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**CAPITAL FLOWS AND THEIR
MACROECONOMIC EFFECTS IN INDIA**

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Foreword

The gradual opening of India's capital account in the 1990s has changed the external sector dynamics in India. Growing integration with the world economy has introduced new macroeconomic influences, making the task of macroeconomic management that much more challenging. This paper by Renu Kohli attempts to analyse the patterns and trends in capital flows into India in the 1990s and how these have affected the key macroeconomic variables in the economy. It also attempts to study the response of the policy makers to the new challenges posed by the partial capital account liberalisation.

The paper finds that an inflow of foreign capital during this period has resulted in real exchange rate appreciation and has had a significant impact on domestic money supply. During a capital surge, these effects have been countered through intervention and sterilisation. The costs of these policies in the event of heavy inflows of foreign capital into India are spelt out in the paper.

I hope that the analysis and policy issues raised in this paper will help generate further research and discussion.

Isher Judge Ahluwalia
Director & Chief Executive
ICRIER

March 2001

I Introduction

The last decade has witnessed a tremendous increase in the mobility of international capital. Cross-country trends in capital flows reveal that private capital flows now dominate with official capital flows reduced to a trickle. Simultaneously, a rise in portfolio capital has tilted the composition of international capital flows towards short-term investments, exposing individual countries to enhanced volatility and sudden withdrawal risks. These have been driven both by strong trends towards globalisation, which has enabled pursuit of higher returns and portfolio diversification, and the market-oriented reforms in many countries, which have liberalised access to financial markets. Concurrent with these trends has been the rising incidence of financial crises, raising questions about linkages between the two. Concern has also been expressed as to whether the costs of increased vulnerability to financial fragility might not outweigh the gains from financial integration. Notwithstanding these doubts, most countries continue to progress in dismantling capital controls to integrate their financial markets with the rest of the world, albeit more cautiously.

These developments have stimulated a keen interest in understanding the nature and economic effects of capital flows as well as the appropriate policy responses to safeguard against financial instability that appears to be associated with international capital mobility. Capital flows affect a wide range of economic variables such as exchange rates, interest rates, foreign exchange reserves, domestic monetary conditions as well as savings and investments. Some commonly observed effects of capital inflows

that have been documented in recent studies¹ include real exchange rate appreciation, stock market and real estate boom, reserve accumulation, monetary expansion as well as effects on production and consumption. Empirical studies that have begun to appear on the subject assess the impact of capital inflows upon output growth (Gruben and McLeod, 1996²), differential macroeconomic effects of portfolio and foreign direct investment (Gunther, Moore and Short, 1996) and effects upon monetary conditions, savings and investment (Kamin and Wood, 1998).

These issues are significant for India as it gradually opens its capital account as part of its broader financial liberalisation strategy. Before 1991, India had a closed capital account with capital mobility being restricted through administrative controls and outright prohibition. These controls were influenced by the balance of payments situation, exchange rate movements and India's import-substituting pattern of development. In the aftermath of the balance-of-payments crisis in 1991, India embarked upon an economic reform programme aimed at transforming the controlled economy into a market-driven one. Following changes in exchange rate regime as well as trade and investment policies' reform, there was a spurt in capital flows into the country between 1992/93-97/98. Though the magnitude of these flows is relatively insignificant in a cross-country perspective, the pattern and composition of these flows conforms to trends observed in other emerging markets. India also shares some attributes with these emerging economies, a fact that enables a comparative assessment. For example, like

¹ See Calvo, G. A., Leiderman, L. & C. Reinhart (1993); Corbo and Hernandez (1994); Khan & Reinhart (1995) and Koenig (1996), amongst others.

² Cited in Kamin & Wood (1998)

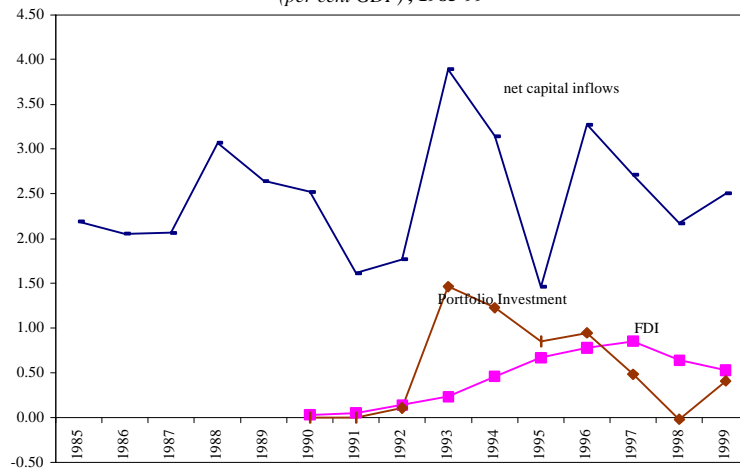
many Asian and Latin American countries, which were at various stages of macroeconomic stabilisation and/or financial liberalisation, when capital started flowing into these economies towards the end of the eighties, India is a liberalising economy too. Notable differences persist, for example, India exhibits far lower openness than these countries and still retains strict capital controls, specifically on outflows.

The above context motivates the aim of this paper. It attempts three things. First, it documents trends in movement and composition of capital flows into India in a comparative perspective. Two, it examines the impact of these flows upon the key macroeconomic variables in the economy, as well as the policy responses of the Indian authorities. Three, it dwells on implications for economic policy. Corresponding to these objectives, the paper is organised into four sections. Section II traces trends in capital inflows into India since the onset of liberalisation, Section III assesses the impact of these flows while Section IV discusses the policy implications and concludes.

II Trends and Composition of Capital Flows

Fig 1 plots the trends in net capital inflows (sum of FDI, portfolio, loans and resident Indian deposits) into India between 1985-98. The plot shows a recovery of net capital inflows that had begun to decline in the late eighties and bottomed out in the 1991

Fig. 1 Volume and Composition of Net Capital Inflows
(per cent GDP), 1985-99



crisis. Following liberalisation of restrictions on inward investment in 1991-92, there was a sharp increase in capital inflows between 1992-95 and 1996-97.³ This is similar to the experiences of other emerging economies in Asia and Latin America, all of who typically experienced a rise in inward foreign capital following market-oriented reforms. The magnitude of capital flows into India is much smaller though; the peak level for India is 3.5 per cent of GDP in 1993-94, which is small when compared to other emerging markets. For instance, the peak levels are above 20 per cent for Malaysia, 13 per cent for Thailand, 10 per cent for the Philippines and almost 10 per cent for Singapore between 1990-93 (Glick, 1998: 4-5).⁴ Second, the swing in the capital account observed in the case of other emerging economies is not visible for India so far. Khan & Reinhart (1995) estimate a change in the capital account from – 2.4 per cent (GDP) on an average between 1984-89 to 1.6 per cent (1990-93) for ten Latin American countries and from 1.6

³ Since then capital flows have been on a declining trend; both portfolio and FDI flows have not reached the peak level of 1995.

⁴ Net private capital flows to emerging markets increased seven-fold between 1990 and 1996 (Glick, 1998: 4-5).

(1984-88) to 3.2 (1989-93) per cent (GDP) for eight Asian ones. Comparative figures for India are 2.3 (1985-89) and 2.4 (1993-98⁵) per cent of GDP, indicating only a marginal increase. This is probably explained by India's relatively late start in liberalising its trade and investment regimes, by which time the competition for international capital had already stiffened.

Though the magnitude of capital inflows into India is at variance vis-à-vis Latin America and other parts of Asia, there is a common pattern in the composition. World capital flows in the nineties have displayed a steep decline in official capital flows and a rise in private investment, particularly portfolio capital. This trend is clearly reflected in

Table 1
Composition of Capital Flows in India:
(percentage to total [net] capital flows)

	Foreign Investment		NRI Deposits	External assistance	Commercial borrowings
	Direct Investment	Portfolio			
1985	0	0	16.3	30.3	21.1
1989	5.8*	0*	34.4	26.5	25.4
1990	1.3	0.08	21.4	30.7	31.3
1991	3.4	0.10	10.6	77.7	40.0
1992	8.0	6.2	51.3	48.4	-9.2
1993	6.0	37.6	12.4	19.6	6.3
1994	14.6	39.1	1.9	16.7	11.3
1995	46.0	58.3	24.5	21.5	29.2
1996	24.7	28.9	29.4	9.9	24.7
1997	36.1	17.8	11.5	9.2	38.8
1998	28.5	-0.7	20.9	9.9	53.0
1999	21.2	29.5	20.3	8.6	3.0

Source: *Total foreign investment as per balance of payments statistics (Handbook of Statistics on Indian Economy, RBI, 2000); the break-up between FDI and Portfolio investment is available from 1990 onwards. Author's calculations based on figures from Handbook of Statistics on Indian Economy, RBI, 1999. Rows do not add up to 100 as all components of the capital account are not included.

⁵ These figures exclude years 1990-91 due to the balance of payments crisis as a result of which there was extensive capital flight of non-resident Indian capital from India (See Economic Survey, 1990-91, 1991-92, MoE, GOI).

Table 1 that profiles the composition of India's capital account over the eighties and nineties. The substantial contribution of aid towards the capital account in the eighties dwindles steadily by the nineties (excluding the IMF loan in 1991 and 1992). Official flows are replaced by private flows; a sharp increase in foreign investment, direct and portfolio, can be observed after 1992. Commercial borrowings abroad drop during the crisis years, resuming thereafter. Portfolio investment flows exceed direct investment (FDI) in the early years of liberalization. The latter accelerates later, peaking in 1995 and falling thereafter. This feature contrasts with what is observed for the countries in the APEC region, where foreign capital was dominated by FDI after the opening of markets, with portfolio flows increasing only in the early nineties. In a way, these movements reflect the global trends: global financial markets had changed substantially by the nineties, with portfolio capital flows registering a sharp rise. More likely however, might be the process of liberalisation in India. While FDI procedures remained complicated and discretionary, investment via the financial markets route was much faster and simpler. This might have tilted the composition of flows in favour of portfolio. A final feature of the table is the continued dependence upon migrants' remittances, after a short decline in 1993-94.

The jump in foreign inward capital that India experienced after *reform/liberalization*, as well as the composition of these inflows conforms to the evidence for other developing countries.⁶ Two broad explanations for this phenomenon have been

⁶ See Khan & Reinhart (1995) for an exhaustive documentation of capital inflows into Latin America and East Asia.

offered in the literature. One viewpoint holds that the fall in US interest rates⁷ between 1989-92, combined with cyclical recession in the US, Japan and many parts of Europe, drove world capital to developing countries in search of higher returns. The other view upholds the role of ‘internal’ or ‘pull’ factors such as credible economic reforms, improved macroeconomic performance and domestic policies that encouraged investor confidence and attracted foreign investment.^{8,9} To what extent are these explanations valid for India?

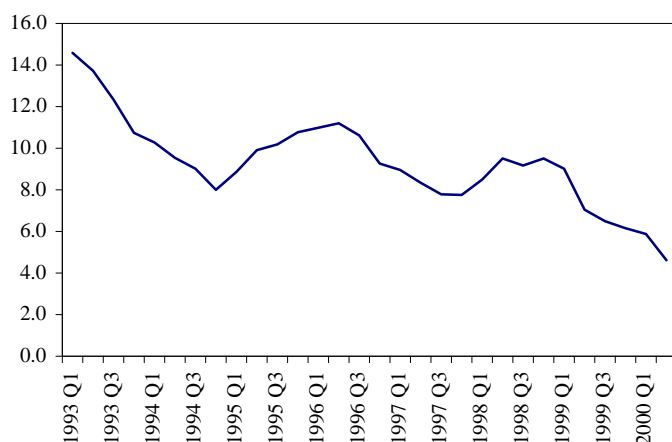
One way of probing the ‘external factors’ hypothesis is to examine comparative returns on domestic and foreign assets, noting that capital mobility will be guided by highest available returns. Due to lack of data availability on comparable assets, we compare interest rate differentials between India and the rest of the world. Fig. 2 graphs

⁷ Calvo, Leiderman and Reinhart (1993) offer empirical evidence in support of this argument.

⁸ See Chohan, Claessens & Mamingi (1993) and Hernandez & Rudolph (1995) who document the role of domestic factors in attracting capital flows. Recent research by Bohn and Tesar (1998) assesses the role of local versus global ‘push’ factors in this context and finds that the former was relatively more important in determining US investment in Asian markets.

⁹ Currency realignment has been offered as another explanation for stimulating capital flows by Goldberg & Klein (1998). Khan & Reinhart (1995) note that reasons vary across Latin America and Asia; for instance, external factors have been more important for the former group.

Fig 2 Lending rate differentials in the 90s



Lending differential is the difference between the prime lending rate and libor

the interest rate spread between the prime lending rate in India and Libor between 1993-2000. The interest spread narrows rapidly from 1993, mainly because of a movement towards lower interest rates after deregulation rather than arbitrage. Foreign investors were allowed to invest in debt instruments in 1997 (subject to a 30% ceiling on total investment) and government treasury bills in 1998. Though it is inappropriate to interpret the trends in interest differentials without allowing for expectations regarding exchange rate changes, superficial evidence does suggest that the relatively high differential rate of return on Indian assets might have played a role in attracting foreign capital after the opening of financial markets.

The timing of these flows however, suggests that internal or 'pull' factors were equally, if not more, important. Before 1991, Indian financial markets were closed, its trade and investment policies did not exactly encourage foreign direct investment and its credit-rating along with investor confidence had ebbed following the balance of payments

crisis in 1991. Post-crisis however, market-oriented reforms were instituted by the government. The macroeconomic performance of the economy improved, as output growth recovered on a higher trajectory, the rate of inflation declined and debt/solvency indicators improved. External debt restructuring resulted in a decline of the short-term to total debt ratio from 10.2 in 1991 to 3.9 in 1994; as a ratio to reserves, short-term debt fell from 382.1 (1991) to 24.1 (1994) and further to 13.5 in 1998.¹⁰

Significant institutional, regulatory and policy changes impacting the external environment during this period were the switch to a flexible exchange rate regime,¹¹ consolidation of external debt, full convertibility of current account transactions, trade reforms,¹² liberalisation of investment policies relating to FDI and financial sector reforms. While the overall thrust of the reforms served to improve international investors' confidence, there is no doubt that specific measures to attract FDI and portfolio capital into India catalysed these inflows. These focused upon elimination of entry barriers and market integration. Foreign investment, which was permitted only in cases of technology transfer, was liberalised and the ceiling of 40 per cent on foreign equity participation was relaxed, procedures were greatly simplified. Elements of financial liberalisation that have a direct bearing upon portfolio investments were allowing foreign institutional investors

¹⁰ Source: "India' External Debt: A Status Report", GOI, MoF, DEA, June 1999.

¹¹ A dual exchange rate regime replaced the basket-linked peg in 1991, signalling transition to the floating exchange rate regime in 1993.

¹² These consist of progressive reduction in tariff rates and removal of quantitative restrictions on imports. The average rate of tariffs, which was 125 in 1991, was successively reduced to 50 per cent by 1995. See Krueger & Chinnoy (2000).

to operate in the Indian capital market; these investments, initially restricted to equity, were subsequently relaxed to include debt, including government bonds.

Simultaneously, raising external resources abroad by domestic corporates was selectively liberalised.¹³ These developments are partly reflected in the growing demand of institutional and private investors abroad, which has facilitated depository issues in the US and Europe and equity purchases by foreign institutional investors on the domestic stock exchanges (Table 2). Equity

Table 2:
International Bond and Equity Issues from India
(billions of US \$)

Year	Global Depository Receipts	External Commercial Borrowings	Equity Investments by Foreign Institutional Investors
	(1)	(2)	(3)
1990-91	-	2.24	-
1992-93	0.09	-0.42	-
1994-95	1.97	1.04	1.54
1996-97	0.93	2.85	2.12
1998-99	0.51	0.85	-0.19

Source: Report on Currency and Finance, 1998-99. Data for FIIs includes both debt and equity. FIIs were allowed to invest in the Indian securities market only in Sept. 1992, in debt instruments in 1997 (subject to an overall ceiling of 30% of total investment) and in government treasury bills in 1998.

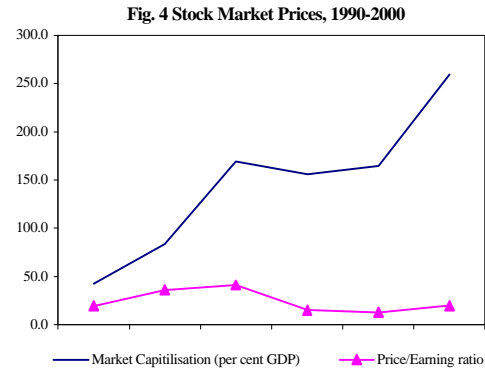
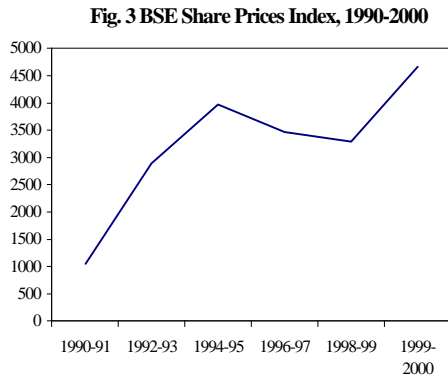
investment has been an important channel for portfolio inflows in other emerging markets too. Table 2 shows that the volume of bond issues has increased after 1991. These changes are consistent with evidence available for other emerging markets in Asia, where bond issues nearly quadrupled between 1989 and 1992 (Khan & Reinhart, 1995: 18) and continued to increase beyond this period.

¹³ This can be observed under the heading commercial borrowings in Table 1. These are closely monitored by the authorities, with annual limits on borrowings. Only companies with a proven track record are permitted to raise capital abroad through depository issues.

The composition of foreign capital is by now well understood to make a difference in impact. Thus short-term or portfolio capital, which is subject to ‘sudden reversal’ and is, therefore, more volatile, renders the recipient country extremely vulnerable. Tentative evidence for India supports this hypothesis as portfolio flows are more volatile than FDI, as measured by the standard deviation of the two series. The standard deviation of portfolio investment between 1990-99 is 5163.2 which is substantially larger than 4592.3 for FDI. The difference in volatility increases when measured at higher frequency, quarterly (1900.5 and 1226.9 respectively) as well as monthly (205.3 and 94 respectively).¹⁴

Portfolio flows also render the stock markets more volatile through increased linkages between the local and foreign financial markets. Preliminary evidence for India shows some support for this hypothesis as the co-movement between the share prices index and other stock prices’ indicators during the capital surge of 1992-95 shows in Figs. 1, 3 & 4. The rise in the share prices’ index presumably contributed to the rise in market capitalisation and the price-earnings

¹⁴ Claessens, Dooley and Warner (1995) however, provide a different view on this. They show both categories of capital flows to hold equivalent time-series properties.



ratios during this period.¹⁵ Simple correlation measures between portfolio capital flows and the BSE share price index is positively strong, 0.58. The price-earnings ratio is observed to be doubling between 1990-91 and 1992-93 and dipping sharply after 1995, when the flows subsided. A similar trend is observed for the period of inflows' boom in South-east Asia; this ratio doubled between 1990-93 for Hong Kong and Thailand. The negative consequences were that it fuelled stock market booms and contributed to market volatility in the case of Mexico and the East Asian economies.

III Capital Flows and Macroeconomic Aggregates

This section examines the impact of capital inflows upon important macroeconomic aggregates following liberalisation. Several studies, notably Corbo & Hernandez (1994), Calvo, Leidermann & Reinhart (1994) and Khan & Reinhart (1995), amongst others, have documented these effects for Latin America and East Asia. Some commonly observed effects of capital inflows are exchange rate appreciation, monetary

¹⁵ The post-1991 period is also concomitant with regulatory, institutional and other changes in the capital market. In part, these measures have also contributed to the upward trend in stock market prices through increase in investor confidence and attracting greater funds.

expansion, rise in bank lending if the flows are intermediated through banks and effects upon savings and investment. This section considers the effects of capital flows upon the exchange rate, foreign exchange reserves and money supply (sterilisation) and the policy responses of the authorities.

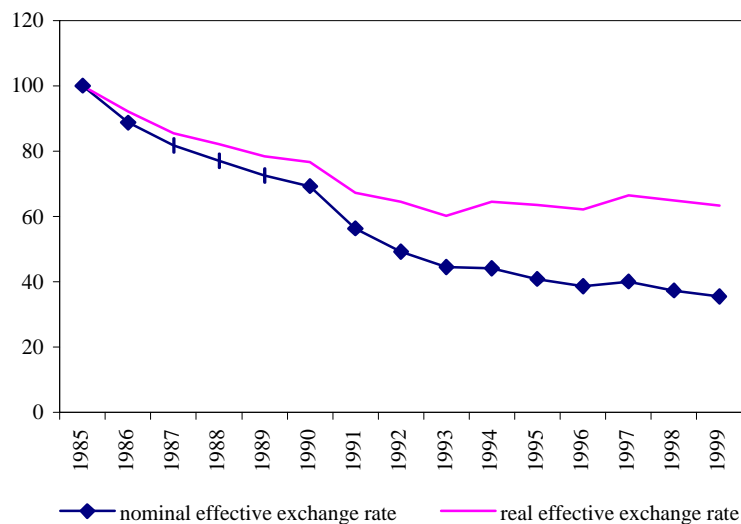
Exchange Rate Appreciation: In theory, an inflow of foreign capital will raise the level of domestic expenditure in the economy, raising the demand for non-tradable goods that results in an appreciation of the real exchange rate. The price-adjustment process then leads to a reallocation of resources from tradable to non-tradable goods and a switching of expenditures in favour of non-tradables. The rise in aggregate expenditure also increases the demand for tradables, leading to a rise in imports and a widening of the trade deficit. The transmission channel of the real exchange rate appreciation will however, depend on the exchange rate regime. With a floating exchange rate and no central bank intervention, the appreciation will take place through a nominal appreciation, but in a fixed exchange rate regime, the appreciation will work through an expansion in the domestic money supply, aggregate demand and the prices of non-tradables.

Fig. 5 shows trends in the bilateral (rupee-dollar), real and nominal, effective exchange rates¹⁶ over three decades. Both series are observed to be depreciating after 1985. After 1993, the time of regime switch, the nominal depreciation persists. The real exchange rate however displays a constant trend, punctuated by two visible appreciation

¹⁶ This is the 5 country trade-weighted real effective exchange rate (REER) index, published by the RBI. It's constructed as a weighted average of NEER adjusted by the ratio of domestic (WPI) to foreign inflation (CPI). The currencies are US Dollar, Japanese Yen, Deutsche Mark, Pound Sterling, French France.

episodes. During the capital surge in 1992-95 and 1996-97, the real exchange rate appreciated by 10.7 (Aug. 1995) and 14 (Aug. 1997) per cent respectively over its March 1993 level. The policy response of the authorities was to avert a nominal appreciation,¹⁷ preferring an adjustment through gradual increases in domestic inflation.¹⁸ Part of the

Fig. 5 Nominal and Real Effective Exchange Rates (1985=100)



policy response was directed towards encouraging capital outflows through early servicing of external debt. India's external adjustment was also facilitated by the timing of these inflows as they coincided with trade reform, convertibility of the current account and liberalisation of overseas investments by Indian firms, measures which were partly financed by the net increase in capital assets during this period.

¹⁷ For a complete discussion on macroeconomic policy response to capital inflows during this period, see Economic Survey, 1994-95, and Acharya (1999).

¹⁸ Both consumer and wholesale price inflation rose between 1993-95, the peak period of inflows and again in 1996-97, when inflows resumed.

Both real exchange rate behaviour and policy response in India bear a closer similarity with East Asian economies than the Latin American ones. The former mostly limited adjustment of their currencies vis-à-vis the US dollar, in contrast to the Latin American countries, particularly Argentina, Brazil and Mexico, who allowed much more exchange rate flexibility. Glick (1998: 8) has noted that though capital inflows have been associated with real exchange rate appreciation in both regions, the extent of real exchange rate appreciation in the Asian region was far less than the Latin American countries, presumably due to differences in policy response. Khan & Reinhart (1995) have pointed out that differences in composition of aggregate demand might account for this varied exchange rate response across the two regions. The investment/GDP ratio increased by 3.5 per cent for the Asian group of countries during the capital surge, but stagnated in the Latin American region, where private savings declined and consumption rose.

A similar comparison for India shows a 3.5 per cent increase in the investment/GDP ratio between 1992-93 and 1994-95, the capital inflow period. During this time, private savings rose by an approximately similar amount while consumption fell. Thus the composition of aggregate demand could also have curtailed a real appreciation, though circumstances indicate that policy response was undoubtedly a major factor in thwarting appreciation pressures upon the real exchange rate. For example, when the flows abated by mid-1995, the central bank effected an adjustment in the nominal exchange rate in late 1995, bringing back the real exchange rate closer to the

March 1993 level.¹⁹ A similar policy response prevailed when the real exchange rate appreciated in response to capital inflows in 1996-97, the appreciation was reduced by 9 per cent in Dec. 1997. These responses can be observed in real exchange rate movements in Fig. 5.

The behaviour of the real exchange rate in response to capital inflows has been an important area of concern and has been examined in several recent studies. Calvo, Leiderman and Reinhart (1993) and Edwards (1999) have explored the association between capital inflows and real exchange rates for a set of Latin American countries. They find substantial evidence that capital inflows contributed both to real exchange rate appreciation and reserves' accumulation in these countries. Is there any such evidence for India? We attempt a tentative exploration of this hypothesis in this paper.

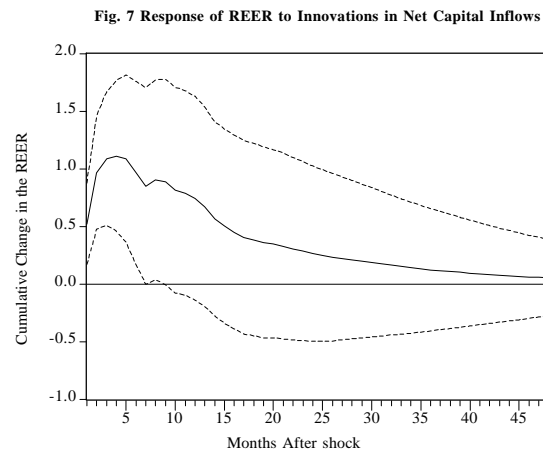
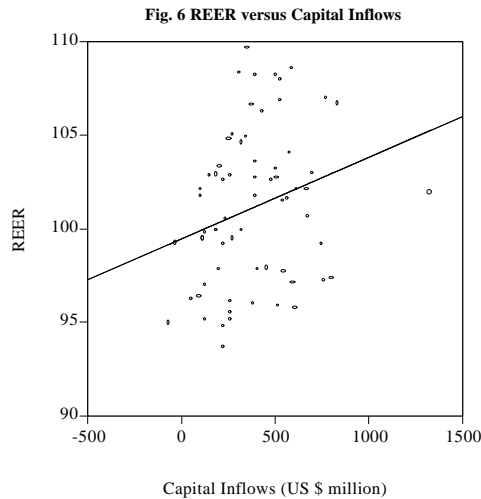
The time-series properties of the two series show both net capital account and the real effective exchange rate (REER) to be stationary, I (0), processes.^{20,21} Restricting ourselves to the post-1993 period with quarterly observations, we next examined whether the two series are cointegrated. Testing for cointegration through Johansen's (1990)

¹⁹ The base of March 1993 is reported to have been notionally established as an 'equilibrium' rate for the rupee by the official authorities. See "Money Market Review" EPW Research Foundation, Economic & Political Weekly, Sept. 13, 1997: 2306.

²⁰ The ADF and Phillips-Perron statistics for net capital account and the real effective exchange rate are -3.15, -5.81 and -3.22 and -2.89 respectively. Critical ADF values are -3.68 (1%), -2.97 (5%), -2.62 (10%) while Phillips-Perron values are -3.67 (1%), -2.96 (5%) and -2.62 (10%) respectively. The REER is stationary according to the Phillips-Perron test at 10 % level of significance only.

²¹ The stationarity of the real exchange rate is interesting, it follows the change in exchange rate regime in 1993 and validates purchasing power parity for the period. The mean-reverting nature of the real exchange rate in the 'managed float' period is however, linked to the PPP rule by which the float is managed rather than a market determined movement of the REER.

procedure, we conclude that both series are tied together in a long-run equilibrium relationship.²² The bivariate relationship between net capital inflows and the real effective exchange rate is plotted in Fig. 6 below. The simple correlation coefficient between the two series is small, 0.11; data at monthly frequency²³ from 1995:01-2000:11 shows a correlation coefficient of 0.24. These correlations are small compared to Edwards' (1999) estimates for seven Latin American economies, which range between 0.14-0.72, but the



direction of correlation is similar. Granger causality tests between the two variables show that the hypothesis that net capital inflows do not cause real exchange rates can be rejected 93 per cent of the time. Reverse causality, i.e. real exchange rates do not Granger cause net capital inflows, is however accepted.

²² The I_{trace} statistic is 20.4, which exceeds the critical value of 20 at one percent, suggesting that the null hypothesis of no cointegrating vector is rejected.

²³ This uses the series foreign investment inflows instead of the net capital account. The former is available only from 1995 onwards. See RBI Bulletin (October 1999)

To illustrate the impact of capital inflows upon real exchange rates in India, we construct an impulse response function between the two series in Fig. 7. The response function indicates that a one standard deviation surprise shock to net capital inflows, i.e. a net inflow of US \$245 million in the first period causes the real exchange rate to appreciate by 1.2 per cent in the second month. The effect of the shock wears out over 48 months, i.e. 4 years. The impulse response indicates that unanticipated capital inflows shocks have significant effects in the first eight months after the surprise innovation and there is no significant effect thereafter.

Preliminary evidence for India therefore, corresponds to individual as well as cross-country evidence on the subject. This empirical evidence however, needs to be examined further in depth, for though fluctuations in real exchange rates can be attributed to capital inflows, they can also be affected by changes in the terms of trade, government spending and monetary as well as exchange rate policies. The importance of the exercise need hardly be emphasised as a significant implication of this result is that a rise in inward capital flows into the economy is likely to lead to losses in international competitiveness via real exchange rate appreciation. This has implications for exchange rate policy, which are spelt out in Section IV of the paper.

Reserve accumulation: Capital inflows can be traced to either international reserves' accumulation or a current account deficit, depending upon the exchange rate regime. If there is no intervention by the central bank, i.e. the exchange rate regime is a pure float, then the net increase in capital assets via capital inflows would be associated with a

similar increase in imports and therefore a widening current account deficit. Alternately, if the exchange rate regime is fixed and the central bank intervenes to counter appreciation pressures, then capital inflows would be visible in increases in foreign exchange reserves. Since the two extremes are rarely observed in practice, the choice of intervention, or its size, narrows down to the degree of exchange rate flexibility desirable by the authorities and is, in essence, a policy choice.

Figs. 8 and 9 plot foreign exchange reserves and the current account deficit (per cent GDP) for India over 1970-99. The current account deficit is seen to be narrowing after touching 3.2 per cent in 1991, the year of crisis. The steep increase in foreign

Fig. 8 Foreign Exchange Reserves
(excluding SDRs & gold)

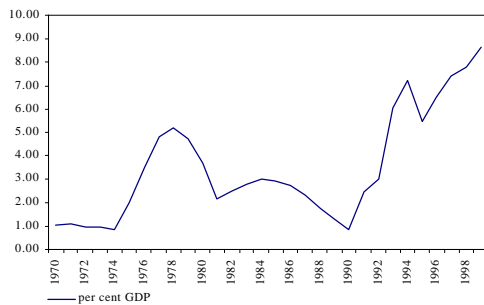


Fig. 9 Current Account Balance

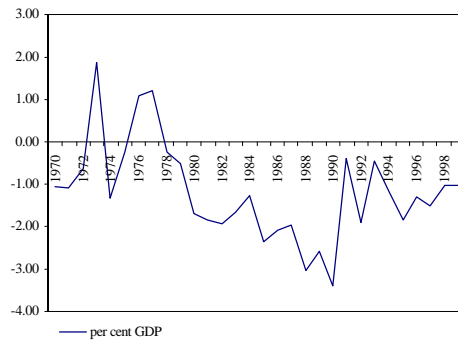


Fig. 10 Official Reserves - East Asia (Indonesia, Korea, Malaysia, Philippines, Thailand)

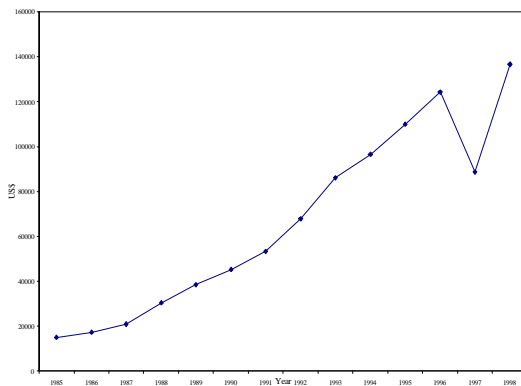
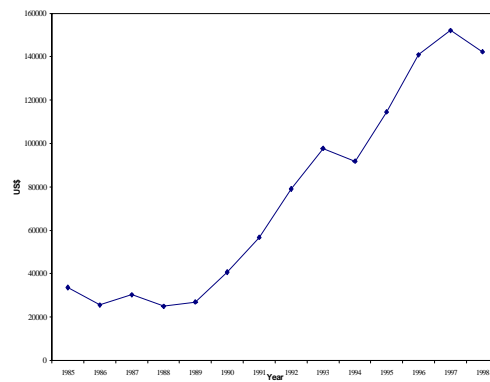


Fig. 11 Official Reserves - Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela)



exchange reserves (Fig. 8) is concurrent with this decline, suggesting absorption of foreign currency inflows by the central bank.²⁴ In 1993, the first year of the capital surge, almost the entire net capital inflows were absorbed as foreign exchange reserves. In 1994, almost one-third of net capital inflows were utilised so; from 1996 onwards, the Reserve Bank has typically absorbed fifty per cent of net capital inflows into international reserves. The stock of international reserves in 1999-2000 (US \$ 38 bn), represents an increase of nearly 552 per cent over the 1991 level. Between 1991-98, the rate of growth of foreign exchange reserves in India averaged 58 per cent against a negative average of 16.8 per cent for 1985-90.²⁵ The heavy buildup of reserves in the aftermath of capital inflows into India mirrors the reserve accumulation patterns of countries in the Asian and Latin American regions, all of who augmented their foreign exchange reserves during the period of heavy capital inflows. In fact, Fig. 8 mimics the trend in international reserves observed for a group of Asian and Latin American countries in Figs. 10-11.

Impact upon Monetary Conditions & Sterilisation: Capital inflows impact upon domestic money supply through accumulation of net foreign currency assets with the central bank. Whether the monetary base is altered or not depends upon whether the central bank intervenes to maintain a fixed exchange rate or allows it to float freely with no intervention. If there is intervention, then an accumulation of international reserves represents an increase in the net foreign exchange assets of the central bank and directly

²⁴ The intervention activities of the RBI have been extensively documented in Kohli (2000a, b).

²⁵ One may also note at this point the conscious efforts made by the authorities to boost foreign exchange reserves through mobilisation of funds from non-resident Indians, viz. the Resurgent India Bonds (1998) and the Indian Millennium Deposit Bonds (2000). These were targeted exclusively at NRIs and overseas corporate bodies predominantly owned by NRIs.

affects the monetary base. What has been the impact of capital inflows upon domestic money supply in India and how has monetary policy responded to these inflows?

Though India has had a market-determined exchange rate since 1993, the flexibility permitted by the monetary authority has been limited²⁶. The size and scale of intervention by the central bank has increased significantly since 1993 (Kohli, 2000) and the foreign exchange reserves' build-up has been substantial. Tables 12 and 13, which present a profile of monetary and fiscal indicators from 1985, offer a perspective via the transmission channel of net capital inflows, changes in net foreign currency assets, the monetary base and the broader monetary aggregates.

Some stylised facts can be established about changes in the movements of monetary aggregates after liberalization. First, net foreign exchange assets of the central bank account for most of the increase in the monetary base (reserve money) in the nineties. As a percentage share of M3, the monetary aggregate targeted by the central bank, net foreign exchange assets have grown from an average of 3.7 per cent in the eighties to 12.1 per cent in 1990s.²⁷ Second, while fiscal policy induced increases in money supply have declined somewhat in the post-liberalization period, it still remains an important exogenous source of monetary expansion. Third, private sector credit appears to be the only policy variable that is manipulated by the central bank via interest rate and reserve requirement changes to adhere to monetary targets.

²⁶ This is true of many developing countries. See Calvo & Reinhart (2000).

²⁷ This is even more significant when compared to a 12 per cent average share in the increase in the monetary base in the eighties (Report on Currency & Finance, 1998-99, RBI, Mumbai).

During the capital surge episode in 1993-95, for example, the central bank's monetary target (M3 growth rate of 15-16 per cent) was overshoot and the monetary base expanded both in nominal and real terms (Cols. 2 & 4, Table 12). As a result of rapid growth of both nominal and real money supply, and the pass-through between the exchange rate and domestic prices, the rate of inflation rose to 10.8 per cent²⁸. *Prima facie*, monetary policy appears to have responded to counter the impact of capital inflows, though monetary variable are partly influenced by money demand. For instance, interest rate movements (Cols. 5 & 6, Table 12), which reflect both monetary as well as fiscal changes, provide evidence of monetary tightening. Nominal interest

Table 12
Money Growth and Interest Rates

	Nominal money growth (M3)	Real M3 growth	Nominal monetary base growth	Real monetary base growth	Nominal interest rates (% pa)	Real interest rates ^a (% pa)	Cash Reserve Ratio	Consolidated Govt. Deficit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1985-88	17.1	8.6	18.2	10.0	-	-	9, 9.5, 10, 10.5, 11	-
1989-91 ^b	17.9	5.6	13.2	4.5	-	-	15.0	-
1992-93	14.8	4.3	11.3	1.2	17	6.2	15.0	7.19
1993-94	18.4	9.3	25.2	15.5	14	7.8	14.5, 14,	8.61
1994-95	22.3	10.4	22.1	10.1	15	5.1	14.5, 14.75, 15	7.27
1995-96	13.5	5.5	14.9	6.7	16.5	6.9	14.5, 14	6.92
1996-97	16.1	9.2	2.8	-3.3	14.8	6.0	13.5, 13, 12, 11.5, 11, 10.5, 10	6.83
1997-98	18.0	12.6	13.2	8.0	14	6.9	9.75, 9.5, 10, 10.5, 10.25	6.42
1998-99	18.3	10.7	14.6	7.2	12.5	3.6	10, 11, 10.5	8.32
1999-00	14.9	11.7	8.1	5.0	11.8	7.2	10, 9.5, 9, 8.5	7.63

Source: Cols. 2-4, Handbook of Statistics on the Indian Economy, RBI, 1999; Col. 5, Indian Public Finance Statistics, MoF, DEA, Economics Division, GOI. ^a = nominal interest rates minus CPI inflation rates; ^b = averages.

²⁸ We acknowledge that real money stock is an *ex post* variable and thus cannot really be used to explain price level movements.

Table 13
Movements in the Monetary Base (Reserve Money)
(percentage to change in reserve money)

	Δ RBICG	Δ RBICC	Δ NFA	Δ GCL	Δ NMLL	Δ RM
1984/85-89/90*	105.5	13.6	7.6	2.0	28.7	100
1991-92	44.0	133.3	92.5	0.7	3.3	100
1992-93	39.32	-49.64	33.79	1.06	7.37	100
1993-94	3.0	-14.7	103.2	0.6	-7.9	100
1994-95	7.1	26.4	76.1	1.3	10.8	100
1995-96	79.3	34.9	-2.5	0.0	11.7	100
1996-97	49.6	-272.5	363.9	9.6	50.5	100
1997-98	41.9	7.8	80.3	0.7	30.7	100
1998-99	42.8	25.1	54.3	1.8	24.0	100
1999-00	-32.4	25.7	211.9	3.1	132.4	100

*Pre-90 figures from Joshi & Little (1994: 253). Author's calculations for the rest of the table.

RBICG: RBI credit to government

RBICC: RBI credit to commercial sector, including commercial banks

NFA: RBI's net foreign exchange assets

GCL: Government currency liabilities to the public

NMLL: Net non-monetary liabilities of the RBI

RM: Reserve money (RM=RBICG+RBICC+NFA+GCL-NMLL)

rates rose with inflation, while the real interest rate rose in 1993-94 and fell in 1994-95.

Nominal interest rates appear to have been raised to prevent the real rate of interest rate from declining.

Another perspective on monetary policy response is offered by noting movements in the monetary base in Table 13. Offsetting squeezes on private domestic credit closely correspond to accretions in net foreign currency assets. Private sector absorption thus adjusted during the capital inflow period of 1993 and 1994. In fact, commercial bank lending to the private sector was almost constant at 23.8-23.3 per cent of GDP between 1993-1997. Between 1993-95, reserve requirements (Col. 8, Table 12) were steadily

raised, possibly to limit the impact of money supply via the banking system. Table 12 (Cols.1-4) shows a sharp contraction in nominal and real base money growth during 1995-96 and 1996-97, which brought about the fall in the rate of broad money growth. Finally, government credit, which had declined between 1991-93, and has traditionally been a major source of monetary expansion, also contributed to the monetary base as the fiscal deficit rose sharply in 1993-94.

Inferences based upon mere movements of the monetary variables however, are in danger of amounting to conjecture, as these are also driven by domestic conditions. For instance, note that the CRR falls in the second episode of capital surge in 1996; so do nominal interest rates, suggesting domestic policy objectives guided monetary policy response. The relationship between capital inflows and money supply, therefore, needs to be investigated more carefully,²⁹ as a monetary expansion implies inflation and if the central bank's monetary growth targets are disrupted, it may be desirable to insulate the impact of capital flows upon money supply. This is typically done through sterilisation, which is simply the exchange of domestic assets for foreign assets. Typical sterilisation tools in developing countries are open reserve requirements and to a lesser extent, open market operations.³⁰ The former have been a common monetary management tool in

²⁹ Recent econometric evidence shows the impact of capital flows upon monetary growth. For instance, Kamin & Wood (1998) uncover a significant independent effect of capital flows upon domestic money demand for Mexico and the Pacific Basin group of countries. Both reserve changes and net capital inflows tended to lower interest rates and raise M2, particularly in Mexico.

³⁰ In most developing countries, the securities markets are thin, with the result that central banks typically rely heavily on reserve requirement changes.

Southeast Asia, as also in some parts of Latin America (Chile, Mexico), to insulate domestic money supply from the expansionary effects of capital inflows.³¹

In India, the monetary impact of reserves' accumulation is neutralised primarily through reserve requirement changes on commercial banks' liabilities. India still relies on direct monetary control instead of indirect monetary management due to structural problems like interest rate rigidities, and less developed short-term money market, which limits optimal utilisation of open market operations. Open market operations are increasingly being used since 1991, though they are limited by the ability of bond and equity markets to absorb government securities. As percentage to M3, open market operations were only 0.28 per cent in 1994, increasing to 2.2 per cent by 1999. Open market operations appear to be used more to neutralize foreign exchange market interventions than as a monetary policy instrument.

While it is difficult to collect evidence on the magnitude of sterilisation, it has been conceded elsewhere that a complete offset could not be achieved.³² During the 1993-95 capital surge episode in India, the cash reserve ratio was raised in three stages from 14 to 15 per cent in 1994-95 (Col. 8, Table 12) to offset the effects of capital inflows upon money supply growth. Evidence gleaned from existing statistics sheds some light on the sterilisation activities of the central bank. For example, holdings of private securities by

³¹ Occasionally, other sterilisation instruments like open market operations, swap operations with commercial banks, cuts in central bank credit and rediscounts, increases in the rediscount rate, conversion of commercial bank debt of public institutions and transfer of assets of pension/provident funds etc. have been used to bring about monetary tightening. For a detailed account of sterilisation methods and experience in Asia, see Spiegel (1995).

³² Acharya (1999).

the commercial banks actually declined during this period, whereas investment by banks in government securities rose³³. The latter continues to show a rising trend after 1992. As percentage to GDP, investment in government securities have risen from 10.1 in 1991 to 11.3 per cent in 1994, dropping to 10.8 per cent in 1995 and then again rising to 11.2 (1996) and 12.6 per cent in 1998.

To look for formal evidence on sterilisation, we estimate a simple domestic credit reaction function where domestic credit creation is assumed to respond to changes in foreign exchange reserves, the current output gap and the past rate of inflation. Estimating this reaction function through two-stage least squares yields the following regression equation:

$$\Delta DC_t = 888.7 - 1.09 \Delta NFA_t - 350.0 p_{t-1}$$

(1.24) (3.25) (0.54)

$$Adj.R^2 = 0.29 \quad DW = 1.88, \quad SER = 4035.8$$

where ΔDC_t is change in the level of domestic credit, ΔNFA_t is the level of net foreign currency assets, $YGAP_t$ is the deviation of real output from trend and p_{t-1} is the rate of wholesale price inflation.³⁴ The extent of sterilisation is indicated by the coefficient on ΔNFA_t , which has the predicted negative sign and is significantly close to unity,

³³ There are other reasons for this rise. For example, financial scams in the early nineties made it difficult for banks to make other investments, inducing risk-averse behaviour. This reflected in increased investments in gilts.

³⁴ The reaction function was estimated using monthly data from 1993:03-2000:05. Lagged values of the explanatory variables, the prime lending rate, federal funds rate (US), as well as the real and nominal exchange rate were used as instruments. Seasonal dummies and a MA (1) term used in the estimation are not reported here.

indicating complete sterilisation. The output gap and lagged inflation are insignificant and of incorrect sign; the output gap was dropped in the final estimated equation. Sensitivity analysis checks reveal the specification to be sensitive to treatment of the output gap as endogenous or exogenous, or lagged one period. The size of the offset coefficient remains unchanged but gains in significance when the output gap variable is dropped, inflation now enters with a correct sign but is insignificant. The size of the offset coefficient is robust to several variants of the reaction function (1.09) indicating a complete sterilisation. These estimates show that the RBI used domestic credit policy to attain internal policy objectives while engaging in sterilised intervention to influence/maintain the exchange rate. Sterilisation has several controversial implications, which are discussed in the next section.

IV Policy Implications and Conclusion

The experience with liberalization of controls on inward capital flows in India shows close similarities with other liberalising economies of Latin America and Asia. A striking difference between India and these economies is that the magnitude of capital inflows has not been very large in India so as to cause intensive macro and micro-management problems. As such, the challenges faced by India, both in terms of impact upon important economic variables as well as macroeconomic management, have been far less. Notwithstanding these differences however, many attributes of the Indian experience, viz. inflow of foreign capital following the opening of markets, real exchange rate response, and monetary policy response, have been shown to bear strong similarities with these economies in this paper. Based on the analysis contained in this paper, the key

policy issues of concern to India are of allowing the exchange rate to change, sterilisation, the soundness and capacity of the financial system to intermediate large volumes of capital inflows as well as the relative costs of particular policies.

It is well known by now that the composition of flows makes a significant difference, both in terms of impact and smooth management. Portfolio flows are more volatile than direct investment flows and because of their short-term nature, more difficult to intermediate smoothly. They can cause uneven expansion and contraction in domestic liquidity and thus have a greater impact upon stock markets and expansion in money supply and domestic credit. Since sudden, large shifts in portfolio demand for a country's liabilities can be very destabilising, portfolio flows need to be skillfully intermediated. Direct investment flows (FDI), on the other hand, are long-term in nature and for that reason, less volatile. Being visibly embedded in investment in plant and equipment, FDI is less susceptible to sudden withdrawals out of the country and leads to productive uses of capital and consequent economic growth.

It is significant that the distribution of capital flows between portfolio and FDI flows into India tilts distinctly towards the former in most years after liberalization. Foreign direct investment does not reveal a stable trend so far. The relatively greater contribution of portfolio capital towards India's capital account, and the fact that these inflows could increase to significant levels in the future as India's financial markets get integrated globally, show that an important sphere of concern is their skillful management to facilitate smooth intermediation. There are two channels through which

inward capital can be intermediated – the stock market or the banking system. Preliminary evidence for India on the relationship between portfolio flows and some stock market indicators suggests that market prices are not unaffected by capital inflows. This exposes the potential vulnerability of the economy to sudden withdrawals of foreign investors from the financial market, which will affect liquidity and contribute to market volatility. The state of development of India's financial markets, which are relatively thin and underdeveloped, is likely to be a severe constraint on intermediating heavy volumes of volatile, short-term capital, though it must be admitted in fairness that the volume of transactions in both foreign exchange and domestic money markets has been steadily increasing in the post-reform period. An increase in the volume of capital inflows, therefore, might necessitate excessive intermediation through the domestic banking sector. What are the implications for India in this regard?

If intermediated through the banking system, portfolio flows have a greater impact upon domestic monetary expansion. Sudden, uneven increases in intermediated funds will lead to an irregular expansion in the volume of domestic financial assets and liabilities.³⁵ Unless sterilised, the volume of bank lending is bound to rise and could lead to unscrupulous lending, which if it finances consumption or real estate, can trigger a consumption boom. Moral hazard risks are thus likely to increase, threatening financial instability, as transpired during the Asian crisis.

³⁵ A further source of expansion in loanable resources of the domestic banks could surface through impending financial reform measures like reduction in reserve requirements or disinvestment proceeds that might be deployed to retire internal public debt.

In such a scenario, a sound banking system is an essential pre-requisite. The state of the Indian banking system, particularly the public sector banks, is fragile. Many of them are under-capitalised, with large levels of non-performing loans on their balance-sheets. Though India's financial reforms have consistently emphasised strengthening of prudential regulation and supervisory standards, sector as well as borrower-specific exposure limits exist, and liquidity requirements are in place, the capacity of these institutions to assess, price and manage risks is doubtful. These capacities can be created through structural changes and institutional reform of these institutions, which is still an unstarted agenda of financial reform in India.

The difference between net capital inflows and the current account deficit has so far been negative in India, as a consequence of which the impact upon the banking system has been small. Thus absorption by the central bank through sterilisation and utilisation of bank reserves for financing import payments (recall that capital inflows during this period were used to liberalise trade transactions) controlled commercial bank lending during the past surge in capital flows. The banking system in India however, accounts for 64 per cent of the total financial assets of the economy, and a sudden expansion in banks' liabilities might be very difficult to monitor, particularly the end-use of loans. Real effects of intermediated foreign capital depend pretty much upon what these loans finance. For example, in the ASEAN region and some Latin American countries, like Chile and Mexico, capital inflows have been associated with high domestic savings, investment and economic growth. Absorption was therefore smooth and did not disrupt macroeconomic stability. However, in the Latin American region,

particularly Argentina and Brazil, there was a rise in private consumption. Instances when inward foreign capital translated into a stock market and real estate boom that ultimately ended in a financial or currency crisis, as in Malaysia and Thailand, are also well known.

So far, the evidence available for India on this issue shows that capital flows financed more investment than consumption. Initially, the current account deficit widened from 0.4 (1993) to 1.8 per cent (1995) in correspondence with the capital surge. This can be traced to a combination of a 3.8 per cent increase in national investment and a 3.0 per cent increase in national savings during the same time.³⁶ In a longer perspective however, i.e. between 1990 and 1995, the current account balance (as percentage of GDP) improved by 1.5 per cent. This reduction is accounted for by a rise in savings rate by 1 per cent whereas the rate of investment actually fell by 0.6 per cent. This is partly because public investment fell during this period by almost by 1.8 per cent though private investment increased by almost 4 per cent. Disaggregation of private investment shows that it went into productive sectors. Real private investment in construction remained constant at 0.6 per cent of GDP between 1991-1995, increasing marginally by 0.1 per cent thereafter, while equipment investment rose from 3.8 per cent of GDP in 1990 to 6.4 per cent in 1993 and by another 2 per cent for 1994 and 1995.

³⁶ Since the current account deficit equals the difference between national saving and investment, imbalances in it can result from either a fall in savings or a rise in investment. A current account deficit stemming from a rise in investment is more desirable since it leads to an increase in productive capacity and economic growth. On the other hand, a fall in the savings rate driving the current account deficit indicates a rise in consumption. However, if capital inflows represent unrequited transfer of wealth, then consumers would rationally increase consumption. The net effects can be worked out through an intertemporal approach to balance of payments.

A second issue is the response of the real exchange rate to removal of capital account restrictions. This paper shows that capital inflows are associated with real appreciation in India. This is an area where conflicting policy choices are bound to arise. On one hand, the policy option of stabilising the real exchange rate to keep it constant can be a source of potential conflict between external and internal objectives and it may not always be possible to reconcile the two. Intervening foreign currency purchases to stabilise the exchange rate and accumulation of foreign exchange reserves has implications for domestic monetary management, which can be seriously impaired by divided short-term monetary responses during a capital surge. Monetary policy therefore, has to be untangled from exchange rate policy to be able to respond effectively to domestic objectives.

The option of a more flexible exchange rate policy, which has the advantages of insulating domestic money supply, domestic credit and the banking system as well as discouraging speculation through increased exchange risk, carries with it the risk of appreciation. A significant implication of real appreciation is the loss in external competitiveness, which hurts exports. This, in turn, will lower the profitability of the trading sectors of the economy and disrupt the process of trade liberalization. Second, there are real adjustment costs associated with exchange rate changes, which, if the inflows are temporary, can severely disrupt economic processes within the economy³⁷.

³⁷ See Calvo & Reinhart (2000) who provide evidence as to why developing countries fear floating exchange rates.

The major policy issue here is how much should the exchange rate be allowed to fluctuate or adjust, vis-a-vis the tradeoff between the real economic costs of exchange rate fluctuations and inflation. In other words, if the external sector has to be protected, how does one reconcile a stable exchange rate and simultaneously control domestic money supply with capital mobility. This is the familiar *macroeconomic policy trilemma* (Obstfeld and Taylor, 2001) where the conflict facing policymakers is the choice between a fixed exchange rate, capital mobility and an activist monetary policy, when only two of the three objectives can be chosen. One may also mention here that the policy option of protecting exports through subsidies, as a safeguard against adverse exchange rate movements, is now constrained by the current environment of globalisation and trade agreements.

One option that could be explored in the face of capital inflow surges is absorption by the external sector through encouraging capital outflows. The policy response during the 1993-97 surge did liberalise capital outflows to contain appreciation pressures. This response actually facilitated trade liberalization as it was possible to pursue import liberalisation despite the expected impact upon the current account. South Korea exercised this option successfully during its current account surplus of 1986-88 when it actively encouraged capital outflows by residents.³⁸

The short experience with liberalization of capital inflows documented in this paper highlights the pressures of a capital surge upon domestic monetary management. It

³⁸ Koo & Park (1994).

also reveals the additional constraint of fiscal-led monetary expansion in India, which raises aggregate demand and aggravates the inflationary impact of capital inflows. These pressures complicate macroeconomic management as the only variable that can be varied in this scenario to control inflation, or adhere to a monetary target, is domestic private sector credit. A popularly suggested macroeconomic policy response during a capital surge to counter their inflationary impact and lower aggregate demand is to exercise fiscal restraint. This option however, has rarely been exercised or observed (Edwards, 2000), the reason being that fiscal policy is usually set according to medium/long-term projections and it is difficult to use it effectively for immediate effects. In India's case, however, there is still a strong argument for fiscal restraint, as fiscal profligacy constrains monetary policy. If monetary management is to be geared towards price stability with an open capital account, it is important that government credit should be curtailed. Private sector credit variations can then be released from the burden of adjustment to keep pace with real GDP growth.

A final issue is the use of sterilisation to limit the impact of foreign currency inflows upon domestic money supply. Preliminary evidence offered in this paper shows part sterilisation of capital inflows by the central bank. If the authorities continue the present emphasis upon a stable exchange rate regime, the need for sterilisation would be even greater. Many academics have noted the pitfalls associated with sterilisation policies (See Spiegel, Calvo, 1991, amongst others) and it is a controversial issue. One reservation about sterilisation is its effects upon interest rates. Since sterilisation involves an exchange of foreign currency assets for domestic currency assets, the interest rate on

the latter has to be kept high to limit central bank losses arising out of interest differentials. This however, would serve to attract further capital inflows, which could be potentially detabilising in some situations. Open market operations is another channel through which sterilisation may exert pressure on short-term interest rates. On the other hand, a non-sterilised intervention increases the monetary base, resulting in lower interest rates.

Two, sterilisation leads to an increase in public debt, and these costs, termed as quasi-fiscal costs in the literature, due to a favourable interest differential for domestic bonds, can be substantial. Calvo, Leiderman & Reinhart (1993) have estimated quasi-fiscal costs for Colombia at 0.5 per cent of GDP while Khan & Reinhart estimate them between 0.25-0.5 per cent of GDP for Latin American countries.³⁹ No such estimates exist for India at present and there is a need for empirical studies on this issue. The substantial rise in commercial banks' holdings of government securities by the banking system in the nineties, mentioned earlier in the paper, suggests that the burden of quasi-fiscal costs could be quite high.

Three, some researchers (for example, Folkerts-Landau et al, 1994) have noted that sterilisation through reserve requirement changes will not be effective in addressing capital inflows intermediated outside the banking system, i.e. bond and equity markets. This is a relevant issue for India for two reasons. First is the heavy dependence upon

³⁹ Kletzer & Spiegel (2000) have extended the analysis further to incorporate the role quasi-fiscal costs might play in monetary policy for a group of APEC countries. Though they find these to be small in their influence upon central bank behaviour, they do find they might play a role in abandonment of a sterilisation programme in the midst of a capital surge.

reserve requirements as a policy tool for monetary management. To counter the impact of a capital surge upon the stock market, effective open market operations and a vibrant, active market for both government and private securities is a necessary prerequisite. The second consideration in this regard is that though a substantial amount of funds in India are still intermediated through the banking sector, its share in the total financial assets of the economy is steadily falling. Between 1990 and 1999, the banking sector's share has fallen from 66.8 to 64.2 per cent, being substituted by the rise of non-bank and investment institutions.⁴⁰ For instance, Spiegel (1995: 33) has noted that the more developed the non-financial sector, the less effective will be sterilisation policy through standard open market operations or through reserve requirement changes. With the structure of financial sector still evolving, and the dilution of the banking sector, the future effectiveness of reserve requirements is questionable. Other costs of sterilisation through reserve requirement changes is the low rates of return on they bear, which distorts the share of intermediation by the banking sector. Another source of loss to the central bank due to sterilisation is the interest differential between the interest rate on purchase of foreign exchange securities and the interest rate paid on external debt servicing (Spiegel, 1995: 18).

Finally, we examine the controversial issue of reserve options with an open capital account. India is gradually liberalising its capital account and the issue of freeing capital outflows is controversial. Presently, restrictions upon outflows stem mainly from

⁴⁰ The fall in the banking sector's assets in the total financial system might have implications for real exchange rate appreciation too. Evidence from Southeast Asia indicates that Korea, which had the largest non-bank financial sector, experienced the greatest degree of real exchange rate appreciation,

the concern that the rupee needs to be protected from a speculative attack depleting foreign exchange reserves. Current trends in reserve accumulation reveal that maintaining a sizeable level of foreign exchange reserves is an important objective of the central bank. This view is reinforced by the authorities' response to an actual or perceived threat to a fall in foreign exchange reserves, viz. two efforts at bolstering the country's reserves through the Resurgent India Bond and the India Millennium Bond issues in 1998 and 2000 respectively.⁴¹ India's foreign exchange reserves have now crossed 40 billion dollars (January, 2001). Undoubtedly, holding an adequate level of reserves, along with other policy instruments, is necessary armour to enable the central bank to respond quickly to short-term capital inflows and outflows.

A second weapon to counter external pressures emerging from capital account transactions is capital controls. There is no doubt, particularly in the aftermath of the currency crises, that capital controls have reemerged as a self-protection device to safeguard against heavy capital surge pressures. These can be effective in managing the external position, particularly in the short-run. Countries that have used them successfully include Israel (1978), Chile (1991) and Malaysia (1998-99). Chile's example illustrates the successful use of dynamic and comprehensive policy in this context. Initially, when capital started flowing into Chile, it was perceived to be temporary and the Chilean authorities resisted nominal exchange rate appreciation, sterilising their purchases. When the flows persisted however, the authorities changed track, allowing greater exchange

whereas countries with large shares of assets in the banking sector, had no, or moderate real exchange rate appreciation.

rate flexibility, lowering sterilisation and imposing restriction on capital inflows, particularly short-term capital. While some, like Khan & Reinhart (1995), have argued that taxation of short-term flows can be subverted through over-invoicing and under-invoicing of imports and exports in the long-run, empirical evidence (Gregorio, Edwards & Valdes, 2000) shows that capital controls had a persistent and sizeable effect upon the composition of capital inflows in Chile, tilting them towards longer maturity.

Presently, most capital account restrictions in India relate to outflows by residents, securities' transactions and transactions that do not reflect trade flows. Controls are differentiated by transaction (current/capital account), direction (inflows/outflows), residence (resident/non-resident) and resident category (individuals/corporates/bank & non-bank financial intermediaries).⁴² Restrictions range from administered ceilings (interest rate ceilings) to price based (tax⁴³ or reserve requirements) controls with respect to size of transaction, purpose, activity, financial instrument or party concerned. Though the earlier legal framework, with its focus on foreign exchange conservation, has been changed recently (June, 2000) to facilitate foreign currency trade and payments, it is significant that the option of imposing controls has not been foreclosed. In the current global financial environment, this intention is perhaps well justified. Capital controls as short-term measures, if carefully timed and fine-tuned to being imposed in rough weather

⁴¹ Immediate issues here are the costs of holding these reserves, especially when the rates of return on domestic and foreign assets diverge substantially.

⁴² See Presentation by Dr. Y. V. Reddy, Deputy Governor, Reserve Bank of India at the Seminar on Capital Account Liberalization: The Developing Country Perspective, at Overseas Development Institute, London, June 21, 2000.

⁴³ For example, taxes on short-term gains are higher than on long-term gains.

and removed in smoother times, can be used effectively in conjunction with other policy instruments, like greater exchange rate flexibility, part sterilisation and encouraging outflows, to manage the capital account. A comprehensive policy package, as Chile's example shows, might perhaps be the best course in order to minimise costs associated with extreme use of a single policy option.

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