Working Paper
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September 2003

Working Papers published since August 1997 (WP 279 onwards)
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This research was conducted when the author was a visiting scholar at the University of Pavia, Italy during January 7 - March 17, 2003. She gratefully acknowledges the generous help and support provided by Gianni Vaggi, Carluccio Bianchi, Paolo Bertoletti, Eduardo Rossi and Marco Missaglia during her stay at Pavia. She thanks the participants at the seminars at the University of Pavia and at CDS for their comments and suggestions, especially K.P. Kannan and Vijayamohanan Pillai. Thanks are also due to Achin Chakraborty for his insightful comments.

ABSTRACT

The East Asian crisis of 1997-98 and the Mexican crisis of 1994 generated much concern among policy analysts regarding the role of macroeconomic policies in the management of capital inflows. A series of economic reform measures including liberalization of foreign capital inflows were initiated in India since the early nineties. Using the vector autoregression (VAR) method, this paper specifically examines if the external shock generated by capital inflows led to appreciation in the real exchange rate as observed in the East Asian and Latin American countries in the 1990's. The role of monetary and fiscal policies in managing the effect of capital inflows on the real exchange rate is also analysed in this context. Based on the quarterly data from 1993.2 to 2001.4 and incorporating the variables such as the real exchange rate, capital inflows, the rate of growth of domestic credit and the rate of inflation, three important observations emerge from the VAR analysis: (a) unlike the East Asian and Latin American countries, the real exchange rate depreciates with respect to one standard deviation innovation to capital inflows, (b) the dynamic impact of random disturbances generated by capital inflows on the real exchange rate is persistent, and (c) the dynamic response of the real exchange rate to capital inflows shock has largely been influenced by monetary policy and not by fiscal policy. The paper argues that the monetary policy was effective in avoiding any serious distortion in the real exchange rate following the liberalization of capital inflows in India while sacrificing its long-term objectives. It addresses two limitations in the existing macroeconomic policies i.e. (a) lack of fiscal consolidation and (b) lack of capital control instruments which seems to have created undesirable pressure on the monetary policy to realize its long-term objectives in the regime of liberalized capital inflows.

Key Words: economic reforms, real exchange rate, macroeconomic policies, vector autoregression, India

JEL Classification: C32, E63, F30, F41

I. Introduction

The East Asian crisis of 1997-98 and the Mexican crisis of 1994 have generated concern among policy analysts regarding the devastating effect of financial liberalization. A large volume of literature analysing the experience of the crisis after financial liberalization in various East Asian and Latin American countries emphasizes the role of macroeconomic policies in the management of capital inflows. As confirmed by the evidence from these countries, large inflows of capital following financial liberalization led to overvaluation of exchange rates. In some of these countries, appreciation of exchange rates had led to widening of the current account deficits. These phenomena undermined the confidence of the investors on the national currency and led to significant reversals of flow of capital in those countries. On the other hand, a comprehensive package of policies combining monetary, fiscal and exchange rate policies as well as the timely implementation of various capital control measures had made it possible to avoid the crisis in many other countries in the same continents. Lessons from the East Asian and Latin American countries have made the policy makers aware of the fact that appropriate macroeconomic policies are capable of significantly reducing the vulnerability of an economy to external shocks including speculative attacks in the aftermath of financial liberalization. Since the currency crisis of the nineties a number of important issues have come up for policy research. One of these issues is the instability in the exchange rates in the wake of volatile capital inflows and its long-

term consequences. A large number of important studies in this context have come up in recent years. In what follows we review a select number of studies relevant from our point of view.

Calvo, Leiderman and Reinhart (1996) observe that the effects of large capital inflows on the real exchange rate in Asian and the Latin American countries during the nineties present a mixed picture. In the Latin American countries appreciation of the real exchange rate was much stronger than that in most of the Asian countries. They attribute this difference to the differences in composition of aggregate demand. In the Asian countries, the share of investment in GDP increased during the period of inflow; whereas in the Latin American countries it was the consumption expenditure, especially private expenditure on nontradables, which had increased. This, in turn, had increased the rate of inflation in the Latin American countries and might have resulted in a stronger real exchange rate appreciation, as the argument goes. Following the financial liberalization, in contrast to the Latin American countries, most of the East Asian countries had implemented contractionary fiscal policy which also helped curb inflation. At the beginning of the surge in capital inflows, all these countries had prevented nominal appreciation mainly through sterilized intervention in the foreign exchange market. But many countries had to scale back the sterilization effort after a few years because such a measure had led to an increase in the short-term interest rate. Thus, as capital inflows persisted, most of these economies except Mexico had to allow their nominal exchange rates to appreciate. But real appreciation was prevented in many of these countries by implementing comprehensive policy packages. These policy packages included not only the fiscal tightening as stated earlier but also capital control measures to curb short-term capital inflows and measures to lengthen the maturity period of capital inflows.

In the discussions on the capital control measures references to two successful cases, viz., Chile and Colombia, are frequently made. Chile had followed a special programme called unremunerated reserve requirement(URR) (Jose de Gregario, 2000). The regulation under this programme was such that almost all kinds of capital inflows would have to deposit 30 per cent in the central bank, which could be treated as an entry cost and this deposit could not be remunerated. This measure thus indirectly imposed a restriction on the short-term capital inflows, since longer the period of maturity less would have been the relative cost of entry. The most important feature of the URR programme was that even in a regime of high rate of interest, it had been able to restrict capital inflows and check appreciation of the real exchange rate. High rates of interest had attracted capital on the one hand, and it had been instrumental in controling aggregate demand and reducing inflation, on the other. The latter in turn checked appreciation of the real exchange rate. Colombia too introduced the system of unremunerated reserve requirement since September 1993 on short-term capital flows. However, unlike Chile, the degree of reserve requirement varied depending on the period of maturity. In the case of Colombia, the longer was the period of maturity the lower was the rate of reserve requirement (Cardenas and Barrera, 1997).

Among the Latin American countries, the case of Mexico is the much debated one because the crisis resulted despite having the strong fundamentals. Moreover, as noted by Calvo and Mendoza (1996), it was for the first time in the postwar period that the currency crisis took place without the pressure of expansionary policies. The cause of Mexican crisis is largely attributed towards the following two factors: (a) large imbalances between the money balances, short-term debt and gross foreign reserves and (b) “herding behaviour” of the global investors. Large inflows of short-term capital into Mexico began with the attempt

at correcting the misalignment of exchange rate in 1994 through devaluation of the currency. However, in the subsequent period the financial fragility resulted due to the commitment to maintain the fixed exchnage rate and the commitment by the central bank to act as lender of last resort. While comparing with Chile, it appears that there were a number of loopholes in the macroeconomic policies in Mexico (Calvo et. al., op.cit). For example, due to persistent sterilized intervention short-term rate of interest was quite high, which in turn attracted further capital inflows. Heavy intervention in the foreign exchange market led to almost no uncertainty regarding the exchange rate and it created favourable situation for speculative short-term capital inflows. In retrospect, the macroeconomic policies followed in Mexico are now criticised mainly for two reasons, viz., for having no control on short-term capital movements and for the sharp decline in domestic savings during the period of capital inflows.

Edwards (2000) is one of those few empirical studies which have made an attempt to evaluate the dynamic effects of capital inflows on the real exchange rate in some Latin American countries. The study observes that historically there had been an inverse relationship between capital inflows and the real exchange rate in the Latin American countries. Immediately after the debt crisis the real exchange rate depreciated sharply in all these countries. The trend, however, was reversed during the nineties with the liberalization of the capital account in these countries. From a vector autoregression analysis the study observes that the dynamic impact of capital inflows on the real exchange rate was different in differnt countries of the region, as far as the magnitude and the degree of persistence were concerned. What is common in all these cases is that large inflows of capital during the early 1990's resulted in appreciation of the real exchange rate. A careful analysis of some important policy measures pursued in those countries during the 1990's

reveals that the variation in the degree of persistence was due to the implementation of different macroeconomic policies in different countries. To explain the variation across countries with respect to the magnitude of appreciation of the real exchange rate following the increase in capital inflows, Edwards argues that, it depends mainly on two variables viz., the intertemporal elasticity of aggregate demand, on the one hand, and the income elasticity of demand and the supply elasticity for nontradables, on the other. The first variable determines the extent of consumption smoothing and distribution of expenditure over time and the second variable determines the rise in inflation resulted from an increase in the price of nontradables.

The present paper builds on the theoretical and methodological insights thrown up by previous research and focuses on the effect of capital inflows on the real exchange rate in India during the liberalized regime beginning early nineties. Using the vector autoregression method, this paper specifically examines if the external shock generated by capital inflows led to appreciation in the real exchange rate as observed in the East Asian and Latin American countries in the 1990's. The role of monetary and fiscal policies in managing the effect of capital inflows on the real exchange rate is also analysed in this context. The paper identifies the crucial role played by the monetary policy in macroeconomic management in India during the nineties. The paper is organised as follows. Section II presents an overview of some features of reforms in India initiated during the early nineties. Section III discusses the variables used in the analysis, data sources and methodology. The empirical results are presented in section IV. Concluding remarks are made in section V.

II. Some Features of India's Economic Reforms in the 1990's:

For our purpose, the reform measures initiated in India in 1991, following the severe balance of payments crisis, can be divided into two

categories: (a) measures relating to liberalization of the domestic financial sector and (b) those relating to liberalization of the external sector. Reform measures in the first category include deregulation of the capital market as well as the banking sector. The policy of deregulation led to free pricing of equity issued to the public and confering more power to the Securities and Exchange Board of India for the regulation of the capital markets. Deregulation of the banking sector, on the other hand, includes reduction of statutory liquidity ratio (SLR) and introduction of market determined rates of interest.

Reform measures relating to liberalization of the external sector include compositional shift in capital flows from debt to non-debt creating sources and regulation of external commercial borrowings. Unlike the period prior to 1991, external commercial borrowings were restricted to meet the foreign exchange cost of capital investment only and not to meet the expenditure on working capital. Foreign direct investment was further liberalised with the automatic approval of foreign investments upto 51% of equity in the priority industries where high technology was thought to be needed. Following the changes in the industrial policy, large public limited companies were encouraged to float shares in the global capital markets through Global Depository Receipts (GDR). Foreign Institutional Investors were allowed to invest in the Indian Stock Exchanges while no restriction was imposed on the volume of investment as well as on the lock-in period. Concessional tax rates were also proposed for the dividend and interest income of the Foreign Institutional Investors. On the other hand, capital account for the residents was also liberalised. Domestic exporters were permitted to retain their earnings abroad for 180 days. Liberalization of the external sector was followed by certain relevant changes in the macroeconomic policies too. Changes in the macroeconomic policies include changes in the exchange rate policy alongwith the policy for foreign exchange reserves and monetary and fiscal policies.

Since 1991, there have been significant changes in the exchange rate policy. After having devaluation of rupee twice in 1991, the economy gradually moved to a floating exchange rate system by 1993. Initiation of the floating exchange rate system and the global integration of the domestic financial markets called for a change in the approach to the management of foreign exchange reserves. Till the balance of payments crisis of 1991, the objective of reserve management was to maintain an appropriate level which would be sufficient to cover three months imports. With the adoption of the recommendations of the High Level Committee on Balance of Payments under the chairmanship of C. Rangarajan there was an evolution in the approach to reserve management. With the changing profile of capital inflows it was felt that the traditional approach to assessing the adequacy of foreign exchnage reserves needed a change. Since 1993, the objective of import cover was supplemented by the objective of smoothening out the volatility in the exchange rate (Tarapore, 1994 and Reddy 2002a). To meet these two objectives, the policy for reserve management was mainly built upon the following facotrs: the size of the current account deficit, short-term liabilities, the possible variability in portfolio investment, and the unanticipated pressures on the balance of payments due to external shocks. These changes in the policy for reserve management had consequences on the monetary policy too.

The long-term objectives of the monetary policy in India have been to maintain price stability and to promote growth. However, with the increasing openness of the economy since 1993 the external sector started to play a dominant role in the monetary management. With the large inflows of capital during 1993 and 1994, the additional objective of the monetary policy has been to maintain orderly condition in the foreign exchange market and to curb excessive speculation (Reddy, 2002b, Rangarajan, 2001). Increasing market orientation of the financial

structure and inflows of foreign capital also led to certain changes in the operational mechanism of the monetary policy during the nineties. Traditionally the operation of the monetary policy in India was based on certain intermediate target viz., broad money, which had close relationship with the ultimate objectives of growth of GDP and price stability. The broad money target was followed by a consistent level of reserve money expansion, and was supported by a number of other indicators such as movement in interest rates and the exchnage rate. While the need for targeting of reserve money expansion emanated mainly from monetisation of fiscal deficit during the period prior to 1992, later it was due to the accumulation of net foreign exchange assets. The major change in the operational mechanism of the monetary policy was reflected upon the use of expanded array of instruments. Prior to reform, reserve money expansion had been effected mainly through the instrument of cash reserve ratio (CRR), emphasis on which was reduced later. The cash reserve ratio alongwith the other two direct instruments, viz., interest rate regulations and selective credit control, were used to reduce the monetary impact of the Government's budgetary operations. However, in the post reform period the more important instrument has been open market operations (OMO). To use it effectively for liquidity management following the liberalization of capital inflows some steps were taken by the Reserve Bank of India for the development of the secondary market for government securities. Introduction of market rate of interest for government securities instead of the administered rate of interest was the major move towards development of the secondary market.

Fiscal policy, on the other hand, witnessed certain major changes too. The most important change in the objective of the fiscal policy was to reduce the fiscal deficit so that inflation could be contained within a manageable limit (Acharya, 2002). It is well-known that one of the

major causes of the economic crisis of 1991 was the very high level of fiscal deficit in the late eighties. While fiscal defcit was 7.2% of GDP, on average, during the period 1980-85, it went upto 9.4% in 1990-91. However, with severe curtailing of the budget deficit to 4.1% of GDP, it had been possible to reduce the fiscal deficit to 6.4% of GDP in 1996-97, which is the least during the entire decade of the nineties. The conduct of fiscal policy has also undergone an important change since 1992-93 with the shift of central government borrowings to market rate of interest. Furthermore, the automatic monetisation of budget deficit through the device of ad hoc Treasury bills was phased out over a period of three years following an agreement between the government and the RBI in September 1994. These two important changes in government borrowing programmes not only constituted important components of the financial sector reform but also influenced the evolution of the monetary policy in the 1990's.

III. Variables, Data Sources and Methodology:

Drawing on the existing literature we have included the following variables in our analysis: (a) log of real effective exchange rate (b) net inflows of capital (FINVQ) (c) rate of growth of domestic credit (RGDC) and (d) the rate of inflation (INFQ). Two measures of real effective exchange rates, based on export-based weight (REQX) and trade-based weight (REQT) using 36 countries have been taken into consideration. Net inflow of capital is the aggregate of three categories of net foreign capital flows into India viz., foreign direct investment, portfolio investment and external commercial borrowing. The rate of growth of domestic credit and the rate of inflation are used as proxies for the monetary and fiscal policies, respectively. Nonavailability of quarterly data, however, made it impossible to include a few more relevant variables in this analysis, for example, interest rate differentials adjusted for expected devaluation and budget deficits. All the three variables, other

than the rate of growth of domestic credit, are compiled from various issues of Reserve Bank of India Bulletin. The series on the rate of growth of domestic credit is taken from International Financial Statistics published by IMF.

We have estimated a series of unrestricted vector autoregression (VAR) using quarterly data for the period 1993:2 to 2001:4. There is no need to elaborate on the VAR methodology as it is available from standard references which include Hamilton (1994), Enders (1995) and Mills (1990), among others. While estimating the VAR, however, one should take note of two main issues: (a) the order of integration of the endogeneous variables and (ii) lag lengths to be included. To test the order of integration of the endogeneous variables we have applied three alternative tests viz., Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. For the choice of appropriate number of differenced lags for the ADF test we have followed Enders (1995). We start with a very large number of lags. If the estimated t-statistic for the last differenced lag is not significant, we reduce the number of differenced lags by one and carry out the test. This process is continued until we find a differenced lag which is statistically significant. For the choice of lag lengths, we estimate several alternative VAR models with lags between two to four and apply the model selection criteria, viz., Akaike Information Criteria (AIC) and Schwartz Criteria (SC) to select the best model. Since the number of observations is small we have not been able to consider lags larger than four. Both the tools of the VAR methodology viz., the impulse response function and the variance decomposition are used for our analytical purposes. As it is well-known that the VAR results might get influenced by the ordering of the endogeneous variables we have tried with various orderings and the results have been compared.

IV. Empirical Results:

We begin with testing the order of integration of all the variables. Results for DF, ADF and Phillips-Perron tests are reported in Table 1. It appears that all the variables have one unit root and they become stationary after taking first difference of these series. We therefore carry out the VAR analysis with the first-differenced series of all these variables. As stated earlier, we have estimated a number of unrestricted VAR models with lags between 2 to 4. Following the Akaike Information Criteria (AIC) and Schwarz Criteria (SC), however, it is found that the model with lags 4 is the best model. The estimated VAR model with lags 4 is reported in Table 2. It appears that the lagged values of some of the variables included in this model have significant effect on FINVQ, INFQ and RGDC but not on REQX. Quite interestingly the included variables explain almost 80% of the variation in FINVQ, INFQ and RGDC whereas the same set of variables account for only 56% of the variation in REQX. However, unlike the econometric models, in the case of the VAR model more important insights are rather drawn from the impulse response analysis and variance decomposition. In what follows, we discuss their implications in detail.

Fig.1 demonstrates the impulse response function for REQX. It is evident that with respect to one standard deviation innovation to foreign capital inflows (FINVQ), log of the real exchange rate (REQX) depreciates by 0.05% and this shock is persistent upto 20 lags. Since it is known that the impulse response functions can show different results if the ordering of the variable is changed, we have tried several alternative orderings. In all the cases, however, impulse response analyses show that log REQX depreciates with respect to one standard deviation innovation to foreign capital inflows. In order to save space, all these results are not reported here. Table 3 reports the results for variance

Fig. 1

Response to One S.D. Innovations

Response of DREQX to DFINVQ

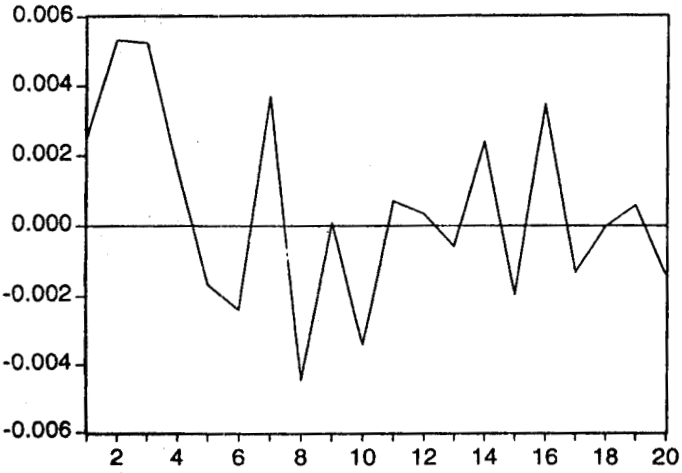
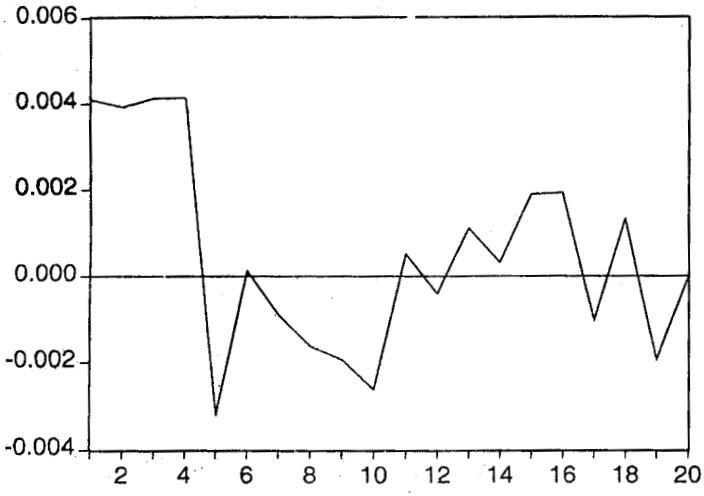


Fig. 2

Response of DREQT to One S.D. DFINVQ Innovation



decomposition. It follows that apart from its own contribution the highest contribution to variation of log REQX comes from net capital inflows. Table 3 shows that the average contribution of net capital inflows to variation of log REQX is 17.59% over 10 lags. Thus, capital inflows have played the most important role in explaining the dynamic changes in real effective exchange rate. Similar estimates have been derived using the other index of real effective exchange rate viz., REQT. The results with log REQT are almost similar to the results with log REQX. In this case too, estimated VAR with lags 4 gives the best model following the AIC and SC criteria and it is reported in Table 4. Impulse response analysis shows that with respect to one standard deviation innovation to foreign capital inflows log REQT depreciates by 0.04% and the shock is persistent even after 20 lags (see Fig.2). Using different orderings of the variables we get the same result in each of the cases. Variance decomposition shows that apart from its own contribution to variation of log REQT the highest contribution comes from FINVQ, which is around 15.33 % on average over ten lags (Table 5).

Findings from the impulse response analysis reflect the fact that the impact of inflows of foreign capital on the real exchange rate during the liberalized regime in India was different from that observed in East Asia and Latin America. In East Asia and Latin America the real exchange rate appreciated with respect to innovation to foreign capital inflows (Edwards, 2000). As the finding based on the Indian data contradicts the established belief, it may be taken by some policy analysts as indicative of efficient management of capital inflows during the nineties. In the same vein, therefore, one may be praising the monetary and fiscal policies pursued in India during the liberalized regime. However, it calls for a more in-depth analysis of the effect of the monetary and fiscal policies on the dynamics of the real exchange rate in India during the period under study.

Fig. 3

Response of DREQX to One S.D. DFINVQ Innovation

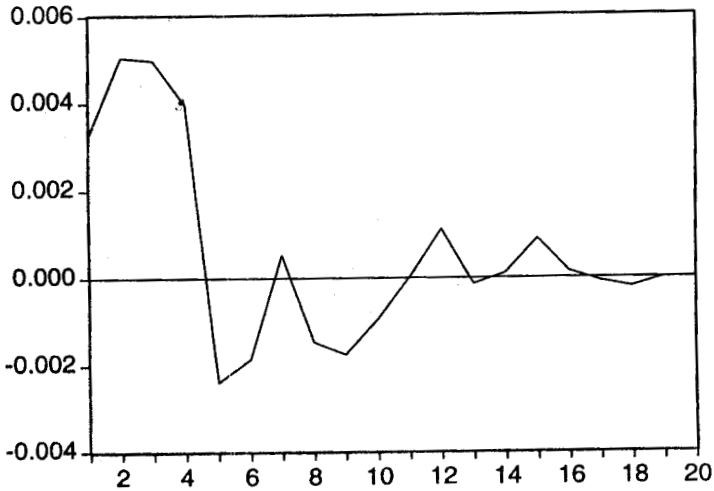
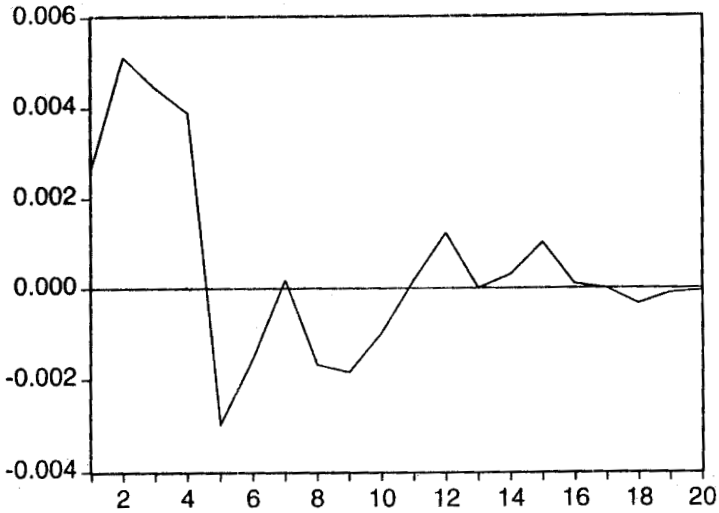


Fig. 4

Response of DREQT to One S.D. DFINVQ Innovation



As discussed earlier, during the nineties one of the major preoccupations of the monetary authority was stabilization of the exchange rate. In order to meet this objective, the Reserve Bank of India had to intervene quite often in the foreign exchange market which is suggestive of the endogeneity of the monetary policy. In other words, monetary policy was adjusting from time to time along with the volume of capital inflows which had the potential threat to destabilize the real exchange rate. Endogeneity of the fiscal policy in our unrestricted VAR model, however, might be the subject of contention. Even though emphasis was given to fiscal tightening as part of the reform measures, till the second half of the nineties not much progress was evident. As stated earlier, Acharya (2002) observes that the fiscal deficit was as high as 9.4% of GDP in 1990-91 and it had come down to 6.4% of GDP in 1996-97. This was the lowest level of fiscal defcit during the entire period of 1983-84 to 2000-2001. Therefore, it seems that unlike the monetary policy the fiscal policy had little role to play in the dynamics of the real exchange rate in India. In order to test this proposition we have reestimated our VAR model without the fiscal policy variable i.e., the rate of inflation (INFQ) and compared the results with that from the previously estimated VAR model.

The estimated VAR model for REQX without the fiscal policy variable i.e. the rate of inflation (INFQ) is reported in Table 6. The impulse response function in this case as shown in Fig.3 demonstrates almost the similar pattern as was evident from Fig.1. From Fig.3 it is evident that log REQX depreciates by 0.05% with respect to one standard deviation innovation to capital inflows and this shock is persistent upto 15 lags. Variance decomposition (Table 7) also exhibits similar results as in Table 3 i.e., the highest contribution to the explanation of the variance in log REQX comes from FINVQ. Following Table 3 we observe that the contribution of FINVQ is around 24.69 % on average over 10

lags. The VAR estimation results using log REQT are also in conformity with the earlier findings. Tables 8 and 9 report the estimated VAR model and the results for variance decomposition respectively, with respect to log REQT. Like Fig.2, the impulse response analysis for log REQT shows (Fig.4) depreciation of 0.05% with respect to one standard deviation innovation to capital inflows and the shock is persistent upto 16 lags. Table 9 also indicates similar results for variance decomposition of log REQT as reported in Table 5 i.e. the highest contribution to variation of log REQT comes from net capital inflows which accounts for 16.38 % of variation of log REQT on average over 10 lags in this case.

The fact that emerges from these findings is that the effect of innovation to capital inflows on the real effective exchange rate is almost the same with and without endogeneity of the fiscal policy. This confirms that the monetary policy played the crucial role in dampening the likely devastating effect of capital inflows on the real exchange rate during the post-liberalization period in India whereas the role of the fiscal policy in this process remained passive. This observation is in sharp contrast to the case of East Asian countries in which contractionary fiscal policy, alongwith the other macroeconomic policies, was one of the important tools in the management of external shocks to the economy following the liberalized inflows of capital, as discussed previously in section I. On the other hand, on the operation of the monetary policy many similarities are observed between India's monetary policy and that followed by the East Asian and Latin American countries. The most notable feature is that, at the beginning, the nominal appreciation of rupee was prevented through sterilized intervention in the foreign exchange market like the East Asian and Latin American countries. However, unlike the Latin American countries, it had not been possible to follow the approach of sterilized intervention for a longer period by

the monetary authority in India, because the quasi-fiscal cost of higher rate of interest due to sterilized intervention was unsustainable. Hence during the later period the real appreciation was prevented by increasing domestic inflation, which was the result of an increase in money supply as a result of intervention of the Reserve Bank of India in the foreign exchange market. This is somewhat close to the East Asian experience.

V. Concluding Observations:

The preceeding analysis may help explain the limitations in the implementation of the macroeconomic policy in India during the nineties which could have caused setback in realizing the full potential of capital account liberalization measures. It is evident from our findings that during the nineties the monetary policy in India played an effective role in the management of capital inflows. On the one hand, this policy of intervention by the RBI in the foreign exchange market has helped to avoid any speculative attack on the domestic currency through building up of large foreign exchange reserves. On the other hand, the combination of this monetary policy having the objective of maintaining a competitive exchange rate and the policy to curb the imports of consumer durables have been able to maintain a moderate trade deficit in the post liberalization period. Thus, there was no imminent problem of debt crisis too. However, the long-term objective of the monetary policy to promote growth had to be sacrificed during the nineties due to the passivity of the fiscal policy. As observed from our empirical findings the role played by the fiscal policy in the management of capital inflows was rather weak in the nineties. A combination of an expansionary fiscal policy and a liberalized interest rate policy helped increase the savings-investment gap. The greatest puzzle during the nineties is that even after the liberalization of foreign capital no substantial increase was observed in investment and production (Khanna, 2002). There is no

doubt that if large inflows of capital raise money supply and inflation, without sufficient increase in aggregate supply and exports then it may jeopardise the entire effort of liberalization as was evident from the experience of the Latin American countries during the eighties. Therefore, for the long-run sustainability of debt it is imperative to implement fiscal crunch alongwith the existing monetary policy. In addition, simultaneous implementation of some sort of capital control measures as followed in Chile and Colombia may be considered which would not only reduce the volatility of short-term capital flows but also would help to reduce the pressure on the monetary authority in the management of capital inflows.

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Table 1. Summary Results

	DF test	ADF test	Phillips-Perron test
FINVQ	I (0) (with C)	I (1) (8 lags without C & T)	I (0) (with C)
	*(-4.78)**	*(-1.79)*	*(-8.23)**
REQX	I (1) (with C)	I (1) (14 lags without C & T)	I (1) (with C)
	(-1.08)	*(-1.54)*	*(-1.93)*
REQT	I (1) (with C)	I (0) (13 lags with C & T)	I (1) (with C)
	(-1.27)	*(-1.02)*	*(-1.54)*
INFQ	I (1)	I (1) (6 lags with C & T)	I (1) (without C & T)
	(-1.82)	*(-1.79)*	*(-1.89)*
RGDC	I (0)	I (1) (9 lags with C)	I (0) (with C)
	*(-4.27)**	*(-1.06)*	*(-8.56)**
DFINVQ	I (0)	I (0) (14 lags with C & T)	I (0)
	*(-5.27)**	*(-7.86)**	*(-14.73)**
DREQX	I (0)	I (0) (13 lags without C & T)	I (0)
	*(-5.80)**	*(-4.60)**	*(-5.80)**
DREQT	I (0)	I (0) (13 lags with C)	I (0)
	*(-5.71)**	*(-4.77)**	*(-5.69)**
DINFQ	I (0)	I (0) (3 lags without C & T)	I (0)
	*(-5.27)**	*(-6.89)**	*(-5.31)**
DRGDC	I (0)	I (0) (5 lags without C & T)	I (0)
	*(-5.46)**	*(-5.78)**	*(-14.74)**

Note: (i) * implies significant at 1 % level

Table 2. Vector Autoregression Estimates

	DFINVQ	DREQX	DINFQ	DRGDC
DFINVQ(-1)	-0.729895	1.30E-06	0.000105	2.27E-05
	*[-2.69799]**	*[1.26141]*	*[1.13310]*	*[0.20049]*
DFINVQ(-2)	-0.556829	2.53E-06	0.000103	0.000118
	[-1.54346]	*[1.83710]*	*[0.82875]*	*[0.78300]*
DFINVQ(-3)	0.019621	2.46E-06	0.000225	-1.45E-05
	[0.04630]	*[1.51817]*	*[1.54053]*	*[-0.08192]*
DFINVQ(-4)	-0.125833	1.27E-06	0.000107	3.53E-05
	[-0.45145]	*[1.19258]*	*[1.12005]*	*[0.30316]*
DREQX(-1)	-199829.1	-0.216955	15.1919	-12.85741
	*[-2.34870]**	*[-0.66768]*	*[0.51888]*	*[-0.36135]*
DREQX(-2)	24158.15	0.74043	11.26254	-10.39136
	[0.23650]	*[1.89797]*	*[0.32040]*	*[-0.24325]*
DREQX(-3)	148250	0.146533	-3.515097	-33.9117
	[1.23050]	*[0.31846]*	*[-0.08478]*	*[-0.67304]*
DREQX(-4)	-119147.3	-0.488996	62.44288	64.20594
	[-1.33131]	*[-1.43065]*	*[2.02752]**	*[1.71543]*
DINFQ(-1)	1230.577	-0.001252	-0.201327	-0.016399
	[1.73482]	*[-0.46213]*	*[-0.82478]*	*[-0.05528]*
DINFQ(-2)	-417.6871	-6.78E-05	0.302623	0.020762
	[-0.68771]	*[-0.02921]*	*[1.44791]*	*[0.08174]*
DINFQ(-3)	-109.4121	-0.000147	-0.235188	-0.427551
	[-0.19245]	*[-0.06762]*	*[-1.20213]*	*[-1.79821]*
DINFQ(-4)	-251.5558	-0.002013	-0.971981	0.2172
	[-0.31142]	*[-0.65266]*	*[-3.49667]**	*[0.64294]*

cont'd.....

	DFINVQ	DREQX	DINFQ	DRGDC
DRGDC(-1)	-1321.29	0.00183	0.056023	-0.784293
	[-1.96939]	*[0.71426]*	*[0.24266]*	*[-2.79521]**
DRGDC(-2)	-329.868	0.003748	0.014166	-1.190096
	[-0.52115]	*[1.55045]*	*[0.06504]*	*[-4.49582]**
DRGDC(-3)	-586.6509	-0.00123	0.196182	-0.677171
	[-0.96615]	*[-0.53057]*	*[0.93889]*	*[-2.66665]**
DRGDC(-4)	-1690.349	-0.0024	0.170155	-0.164677
	*[-2.30374]**	*[-0.85637]*	*[0.67389]*	*[-0.53665]*
C	780.7452	-0.000754	-0.64871	0.044093
	[0.65891]	*[-0.16656]*	*[-1.59095]*	*[0.08898]*
R-squared	0.792124	0.561479	0.822797	0.856526
Akaike Information Criteria		24.59854		
Schwarz Criteria		27.80461		

Note: (i) t-statistics are reported in parentheses

(ii) * implies significant at 1 % level

Table 3. Variance Decomposition of DREQX

Period	DFINVQ	DREQX	DINFQ	DRGDC
1	9.507723	90.49228	0.000000	0.000000
2	16.09699	83.34404	0.287450	0.271520
3	23.17794	76.11339	0.258675	0.449998
4	26.08781	70.42505	1.191924	2.295209
5	27.19622	68.65818	1.617198	2.528395
6	27.09925	68.22019	2.152236	2.528329
7	27.00522	68.30729	2.144814	2.542677
8	25.96	68.99865	2.623472	2.417879
9	27.39952	67.67166	2.561791	2.367023
10	28.12967	66.11429	3.229947	2.526096
11	28.07141	66.08598	3.270776	2.571838
12	27.97747	65.45576	4.017496	2.549276
13	28.12104	65.26649	3.998639	2.613834
14	28.06765	65.27434	3.992475	2.665543
15	29.04693	64.26821	3.964465	2.720396
16	29.1662	63.26905	4.661145	2.903601
17	29.07624	63.26173	4.733167	2.928862
18	29.11394	63.05716	4.908101	2.920796
19	29.45412	62.22976	5.157473	3.158643
20	29.35674	62.10142	5.149055	3.392785

Ordering: DFINVQ DREQX DINFQ DRGDC

Table 4. Vector Autoregression Estimates

	DFINVQ	DREQT	DINFQ	DRGDC
DFINVQ(-1)	-0.711725	1.33E-06	0.000108	2.67E-05
	[-2.62246]*	[1.28392]	[1.16739]	[0.23485]
DFINVQ(-2)	-0.534343	2.43E-06	0.000103	0.000124
	[-1.47612]	[1.76715]	[0.83187]	[0.81681]
DFINVQ(-3)	0.049104	2.24E-06	0.000232	-3.83E-06
	[0.11538]	[1.38369]	[1.59129]	[-0.02150]
DFINVQ(-4)	-0.129079	1.04E-06	0.000117	4.49E-05
	[-0.46360]	[0.98373]	[1.22580]	[0.38545]
DREQT(-1)	-209441.5	-0.195406	16.57196	-11.92905
	[-2.42534]*	[-0.59454]	[0.56039]	[-0.32990]
DREQT(-2)	42925.25	0.829866	10.97154	-12.54677
	[0.41716]	[2.11899]*	[0.31136]	[-0.29120]
DREQT(-3)	143384.8	0.060922	-9.940249	-33.19094
	[1.14733]	[0.12808]	[-0.23227]	[-0.63427]
DREQT(-4)	-125407.9	-0.513323	67.11503	66.12554
	[-1.34758]	[-1.44929]	[2.10599]*	[1.69696]
DINFQ(-1)	1148.37	-0.001667	-0.231678	-0.021281
	[1.56724]	[-0.59758]	[-0.92330]	[-0.06936]
DINFQ(-2)	-442.8692	0.000114	0.322893	0.01753
	[-0.70553]	[0.04758]	[1.50212]	[0.06669]
DINFQ(-3)	-17.64196	8.80E-05	-0.232421	-0.444642
	[-0.03073]	[0.04026]	[-1.18235]	[-1.84990]

cont'd.....

	DFINVQ	DREQT	DINFQ	DRGDC
DINFQ(-4)	-370.7648	-0.002109	-0.991819	0.210909
	[-0.44795]	[-0.66933]	[-3.49916]*	[0.60854]
DRGDC(-1)	-1303.106	0.002292	0.064717	-0.796136
	[-1.93173]	[0.89289]	[0.28015]	[-2.81855]*
DRGDC(-2)	-212.1195	0.004213	0.004015	-1.213163
	[-0.33512]	[1.74874]	[0.01852]	[-4.57725]
DRGDC(-3)	-592.2101	-0.001318	0.195143	-0.677479
	[-0.98883]	[-0.57807]	[0.95149]	[-2.70156]*
DRGDC(-4)	-1659.218	-0.0022	0.193637	-0.169868
	[-2.25144]*	[-0.78429]	[0.76727]	[-0.55048]
C	834.8256	-9.80E-05	-0.730314	0.019626
	[0.69248]	[-0.02135]	[-1.76899]	[0.03888]
R-squared	0.794376	0.581633	0.826417	0.857733
Akaike Information Criteria		24.56682		
Schwarz Criteria		27.77289		

Note: (i) t-statistics are reported in parentheses

(ii) * implies significant at 1 % level

Table 5. Variance Decomposition of DREQT

Period	DFINVQ	DREQT	DINFQ	DRGDC
1	3.519913	96.48009	0.000000	0.000000
2	15.35298	81.76279	0.216731	2.667504
3	18.71199	76.67897	2.617670	1.991369
4	16.75476	65.1339	7.247180	10.864160
5	17.89207	63.87383	7.170554	11.063550
6	18.04803	61.91853	7.326660	12.706780
7	19.23198	60.35081	7.891717	12.525490
8	20.82372	58.96111	6.794900	13.420270
9	20.51069	58.93042	7.106053	13.452850
10	22.51804	57.46362	7.278997	12.739340

Ordering: DFINVQ DREQT DINFQ DRGDC

Table 6. Vector Autoregression Estimates

	DFINVQ	DREQX	DRGDC
DFINVQ(-1)	-0.681883	1.03E-06	5.13E-05
	[-2.17305]*	[1.16456]	[0.62741]
DFINVQ(-2)	-0.464186	1.38E-06	0.000158
	[-1.07007]	[1.12578]	[1.39708]
DFINVQ(-3)	-0.086843	1.11E-06	9.20E-05
	[-0.19044]	[0.86059]	[0.77410]
DFINVQ(-4)	-0.143537	3.64E-08	2.22E-05
	[-0.39012]	[0.03503]	[0.23109]
DREQX(-1)	-175679.7	0.06613	-73.28125
	[-1.73090]	[0.23070]	[-2.77084]*
DREQX(-2)	153250.2	0.595958	6.901767
	[1.31794]	[1.81473]	[0.22778]
DREQX(-3)	73967.91	-0.061033	-2.499575
	[0.61421]	[-0.17945]	[-0.07965]
DREQX(-4)	-98555.15	-0.485614	-0.371461
	[-0.84681]	[-1.47741]	[-0.01225]
DRGDC(-1)	-409.4658	0.001983	-1.237802
	[-0.45487]	[0.77982]	[-5.27705]*
DRGDC(-2)	716.8651	0.003002	-1.148694
	[0.79502]	[1.17903]	[-4.88894]*
DRGDC(-3)	-129.3714	-0.002272	-0.862995
	[-0.15437]	[-0.95984]	[-3.95192]*

cont'd.....

	DFINVQ	DREQX	DRGDC
DRGDC(-4)	-939.3627	-0.001787	-0.526843
	[-1.17016]	[-0.78829]	[-2.51860]*
C	225.5442	0.001055	0.133036
	[0.14304]	[0.23694]	[0.32380]
R-squared	0.69841	0.449268	0.902036
Akaike Information Criteria		20.25815	
Schwarz Criteria		22.17249	

Note: (i) t-statistics are reported in parentheses
(ii) * implies significant at 1 % level

Table 7. Variance Decomposition of DREQX

Period	DFINVQ	DREQX	DRGDC
1	5.79202	94.20798	0.000000
2	16.70765	81.17807	2.114273
3	24.01870	74.14313	1.838164
4	26.29208	66.53221	7.175707
5	27.34124	64.63912	8.019640
6	28.13492	63.93715	7.927927
7	27.95788	64.15191	7.890215
8	27.85122	64.42491	7.723872
9	28.54142	63.80828	7.650296
10	28.61213	63.50292	7.884947
11	28.59223	63.51293	7.894846
12	28.75002	63.39994	7.850042
13	28.74885	63.39973	7.851425
14	28.65597	63.45284	7.891195
15	28.81602	63.27259	7.911390
16	28.81886	63.26502	7.916125
17	28.81210	63.27258	7.915323
18	28.81074	63.27731	7.911948
19	28.81052	63.27753	7.911953
20	28.80243	63.26700	7.930565

Ordering: DFINVQ DREQX DRGDC

Table 8. Vector Autoregression Estimates

	DFINVQ	DREQT	DRGDC
DFINVQ(-1)	-0.749909	1.00E-06	4.46E-05
	[-2.92418]*	[1.28515]	[0.45612]
DFINVQ(-2)	-0.568393	1.95E-06	8.60E-06
	[-1.66501]	[1.88182]	[0.66086]
DFINVQ(-3)	-0.199439	1.54E-06	2.72E-05
	[-0.55744]	[1.41342]	[0.19931]
DFINVQ(-4)	-0.163884	6.85E-07	-3.20E-06
	[-0.569884]	[0.78406]	[-0.02922]
DREQT(-1)	-128791.5	-0.12739	-34.80911
	[-1.69022]	[-0.55005]	[-1.19867]
DREQT(-2)	89539.14	0.671257	13.18487
	[1.12046]	[2.76365]*	[0.43292]
DREQT(-3)	55647.62	0.169101	-43.28004
	[0.59670]	[0.59658]	[-1.21773]
DREQT(-4)	-70935.41	-0.62681	48.09891
	[-0.85356]	[-2.48153]*	[1.51865]
DRGDC(-1)	-558.1343	0.002377	-0.890508
	[-0.93057]	[1.30407]	[-3.89582]*
DRGDC(-2)	146.9757	0.003808	-1.111594
	[0.23391]	[1.99395]*	[-4.64202]*
DRGDC(-3)	-315.59	-0.001025	-0.784036
	[-0.49808]	[-0.53224]	[-3.24686]*

cont'd.....

	DFINVQ	DREQT	DRGDC
DRGDC(-4)	-899.2383	-0.002697	-0.235288
	[-1.51599]	[-1.49610]	[-1.04082]
C	389.9284	0.001319	0.089051
	[0.31118]	[0.34645]	[0.18647]
R-squared	0.655271	0.552692	0.802417
Akaike Information Criteria		20.72666	
Schwarz Criteria		22.56544	

Note: (i) t-statistics are reported in parentheses

(ii) * implies significant at 1 % level

Table 9. Variance Decomposition of DREQT

Period	DFINVQ	DREQT	DRGDC
1	1.745989	98.25401	0.000000
2	10.20263	83.37466	6.422713
3	20.33125	74.25974	5.409017
4	18.33289	63.88547	17.781630
5	18.07602	64.34376	17.580210
6	18.90097	62.09263	19.006390
7	18.54365	62.88645	18.569900
8	18.43295	62.78713	18.779920
9	19.65692	61.26081	19.082270
10	19.66702	60.20555	20.127430

Ordering: DFINVQ DREQT DRGDC

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