02. Section II and III deal with the relevant literature and methodological issues respectively. The subsequent section provides empirical results and the last section summarizes and concludes the findings of the paper.

2. Literature Review

Studies on budget deficits in literature have largely focused on the interaction of deficits with interest rates. We briefly look at some of these studies before proceeding to studies dealing with relationships with other macroeconomic variables.

There have been conflicting and inconsistent empirical findings about the relationship between budget deficits and interest rates. Evans (1985, 1987) and Barro (1987) found no causal relationship between budget deficits and interest rates in the US. On the other hand, Hoelscher (1986) and Cebula and Koch (1989), found that federal budget deficits have contributed to higher levels of interest-rate yields. Knoester and Mak (1994) showed that only in Germany (among eight OECD economies) does the government budget deficit contribute significantly to the explanation of higher interest rates

Evans (1985) suggests that federal deficits affect consumption and interest rates whereas Bernheim (1989) finds evidence to the contrary. Regardless of various studies, the reality is that the

presence of large budget deficitsin both developed and developing countries has adversely affected economic growth.

Not many studies have explored the impact of budget deficits on the value of the domestic currency, though there is some literature on relationship between current account deficit and government deficit (e.g. Abell, 1990).

It has been largely held that the short run impact of budget deficits on exchange rates has led to the uncertainty in the nature of the relationship between the two variables. Krugman (1995) and Sachs (1985) argued that lower budget deficit lowers the value of the dollar. There is a lot of literature that contributed to many economists holding this opinion, mostly in the case of the US (Mundell, 1963; Fleming, 1962; Dornbusch 1976). Other economists including Evans (1986) argue that lower deficit might actually appreciate the dollar in the short run. Cantor and Driskill (1995) suggest that the possibility of both short run and long run appreciation of a currency to fiscal contraction hinges on domestic country being a large debtor[1].

In an important paper, Feldstein (1986)[2] points out that appreciation of the dollar in the 1980s coincided with high budget deficits[3]. A few more studies arrived at a similar conclusion using empirical analysis (Alse and Bahmani-Oskooee, 1992; Bahmani-Oskooee and Payesteh 1993). A similar phenomenon has been found in Canada where budget deficits contributed to appreciation of the Canadian dollar Wijnbergen, 1987).

Evans (1986) has found no evidence of the presence of any relationship between budget deficit and value of domestic currency and suggests that budget deficits are a sign of weakness in the economy (and quite possibly a signal of future inflation). Another

[1]It is because of the improvement of the current account brought about the reduction in factor payments associated with the reduced domestic interest rates

[2] He estimated reduced-form equations for dollar-mark real exchange rate

[3] This study started debate on the efficacy of cutting budget deficit in the US to strengthen the dollar

paper by Evans (1987) proposes that high budget deficits do not necessarily lead to a strong currency. He argues that if the budget deficit affects aggregate demand, it might result in higher price levels and in turn lead to domestic currency losing its value. Beck (1993) tests the significance of budget deficit and government spending changes on exchange rates in five industrialized countries: U.S., Germany, Japan, U.K., and Canada and finds that there exists a negative relationship between budget deficit and exchange rates in all the cases except Japan.

There have been other studies on the impact of budget deficits on other macroeconomic variables such as inflation and money supply. McMillin (1986) find evidence that budget deficits cause inflation. Other studies refute this finding and suggest that budget deficits do not contribute significantly to higher inflation (Karras, 1994). It has also been stated that depending on the degree of independence the Central bank enjoys, it may resort to monetize the deficit in the current period or in future periods (Sargent and Wallace, 1981). Turnovsky and Wohar (1987) have argued that the empirical results depend on the exchange rate regime under which the economies operate.

In terms of the relationship between budget deficits and money supply, some studies have found evidence in favor of the debt-monetisation hypothesis (Allen and Smith, 1983), while others have reached the opposite results (Niskanen, 1978). Inflationary conditions could be made worse through printing more money; crowding out effect[4], which tends to and excessive issue of government bonds, since they constitute a substantial part of money supply. Therefore, higher budget deficits could aggravate the inflationary conditions in the economy, contributing to the presence of a depreciated domestic currency.

[4] Results in reduced real capital stock in the economy, in turn, a lower growth rate of output, and thereby, with a given money supply, to higher prices.

3. Data and Methodology

Data

The annual time series data on nominal budget deficits (D), exchange rates (E) defined as nominal effective exchange rates (NEER)[5], real GDP (Y) at 1990 prices and money supply (M) measured as M3 have been collected from the Handbook of Indian Statistics published by the Reserve Bank of India. See Table 1 for the data.

Methodological issues

The cointegration approach

Since we are interested in finding whether a long-run relationship exists between budget deficits and exchange rates, GDP, Consumer Price Index and Money Supply we undertake the cointegration tests. We then proceed to causality tests.

The empirical exercise comprises two parts: (1) testing for a unit root, I (1), in each series and (2) testing for the number of cointegrating vectors in the system, provided that we cannot reject the null hypothesis of unit root in each of the time series being studied

1. Unit Root Test: To test for a unit root in each series, we employ the test posited by Phillips and Peron (PP) (Phillips and Peron, 1987) that allows weak dependence and heterogeneity in residuals, is conducted by the following regression:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + u_t$$

Where u_t is serially correlated.

[5] Trade weighted Nominal Effective Exchange Rate

2. Cointegration Test: To investigate the existence of a long-term relationship between trade balance and other variables, we explore existence of any significant long-run relationships among the variables in our model. If the variables that we are using in the study are found to be cointegrated, it will provide statistical evidence for the existence of a long-run relationship. Though, a set of economic series are not stationary, there may exist some linear combination of the variables which exhibit a dynamic equilibrium in the long run (Engle and Granger, 1987). We employ the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991). Specifically, if Y_t is a vector of n stochastic variables, then there exists a p-lag vector auto regression with Gaussian errors of the following form:

$$\Delta Y_t = k + \Gamma_1 \Delta Y_{t-1} + ... + \Gamma_{p-1} \Delta Y_{t-p+1} + \Pi Y_{t-1} + z_t$$

where Γ_1, ... Γ_{p-1} and Π are coefficient matrices, z_t is a vector of white noise process and k contains all deterministic elements.

The focal point of conducting Johansen's cointegration tests is to determine the rank (r) of matrix Γ_k. In the present application, there are three possible outcomes. First, it can be of full rank, (r=n), which would imply that the variables are stationary processes, which would contradict the earlier finding of non-stationarity. Second, the rank of k can be zero (r=0), indicating that there is no long-run relationship among the variables. In instances when Γ k is of either full rank or zero rank, it will be appropriate to estimate the model in either levels or first differences, respectively. Finally, in the intermediate case when there are at most r cointegrating vectors $0 \leq r \leq n$ (i.e., reduced rank), it suggests that there are (n-r) common stochastic trends. The number of lags used in the vector auto-regression is chosen based on the evidence provided by Akaike's Information Criterion (AIC). The cointegration procedure yields two likelihood ratio test statistics, referred to as the maximum eigenvalue (λ-max) test and the trace

test, which will help determine which of the three possibilities is supported by the data[6].

3. Granger Causality: If budget deficit shares a long-run relationship with other macroeconomic variables that we are studying, the next step is to examine causality, since if two or more variables are cointegrated; there is causality in at least one direction (Engel and Granger, 1987). We proceed to determine whether deficits Granger-cause exchange rates and other variables and vice-versa, using Vector Error Correction Model (VECM).

According to Engle and Granger (1987), if two variables are co-integrated, then a more comprehensive test of causality, which has become known as an error-correction model, should be adopted. The VEC specification restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing a wide range of short-run dynamics (Granger Causality). The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

4. Empirical Results

Unit root tests and Cointegration Analysis

The data on variables presented in Table-1 and we have used and Phillips-Perron tests to find the existence of a unit root in each of the time series: Real Gross Domestic Product (Real GDP), Budget Deficit, and Money Supply (M3) (Bn. Rupees), besides Wholesale Price Index (WPI) and Nominal Effective Exchange Rate (NEER).

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[6] The trace test statistic is given by Trace = $T \Sigma^{n}_{i=r+1} \ln (1- \lambda_i)$ where λ_{r+1},...., n are the (n- r) smallest squared canonical correlations between Y_{t-k} and ΔY_t series, corrected for the effect of the lagged differences of the Yt, and T is the sample size actually used for estimation. The λ-max statistic is given by λ-max = $T\ln (1 - \lambda_{r+1})$ Since the asymptotic distributions of the Trace and λ -max test statistics follow χ^2 distributions, a simulation procedure is needed to identify proper critical values for each test (see Osterwald-Lenum, 1993)

Table 1. Data

Year	Real GDP	Budget Deficit	WPI	NEER	M3
1970	1123	285	37.8	133.26	110.2
1971	1116	519	39.6	122.33	126.9
1972	1127	870	42.7	115.45	150.1
1973	1092	328	52.7	106.63	176.2
1974	1091	720	66.2	102.34	195.5
1975	1058	367	62.1	99.87	224.8
1976	1127	131	62.1	97.73	277.8
1977	1116	932	67	98.06	329.1
1978	1187	1506	68	98.08	401.1
1979	1218	2433	75.8	98.02	472.3
1980	1154	2477	82.7	102.27	557.7
1981	1222	1400	93.3	103.59	627.5
1982	1262	1656	100.9	104.83	731.8
1983	1294	1417	113.3	105.19	865.3
1984	1364	3745	119.3	102.27	1029.3
1985	1394	5316	127.9	100	1193.9
1986	1455	8261	139.5	88.68	1416.3
1987	1513	5816	152.6	81.73	1642.8
1988	1550	5642	166	77.05	1934.9
1989	1657	10592	175	72.52	2309.5
1990	1717	11347	199	69.26	2658.3
1991	1756	6855	225	56.29	3170.5
1992	1716	12312	243	49.23	3640.2
1993	1773	10960	264	44.47	4310.8
1994	1846	961	289	44.08	5276
1995	1954	9807	317	40.82	5991.9
1996	2066	13184	350	38.6	6960.1
1997	2217	-910	372	40.08	8213.3
1998	2360	-209	429	37.3	9809.6
1999	2464	864	431	35.46	11241.8
2000	2564	-1197	446	35.58	13132.2
2001	2365	-1496	469	35.45	12681.8
2002	2386	5298	484	37.06	12735

Table 2. Unit Root Tests

Variables	PHILLIPS-PERRON TEST	
	Levels	Differences
Budget deficits	$Z(\alpha^*) = -2.63$	$Z(\alpha^*) = -4.43^*$
	$Z(t_\alpha^*) = -2.54$	$Z(t_{\alpha^*}) = -3.97^*$
Logneer	$Z(\alpha^*) = -0.09$	$Z(\alpha^*) = -8.85^*$
	$Z(t_\alpha^*) = -1.36$	$Z(t_{\alpha^*}) = -7.54^*$
Logcpi	$Z(\alpha^*) = -0.667$	$Z(\alpha^*) = -4.75^*$
	$Z(t_\alpha^*) = -2.65$	$Z(t_{\alpha^*}) = -4.87^*$
Loggdp	$Z(\alpha^*) = -0.71$	$Z(\alpha^*) = -4.47^*$
	$Z(t_\alpha^*) = -1.98$	$Z(t_{\alpha^*}) = -4.49^*$
LogM3	$Z(\alpha^*) = -1.41$	$Z(\alpha^*) = -3.01^*$
	$Z(t_\alpha^*) = -1.14$	$Z(t_{\alpha^*}) = -3.65^*$

Table 3. Johansen Cointegration Test

Eigenvalue	Likelihood Ratio	Critical Value 5%	Critical Value 1%	Hypothesized No. of CE(s)
0.687476	90.78068	68.52	76.07	None **
0.59736	45.88842	47.21	54.46	At most 1
0.419814	28.59702	29.68	35.65	At most 2
0.207886	12.26482	15.41	20.04	At most 3
0.161196	3.273329	3.76	6.65	At most 4
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. test indicates 1 cointegrating equation(s) at 5% significance level				

The results in Table 2 suggest that all the variables have been found to be non-stationary in levels but stationary in first difference form at 5% level of significance, that is, all variables are integrated of order 1 [I (1)]. We proceed to apply cointegration tests between the variables to detect any possible long-run equilibrium between the series. The null of no cointegrating vector can be rejected for all the variables used in the study (see Table 3) and the empirical findings reinforce the conclusions about the presence of long run relationship between budget deficit, output, money and prices.

The Granger causality approach

Table 4. Granger Causality using VECM

	D(BUDGET)	D(LCPI)	D(LGDP)	D(LM3)	D(LNEER)
CointEq1	-0.71	2.19E-06	1.30E-06	-1.46E-07	-2.92E-06
	(0.25)	(1.7E-06)	(1.2E-06)	(1.4E-06)	(1.4E-06)
	(-2.78) **	(1.28)	(1.08)	(-0.10)	(-2.12)*
D(BUDGET(-1))	-0.04	-5.68E-07	-1.53E-07	1.50E-07	2.21E-06
	(0.19)	(1.3E-06)	(9.1E-07)	(1.0E-06)	(1.0E-06)
	(-0.23)	(-0.43)	(-0.16)	(0.14)	(2.11) *
D(LCPI(-1))	13278.16	0.13	-0.11	-0.14	-0.03
	(30722.8)	(0.20)	(0.14)	(0.16)	(0.16)
	(0.43)	(0.68)	(-0.80)	(-0.88)	(-0.19)
D(LGDP(-1))	61491.29	-0.42	-0.13	-0.03	0.34
	(60550.1)	(0.40)	(0.28)	(0.32)	(0.32)
	(1.01)	(-1.04)	(-0.47)	(-0.10)	(1.08)
D(LM3(-1))	-3215.12	1.12	0.13	-0.12	-0.17
	(84219.6)	(0.55)	(0.39)	(0.45)	(0.44)
	(-0.03818)	(2.01) *	(0.33)	(-0.26)	(-0.39)
D(LNEER(-1))	-75135.69	0.23	0.20	-0.09	0.20
	(42645.0)	(0.28)	(0.19)	(0.22)	(0.22)
	(-1.76) *	(0.81)	(1.04)	(-0.40)	(0.91)
C	-2492.62	-0.03	0.01	0.07	-0.004
	(5827.19)	(0.03)	(0.02)	(0.03)	(0.03)
	(-0.42)	(-0.97)	(0.42)	(2.52)	(-0.15038)

* 5% level of significance, ** 1% level of significance. Lag values have been determined by Akaike Information Criteria. Critical values 1% - 2.47 5% - 1.70 10 % – 1.31

The results of the causality tests reported in Table 4 the empirical findings suggest that there is a significant long-run equilibrium relationship between budget deficits and exchange rates. The results are consistent with those of other studies. However, we have not observed any significant relationship between budget deficit and GDP, Money supply & consumer price index. It is also observed that the GDP is influencing the budget deficit where as budget deficit not.

From the Granger causality results (VECM), it is evident that there is a bi-directional Granger-causality budget deficit and exchange rates. Hence, it is suggested that policy makers adopt optimal monetary and fiscal policies that stabilize exchange rate as well as control budget deficits.

Variance Decomposition

Further, variance decomposition results from Tables 5.1 to 5.5 reveal that with a lag of seven periods, the GDP result the variance in budget deficit by 23.26% and 33.19% by the end of the ten periods.

Table 5.1.Variance Decomposition of Budget Deficit

Period	S.E.	BUD DEF	LNEER	LCPI	LGDP	LOGM3
1	3319.19	100	0	0	0	0
2	3982.55	89.51	9.65	0.43	0.00	0.39
3	4314.95	81.61	11.03	0.84	5.85	0.64
4	4657.47	76.20	11.47	0.99	10.75	0.56
5	4929.43	71.15	12.16	1.11	15.04	0.51
6	5189.64	66.50	12.41	1.26	19.34	0.47
7	5438.78	62.31	12.58	1.40	23.26	0.43
8	5677.23	58.50	12.64	1.52	26.91	0.40
9	5907.65	55.10	12.65	1.64	30.22	0.37
10	6130.32	52.08	12.62	1.74	33.19	0.34

It is also observed that the exchange rate with lag of seven periods effects the budget deficit 12.58% and with lag of ten periods 12.62%. On the other hand, no significant part of variance in budget is caused by consumer price index and money supply. The variance in the exchange rate explained by budget deficit is 62.93% with lag of seven periods and 64.13% by the end of ten periods, respectively. It is also observed that the variance in exchange rate is explained by GDP is 7.91% with a lag of seven periods and 9.84% at the end of ten periods. The variance in exchange rate is not much influenced by Money supply and consumer price index.

Table 5.2. Variance Decomposition of LOGNEER

Period	S.E.	BUD DEF	LNEER	LCPI	LGDP	LOGM3
1	0.017	43.86	56.13	0	0	0
2	0.028	45.77	53.09	0.96	0.00	0.15
3	0.042	54.82	41.74	1.85	1.28	0.29
4	0.057	58.79	34.90	2.09	3.671	0.53
5	0.071	60.80	30.84	2.10	5.51	0.72
6	0.085	62.11	28.11	2.07	6.87	0.81
7	0.098	62.93	26.23	2.04	7.91	0.88
8	0.111	63.48	24.85	2.01	8.71	0.93
9	0.123	63.87	23.83	1.98	9.34	0.96
10	0.13	64.15	23.04	1.96	9.84	0.99

Table 5.3. Variance Decomposition of LOGCPI

Period	S.E.	BUD DEF	LNEER	LCPI	LGDP	LOGM3
1	0.02	0.13	4.76	95.10	0	0
2	0.03	0.05	5.88	75.96	4.21	13.88
3	0.04	0.83	7.44	67.78	6.74	17.19
4	0.05	1.27	8.68	64.20	7.76	18.07
5	0.06	1.73	9.22	62.25	8.35	18.42
6	0.07	2.27	9.58	60.60	8.97	18.54
7	0.07	2.75	9.86	59.20	9.54	18.63
8	0.08	3.18	10.07	58.06	10.01	18.66
9	0.09	3.56	10.23	57.13	10.40	18.66
10	0.09	3.89	10.35	56.35	10.73	18.65

The variance in consumer price index is explained by exchange rate, GDP and money supply at the end of ten periods is 10.35%, 10.73% and 18.65% respectively. The variance in GDP is explained by the consumer price index is 6.39% at the end of ten periods and no significant part of GDP is caused by Budget deficit, Exchange Rate and Money supply. Finally its observed that the variance in money supply explained by exchange rate and CPI with lag of seven periods is 12.00%, 7.30% and at the end of the ten periods 12.32%, 7.54% respectively. However the variance in money supply

explained by GDP with a lag of five periods is 27% and remains 26.90% in the remaining periods.

Table 5.3. Variance Decomposition of LOGGDP

Period	S.E.	BUD DEF	LNEER	LCPI	LGDP	LOGM3
1	0.01	0.18	0.19	2.01	97.61	0
2	0.02	0.44	1.09	3.75	94.43	0.27
3	0.02	1.43	1.17	4.74	92.45	0.18
4	0.03	1.37	1.23	5.27	91.97	0.14
5	0.03	1.35	1.37	5.61	91.54	0.12
6	0.04	1.31	1.44	5.84	91.28	0.10
7	0.04	1.26	1.51	6.03	91.09	0.09
8	0.04	1.21	1.56	6.17	90.94	0.09
9	0.05	1.17	1.61	6.29	90.82	0.08
10	0.05	1.13	1.65	6.39	90.73	0.08

Variance Decomposition of LOGM3

Period	S.E.	BUDGET	LNEER	LCPI	LGDP	LOGM3
1	0.02	3.03	9.13	1.10	31.83	54.09
2	0.02	2.22	9.09	4.56	29.11	54.16
3	0.02	2.12	11.01	6.20	27.80	53.77
4	0.03	2.12	11.40	6.71	27.16	52.59
5	0.03	1.97	11.63	6.97	27.00	52.40
6	0.03	1.85	11.84	7.16	26.90	52.19
7	0.03	1.74	12.01	7.30	26.89	52.03
8	0.04	1.65	12.13	7.41	26.89	51.90
9	0.04	1.57	12.23	7.48	26.90	51.79
10	0.04	1.51	12.32	7.54	26.91	51.69

5. Summary and Conclusion

It is a well-established fact that macroeconomic variables such as exchange rates, GDP, money supply and consumer price index and budget deficits exert influence on each other. Theory says that in a closed economy, the initial impact of the budget deficit is on national savings, representing negative public savings, reducing the level of

loanable funds. However in an open economy, the reduced supply of loanable funds has an additional impact, first the reduced supply of loanable funds leads to higher interest rates and, second, the demand for foreign investment decreases since the savings kept at home earn more returns resulting in reduced demand for foreign currency. However the higher interest rates at home attract foreign investment. The decline in the demand for foreign currency will affect exchange rate, which in turn affects the consumer price index.

This article examines long-run relationship between budget deficit and other macroeconomic variables. The results conform to established theory as enunciated by Mankiw (2002). In the empirical exercise, we have used Phillip-Perron test for finding out the presence of unit root in all the variables (budget deficit, GDP, nominal effective exchange rate, consumer price index and money supply) used in the study and have found that they are non-stationary in levels and stationary in the first difference (i.e. they are I (1)). We have employed Johansen test and Vector Error Correction Model (VECM) to check cointegration of these variables and Granger-causality in the presence of cointegrating relationships. We find that the variables in the study have one cointegrating vector. VECM results reveal that budget deficits and exchange rates (NEER) adjust to the deviations from the equilibrium path. There is a bi-directional Granger-caused between budget deficits and exchange rates. Further, the consumer price index is Granger-caused by money supply (M3).

We also discuss the results from variance decomposition method. GDP and exchange rates produce 12.62% and 33.19% of variance in budget deficit at the end of ten periods, respectively. Budget deficits and GDP produce 64.15% and 9.84% of variance in exchange rates, respectively. Exchange rate, GDP and Money supply produce 10.35%, 10.73% and 18.65% of variance in CPI, respectively. CPI produces 6.39% of variance in GDP. The variance in money supply caused by exchange rates and CPI are 12.32% and 7.54% respectively. Interestingly, the effect of GDP on the variance of money supply has been decreasing for the first five time periods and remains constant for the next five periods. The predictions will help

the policy makers as well as quantitative analysts in determining the stance of monetary policy as well as fiscal policy. Policy makers, economists and analysts may take a cue from these studies, and have to necessarily keep themselves watchful of the changes in the macroeconomic fundamentals.

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