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Capital Flows and Their Macroeconomic Effects in India

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Abstract

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper documents trends in movement and composition of capital flows into India in a comparative perspective, examines the impact of these flows upon key macroeconomic variables in the economy, and dwells on implications for economic policy. We find that an inflow of foreign capital results in a real appreciation and has a significant impact on domestic money supply. During a capital surge, these effects have been countered through intervention and sterilization. The paper concludes with a discussion on the costs of these policies in the event of a heavy inflow of foreign capital into India.

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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 trends have been driven by globalization, which has enabled pursuit of higher returns and portfolio diversification, and market-oriented reforms in many countries, which have liberalized 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 studies² 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, 1996), 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 liberalization strategy. Before 1991, India had a closed capital account with capital mobility being restricted through administrative controls and outright prohibition. The balance of payments situation, exchange rate movements and India's import-substituting pattern of development influenced these controls. In the aftermath of the balance-of-payments crisis in 1991, India embarked upon an economic reform program 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

² See Calvo, G. A., Leiderman, L. & C. Reinhart (1993); Corbo and Hernandez (1994); Khan & Reinhart (1995) and Koenig (1996), amongst others.

attributes with these emerging economies, a fact that enables comparative assessment. For example, like many Asian and Latin American countries, which were at various stages of macroeconomic stabilization and/or financial liberalization, when capital started flowing into these economies, India is a liberalizing economy too. Notable differences persist. For instance, 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 an international perspective. Two, it examines the impact of these flows upon the key macroeconomic variables as well as the policy responses of the Indian authorities. Finally, it dwells on implications for economic policy. The following sections correspond to these objectives. Section II traces trends in capital inflows into India since the onset of liberalization, Section III assesses the impact of these flows while Section IV discusses the policy implications and concludes.

II. TRENDS AND COMPOSITION OF CAPITAL FLOWS

Figure 1 plots the trends in net capital inflows (sum of FDI, portfolio, loans and resident Indian deposits) into India between 1985-99. The plot shows a recovery of net capital inflows that had begun to decline in the late eighties and bottomed out in the 1991 crisis. Following liberalization of restrictions on inward investment in 1991-92, there was a spurt of capital inflows between 1992-95 and 1996-97.³ This is similar to the experiences of Asian and Latin American economies, 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, whereas 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 (1984-88) to 3.2 (1989-93) per cent (GDP) for eight

³ Since then capital flows have been on a declining trend: both portfolio and FDI flows have not so far matched the 1995 peak.

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

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 liberalizing its trade and investment regimes, by which time the competition for international capital had already stiffened.

The change in composition of India's capital account is significant though, a feature common to Latin America and other parts of Asia. 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 reflected in Table 1, which profiles the composition of India's capital account over the last two decades. 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 borrowing abroad drops during the crisis years, resuming thereafter. A final feature of the table is the continued dependence upon migrants' remittances, after a short decline in 1993-94.

Portfolio investment flows exceed direct investment (FDI) in the early years of liberalization. FDI catches up later, peaking in 1995 but falls thereafter. This feature contrasts with what is observed for 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. The process of liberalization in India may also explain this. For example, though most FDI approvals were placed under the automatic approval route, the element of discretion remained via mandatory clearances from the Foreign Investment Promotion Board (a government body) for some projects. Comparatively, a one time, entry-point registration for portfolio investments in financial markets, made it faster and simpler. This might have tilted the composition of flows in favor of portfolio investments.

A. Determinants of Capital Inflows

The jump in private foreign capital that India experienced after *reform/liberalization*, as well as the composition of these inflows thus conforms to the evidence for other developing countries. Two broad explanations for this phenomenon have been offered in the literature. One viewpoint holds that the fall in US interest rates 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 (Calvo, Leiderman and Reinhart, 1993). 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

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, MoF, GOI).

confidence and attracted foreign investment. (Chuhan, Claessens & Mamingi, 1993; Hernandez & Rudolph, 1995 amongst others) Currency realignment has been offered as another internal stimulus for inward foreign capital (Goldberg & Klein, 1998). The extent each factor may contribute however, remains indeterminate as it the interplay between the two factors makes capital flows a jointly determined variable.

Khan & Reinhart (1995) note that reasons vary across Latin America and Asia; for instance, external factors have been more important for the former group. Bohn and Tesar (1998) have similarly concluded that local factors have been relatively more important in determining US investment in Asian markets. To what extent are these explanations valid for India?

The determinants of capital flows into India are examined only superficially in this paper. First, the co-movement between private resource flows (total as well as portfolio) to developing countries and to India in Figures 1 & 2 illustrate that the inflow of private capital into India was part of the global trend. Net private capital flows to emerging markets increased seven-fold between 1990 and 1996 and India became a recipient as it opened its financial markets. Portfolio equity flows into the country particularly move with the global movements, emphasizing the role of global factors. For example, portfolio flows to developing countries peaked at 1.09 per cent of GNP in 1993 and declined thereafter; trends in India's capital account mirror these movements. Second, noting that capital mobility will be guided by arbitrage opportunities, comparative returns on domestic and foreign assets are also examined. Due to lack of data availability on comparable assets, the domestic-foreign interest rate differential is presented in Figure 3. Though it is inappropriate to interpret trends in interest differentials without allowing for expectations regarding exchange rate changes, the relatively high differential rate of return on Indian assets may have played a role in attracting foreign capital after the opening of financial markets. The spread is seen to be narrowing rapidly from 1993, mainly because of a movement towards lower interest rates after deregulation rather than arbitrage. The wedge continues to be in place due to the persistence of capital controls.

The timing of these flows however, suggests that internal or 'pull' factors were equally, if not more, important. The institution of market-oriented reforms following the 1991 crisis, recovery of output growth on a higher trajectory and improved macroeconomic performance of the economy signaled corresponding improvements in the country's credit-ratings and restored investor confidence. The opening of financial markets also coincided with a fall in the inflation rate, restructuring of external debt (bringing down the short-term to total debt ratio from 10.2 in 1991 to 3.9 in 1994 and improvement in foreign exchange reserves. These factors served to attract foreign investors.

Other changes impacting the external environment during this period were the switch to a flexible exchange rate regime, full convertibility of current account transactions by India's acceptance of obligations under Article VIII of the Articles of Agreement in 1994, trade reforms aimed at progressive reduction in tariff rates and liberalization of foreign direct investment policies (Krueger & Chinoy, 2000). Financial sector reforms, focusing upon elimination of entry barriers and market integration, catalyzed both FDI and portfolio flows.

Specific measures to attract FDI were opening of most sectors to foreign investors with full repatriation benefits, removal of the 40 per cent cap on foreign equity participation and placing most FDI approvals under the automatic route. Portfolio investments were similarly encouraged by allowing foreign institutional investors to operate in the Indian capital market; these investments, initially restricted to equity, were subsequently relaxed to include debt (1997) and government bonds (1998). Simultaneously, indirect measures aimed at investor protection focused upon eliminating differences in accounting standards; legal and regulatory structures began to be addressed for the first time. Other factors contributing to rapid increases in portfolio equity flows have been identified by World Bank (1997: 27) as: well-known corporate names with established track record on a liquid exchange, coincidence of the capital surge with monetary policy tightening in 1996, and high budget deficits that kept domestic borrowing costs high.

Preliminary statistical evidence supports the role of 'pull' factors in catalyzing these inflows. Private capital flows (sum of FDI & portfolio) correlate highly and positively with credit ratings for India (*Institutional Investor* ratings) at 0.65. Simple correlation measures between portfolio capital flows and the BSE share price index is positively strong – 0.58, while stock market returns, viz. market capitalization and price earning ratio, correlate at 0.24 and 0.31 respectively with portfolio flows. Though by themselves these correlations do not prove causality, it is notable that movements in capital inflows closely track movements in share prices index and stock prices' indicators (Figures 4 & 5). 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 Southeast Asia; this ratio doubled between 1990-93 for Hong Kong and Thailand.

These factors need to be examined in depth as the respective roles of external and internal factors have implications for economic policy. For example, do capital flows respond more to domestic economic performance, exchange rate movements or mobility of world capital? If the latter effects were to dominate, for example, then it implies increased vulnerability of the economy to external shocks.

III. CAPITAL FLOWS AND MACROECONOMIC AGGREGATES

This section examines the impact of capital inflows upon important macroeconomic aggregates following liberalization. Several authors (Corbo & Hernandez, (1994); Calvo, Leidermann & Reinhart (1994) and Khan & Reinhart (1995), amongst others) have documented these effects for Latin America and East Asia and this section draws upon these studies in analyzing India's experience. Some commonly observed effects of capital inflows are exchange rate appreciation, monetary expansion, rise in bank lending if the flows are intermediated through the banking system and effects upon savings and investment. This section considers the effects of capital flows upon the exchange rate, foreign exchange reserves and money supply (sterilization) and the policy responses of the authorities.

A. 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 favor 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.

Figure 6 charts bilateral (rupee-dollar), real and nominal, effective exchange rates over three decades. Both series are observed to be depreciating after 1985. After 1993, the time of regime switch, the nominal depreciation persists while the real exchange rate series fluctuates around a constant trend. Two real appreciation episodes are visible after 1993. These coincide with the capital surge in 1992-95 and 1996-97, when 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 (Acharya, 1999), preferring an adjustment through gradual increases in domestic inflation. Part of the 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 liberalization of overseas investments by Indian firms, measures which were partly financed by the net increase in capital assets during this period.

Both real exchange rate behavior 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 exercise 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. Consumption, both private and government, declined during the first episode of the capital inflow surge, i.e. 1993-95. In the second episode (1996-97) when the inflows resumed, investment remained sluggish, showing only a marginal increase in 1997-98. However, government consumption retained its upward trend; private consumption rose too, declining slowly thereafter. No clear-cut pattern is thus visible in the macro economic statistics, except a steady increase in public consumption and an investment boom between 1993-95. The role of composition of aggregate demand in curtailing a real appreciation is thus indeterminate during this time span. 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. 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 Figure 6.

The behavior of the real exchange rate in response to capital inflows has been an important area of concern, being 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 at quarterly frequency between 1993-99.^{6,7} Both series are also cointegrated.⁸ The simple correlation coefficient between the two series is 0.11, which is low compared to estimates for seven Latin American

⁶The 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.

⁷ 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 might however, be associated with the PPP rule by which the float is managed rather than a market determined movement of the REER.

⁸The λ_{trace} statistic is 20.4, which exceeds the critical value of 20 at one percent, suggesting that the null hypothesis of no cointegrating vector be rejected.

economies. These range between 0.14-0.72 (Edwards, 1999), but the direction of correlation is similar. Figure 7 plots the bivariate relationship between net capital inflows and the real effective exchange rate. Granger causality tests 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. To illustrate the impact of capital inflows upon real exchange rates in India, we construct an impulse response function from the vector error-correction estimation between the two series in Figure 8. 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 0.6 per cent in the second month, followed by oscillations around this value for a period of approximately one year. This is then accompanied by a cumulative appreciation of 1.2 per cent, which then wears out over 45 months, i.e. 4 years. The impulse response simulations reveal a permanent effect of unanticipated capital account shocks upon the real effective exchange rate. The VECM representation also shows a significant adjustment response of the real exchange rate to past disequilibrium, the size of the adjustment coefficient being 0.006.⁹ Finally, net capital account does not move significantly to restore equilibrium as observed by the insignificant adjustment coefficient on the capital account equation in the system.

Preliminary evidence for India therefore, corresponds to individual as well as cross-country evidence on this issue. This empirical evidence however, needs to be examined within a well-specified context, 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 emphasized 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.

B. Reserve Accumulation

Depending upon the exchange rate regime, capital inflows can be traced to either international reserves' accumulation or a current account deficit. 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.

⁹ The detailed VECM results are not reported here but are obtainable from the author upon request.

Figures 9 and 10 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 exchange reserves (Figure 9) is concurrent with this decline, suggesting absorption of foreign currency inflows by the central bank. 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 utilized so; from 1996 onwards, the Reserve Bank has typically absorbed fifty per cent of net capital inflows into international reserves (Kohli 2000a,b). 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 1985-90.¹⁰

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, Figure 9 mimics the trend in international reserves observed for a group of Asian and Latin American countries in Figures 11-12.

C. Impact upon Monetary Conditions & Sterilization

Capital inflows affect domestic money supply through accumulation of net foreign currency assets with the central bank. If the central bank intervenes to maintain a fixed exchange rate, then an accumulation of international reserves represents an increase in the net foreign exchange assets of the central bank and directly affects the monetary base. In contrast, if the exchange rate is allowed to float without intervention, there is no impact on domestic money supply. 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 limited, a feature common to most developing countries (Calvo & Reinhart, 2000). The size and scale of intervention by the central bank has increased significantly since 1993 and the foreign exchange reserves' build-up has been substantial (Kohli, 2000). Tables 2 and 3, 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.

¹⁰ 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) are also to be noted at this point. These were targeted exclusively at NRIs and overseas corporate bodies predominantly owned by NRIs.

Some stylized 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. 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.

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 2). 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 cent¹¹. *Prima facie*, monetary policy appears to have responded to counter the impact of capital inflows, though monetary variables are partly influenced by money demand. For instance, interest rate movements (Cols. 5 & 6, Table 2), which reflect both monetary as well as fiscal changes; provide evidence of monetary tightening. Nominal interest 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 from declining.

Another perspective on monetary policy response is offered by noting movements in the monetary base in Table 3. 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 2) were steadily raised to limit the impact of money supply via the banking system. A sharp contraction in nominal and real base money growth (Table 2, (Cols.1-4)) observed in 1995-96 and 1996-97 appears to have 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 movements of monetary variables however, are ridden with conjecture as these are also driven by domestic conditions. For instance, note that the reserve requirements fall in the second episode of capital surge in 1996; so do nominal interest rates, suggesting accommodation of foreign capital inflow to suit domestic conditions.

¹¹ We acknowledge that real money stock is an *ex post* variable and thus cannot really be used to explain price level movements.

In India, the monetary impact of reserves' accumulation was, until recently, neutralized primarily through reserve requirement changes on commercial banks' liabilities. Since the mid-nineties however, monetary management has been shifting to open market operations, adjustments in reverse and repo rates and changes in the Bank Rate. The ability of the central bank to use indirect instruments however, is still constrained by structural factors like interest rate rigidities, the ability of bond and equity markets to absorb government securities and a less-developed short-term money market. Though efforts are being made to shift to indirect monetary control, open market operations still constituted only 2.2 per cent of M3 in 1999, being used mainly to neutralize foreign exchange market interventions than as a monetary policy instrument. Reserve requirements are typical sterilization tools, used frequently by most developing countries, which have very thin markets for government securities. This has been a common monetary management tool in Southeast Asia, as also in some parts of Latin America (Chile, Mexico), to insulate domestic money supply from the expansionary effects of capital inflows. Occasionally, other sterilization 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 also been used (Spiegel, 1995).

While it is difficult to collect evidence on the magnitude of sterilization in India during the capital inflow surge, it has been conceded elsewhere that a complete offset could not be achieved (Acharya, 1999). 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 2) to curtail monetary growth. Kletzer and Kohli (2001) note that for the period Aug. 1995-Dec. 2000, correlation between monthly increases in commercial bank credit to government and reserve inflow for the previous month is 0.48, while correlation between contemporaneous changes is 0.29. This indicates sterilization of reserve inflows by the Reserve Bank through increase in public debt held by the financial sector. Evidence gleaned from existing statistics sheds further light on the issue: holdings of private securities by the commercial banks actually declined during this period, whereas investment by banks in government securities rose¹². 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.

Finally, a simple domestic credit reaction function was estimated for the period 1993-2000 to establish the extent of sterilization by the monetary authorities during this period. Here domestic credit creation is assumed to respond to changes in foreign exchange reserves, the current output gap and the past rate of inflation. ΔDC_t is change in the level of domestic credit, ΔNFA_t is the change in the level of net foreign currency assets, $YGAP_t$ is the deviation

¹² There may be other reasons for this rise. Financial scams in the early nineties induced risk-averse behaviour amongst banks, reflecting in increased investments in gilts.

of real output from trend and π_{t-1} is the rate of wholesale price inflation.¹³ Using two stage least squares to estimate the function to overcome simultaneity problems, we obtained the following regression equation

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

(1.24) (3.25) (0.54)

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

The extent of sterilization is indicated by the coefficient on ΔNFA , which has the predicted negative sign and is significantly close to unity, indicating complete sterilization. The output gap and lagged inflation are insignificant and of incorrect sign. 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 sterilization. These estimates suggest that the RBI used domestic credit policy to attain internal policy objectives while engaging in sterilized intervention to influence/maintain the exchange rate. Sterilization has several controversial implications, which are taken up 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 liberalizing 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, as a result of which challenges to macro and micro-economic 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.

As the Indian economy gets increasingly integrated with the rest of the world, a reasonable expectation would be that foreign capital inflows would increase, perhaps even to match levels reached by other emerging markets. In such a scenario, a disturbing feature at present is the distinct tilt towards portfolio rather than direct investment flows. It is well known that

¹³The 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 an MA (1) term used in the estimation are not reported here.

the composition of flows makes a significant difference, both in terms of impact¹⁴ and smooth management. Portfolio flows are more volatile than direct investment flows and because of their short-term, uneven nature, more difficult to intermediate.¹⁵ Thus they have a greater impact upon stock markets and domestic money supply and can lead to consumption, stock market and real estate booms via sudden expansions in liquidity in financial markets. FDI, on the other hand, is long-term in nature; being embedded in plant and equipment investment, it is less susceptible to sudden withdrawals and leads to productive uses of capital and economic growth. Short-term flows therefore, need to be matched by foreign capital inflows of a longer duration.

In this regard, a comprehensive study by Bosworth and Collins (1999) provides evidence on the effect of capital inflows on domestic investment for 58 developing countries during 1978-95. They distinguish among three types of inflows: FDI, portfolio investment, and other financial flows (primarily bank loans) and find that an increase of a dollar in capital inflows is associated with an increase in domestic investment of about 50 cents. Significant differences exist however, among types of inflow. FDI appears to bring about a one-for-one increase in domestic investment; there is virtually no discernible relationship between portfolio inflows and investment (little or no impact); and the impact of loans falls between those of the other two. These results point towards a strong preference for FDI amongst foreign capital inflows.

But FDI does not reveal a stable, dominating trend in India so far. Therefore, this is a critical area for economic policy to concentrate upon. The fact that portfolio flows are an intricate part of global equity capital highlights India's vulnerability to external financial shocks. This has implications for smooth management of inflows too. 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 market volatility. Though the volume of transactions in both foreign exchange and domestic money markets has been steadily increasing in the post-reform period, India's financial markets are still relatively thin and underdeveloped. These could pose a severe constraint on intermediating heavy volumes of volatile, short-term capital, necessitating excessive intermediation through the domestic banking sector. So far, the difference between net capital inflows and the current account deficit has been positive in India, as a consequence of which the impact upon the banking

¹⁴ Some studies have shown both categories to hold equivalent time-series properties though. See Claessens, Dooley and Warner (1995).

¹⁵ Tentative evidence for India supports this hypothesis. Portfolio flows are more volatile than FDI, as measured by the standard deviation of the two series.

system has been small. Banks however, account for 64 per cent of the total financial assets of the Indian economy. What are the implications for India in this regard?

The unanticipated, irregular nature of portfolio capital leads to a sudden expansion in banks' liabilities. The consequent domestic monetary expansion is difficult to monitor and could lead to unscrupulous loans, unless the inflows are sterilized. Monitoring the end-use of loans is equally important as real effects of intermediated foreign capital depend critically upon what it finances. If lending finances consumption or real estate, it can trigger off a consumption boom. Moral hazard risks are thus likely to increase, threatening financial instability, as transpired during the Asian crisis. 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-capitalized, with large levels of non-performing loans on their balance sheets. This has exposed the fragile nature of the banking sector and is reflected, for example, in the recent failures of some urban cooperative banks and threats to systemic stability from the involvement of some public banks, financial institutions and India's largest mutual fund in financial scams. Though India's financial reforms have consistently emphasized 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. Moreover, regulatory reforms need to be supplemented with an appropriate incentive environment, which does not at present exist. These capacities can be created through structural changes and institutional reform of these institutions, progress on which is still to gain momentum. For instance, privatization and operational autonomy to public banks are two spheres of financial sector reform that would address these features but where progress has been very limited.

A second issue is the response of the real exchange rate to removal of capital controls. 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. For though the policy option of stabilizing the real exchange rate can be a source of potential conflict between external and internal objectives, the option of a more flexible exchange rate policy, which has the advantages of insulating domestic money supply and discouraging speculation through increased exchange risk, does carry 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 that India is currently implementing. Moreover, there are real adjustment costs associated with exchange rate changes, which, if the inflows are temporary, can severely disrupt economic processes within the economy¹⁶. 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 globalization and trade agreements.

¹⁶ 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-à-vis the tradeoff between the real economic costs of exchange rate fluctuations and inflation. At present, unless India's export performance improves drastically to place them on a higher trajectory, it is difficult to anticipate a more flexible exchange rate policy. In the event of large inflows of foreign capital, it is likely that appreciation pressures may be averted by the use of short-term options like absorption by the external sector through encouraging capital outflows,¹⁷ parking them abroad and the continued use of short-term capital controls. It must be noted though that other aspects of reforms like tariff reductions, structural reforms on the domestic front, fiscal consolidation etc. could work to counter the upward pressure upon the real exchange rate.

The focus on a stable exchange rate regime is also likely to slow the pace of capital account liberalization, for a stable exchange rate is difficult to reconcile with simultaneous control of domestic money supply along with capital mobility.¹⁸ India's liberalization of its capital account is cautious and gradual and in the current global financial environment it appears unlikely that India will completely relinquish capital controls over a short horizon (Reddy, 2000). 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).¹⁹ 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-

¹⁷ As mentioned earlier, policy response in India 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 has also exercised this option successfully during its current account surplus of 1986-88 when it actively encouraged capital outflows by residents (Koo & Park, 1994).

¹⁸ 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.

¹⁹ Some authors (e.g. Khan & Reinhart, 1995), have argued that taxation of short-term flows is subvertible through over-invoicing and under-invoicing of imports and exports in the long run. On the other hand, there is some empirical evidence to suggest that capital controls had a persistent and sizeable effect upon the composition of capital inflows in Chile, tilting them towards longer maturity (Gregorio, Edwards & Valdes, 2000).

bank financial intermediaries).²⁰ Restrictions range from administered ceilings (interest rate ceilings) to price based (tax²¹ or reserve requirements) controls with respect to size of transaction, purpose, activity, financial instrument or party concerned. Many of these restrictions, particularly those enabling exchange rate management, are unlikely to be dismantled completely.

Presently, restrictions upon outflows stem mainly from 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 boosting the country's reserves through the Resurgent India Bond and the India Millennium Bond issues in 1998 and 2000 respectively.²² 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 armor to enable the central bank to respond quickly to short-term capital inflows and outflows.

The short experience with liberalization of capital inflows documented in this paper highlights the pressures of a capital surge upon domestic monetary management. It 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. Large fiscal deficits have so far been sustained through magnetization and taxation of the domestic banking system. However, as interest rate and other financial sector reforms progress, the government's ability to extract such revenues will be progressively constrained. The gross fiscal and the primary deficit of the

²⁰ 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.

²¹ For example, taxes on short-term gains are higher than on long-term gains.

²² Immediate issues here are the costs of holding these reserves, especially when the rates of return on domestic and foreign assets diverge substantially.

government graphed in Figure 13 show the steady deterioration in public finances since the mid-eighties. There has been some adjustment in the nineties, but the burden of interest payments continues to exert fiscal pressure. If monetary management is to be geared towards price stability with an open capital account, it is important that government credit should be curtailed. The existence of capital controls has enabled the government to so far finance its deficits via the banking system, but with increasing capital mobility, the melting of the domestic-foreign interest rate wedge will obviously limit this source of financing. Fiscal reform therefore, is an extremely important pre-condition for further liberalization of the capital account in India.

Finally, in managing capital inflows so far, sterilization has been regularly used to limit the impact upon domestic money supply. Preliminary evidence in this paper shows a high degree of sterilization of capital inflows by the central bank. If a stable exchange rate regime continues to be the optimal policy objective, the need for sterilization would be even greater. To sterilize or not to sterilize is a controversial issue and many academics have noted the pitfalls associated with sterilization policies (See Spiegel, 1995; Calvo, 1991, amongst others). Familiar arguments against sterilization relate to effects upon interest rates. Since it 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 destabilizing in some situations. Open market operations is another channel through which sterilization may exert pressure on short-term interest rates. On the other hand, a non-sterilized intervention increases the monetary base, resulting in lower interest rates.

A more pertinent argument against sterilization in the Indian context is its fiscal implication. It leads to an increase in public debt, and these costs, termed as quasi-fiscal costs in the literature, due to a favorable 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.²³ 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. In conjunction with the existing levels of public debt, as well as the mounting burden of interest payments, the costs of using the sterilization option are likely to be severe.

²³ 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.

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

	I. FOREIGN INVESTMENT		NRI Deposits	External assistance	Commercial borrowings	Net Capital Account (US \$ billion)
	<i>Direct Investment</i>	<i>Portfolio</i>				
1985	0	0	16.3	30.3	21.1	1.37
1989	0	0	34.4	26.5	25.4	1.86
1990	1.3	0.08	21.4	30.7	31.3	7.19
1991	3.4	0.10	10.6	77.7	40.0	3.78
1992	8.0	6.2	51.3	48.4	-9.2	2.94
1993	6.0	37.6	12.4	19.6	6.3	9.70
1994	14.6	39.1	1.9	16.7	11.3	9.16
1995	46.0	58.3	24.5	21.5	29.2	4.69
1996	24.7	28.9	29.4	9.9	24.7	11.41
1997	36.1	17.8	11.5	9.2	38.8	10.01
1998	28.5	-0.7	20.9	9.9	53.0	8.56
1999	21.2	29.5	20.3	8.6	3.0	10.42
2000	30.9	14.1	22.0	5.8	54.7	7.49

Source: Author's calculations based on figures from *Report on Currency & Finance*, 1998-99 & *RBI Bulletin*, July 2001, RBI, Mumbai.

Table 2. 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	Consolidat ed 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, 6.42 10, 10.5, 10.25	6.42
1998- 99	18.3	10.7	14.6	7.2	12.5	3.6	10, 11, 8.32 10.5	8.32
1999- 00	14.9	11.7	8.1	5.0	11.8	7.2	10, 9.5, 9, 7.63 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.

Table 3. 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)

Fig. 1. Private Net Resource Flows to India, 1985-99

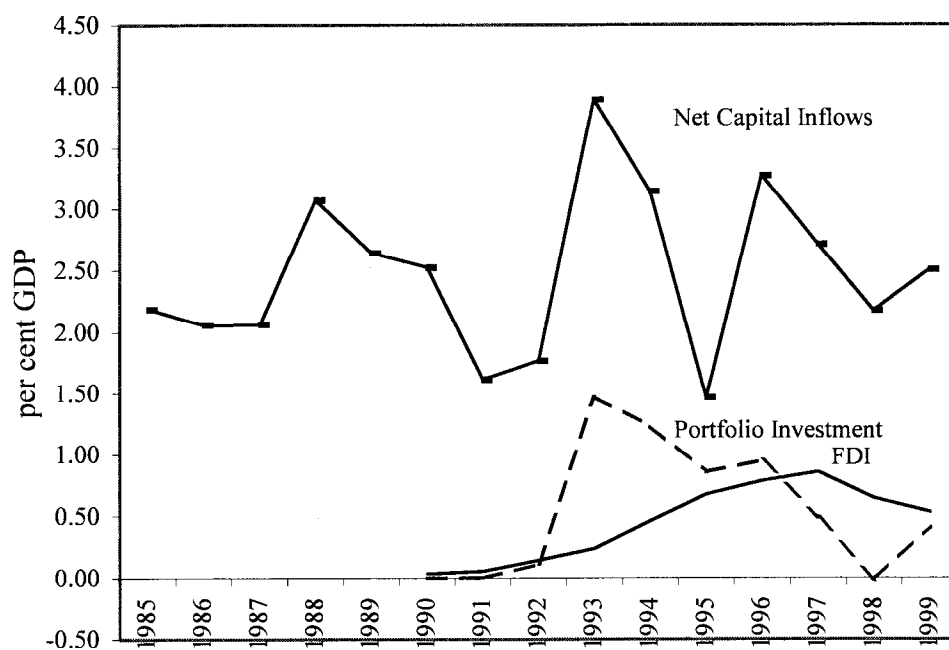
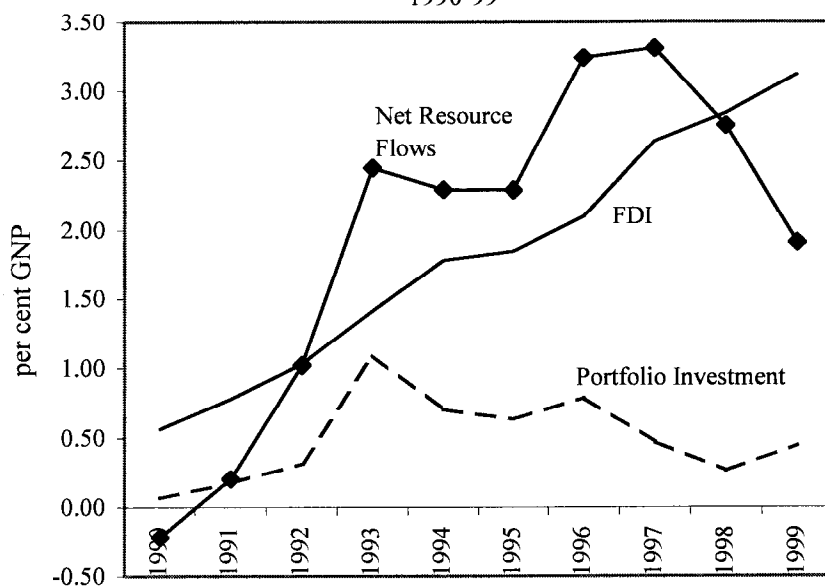
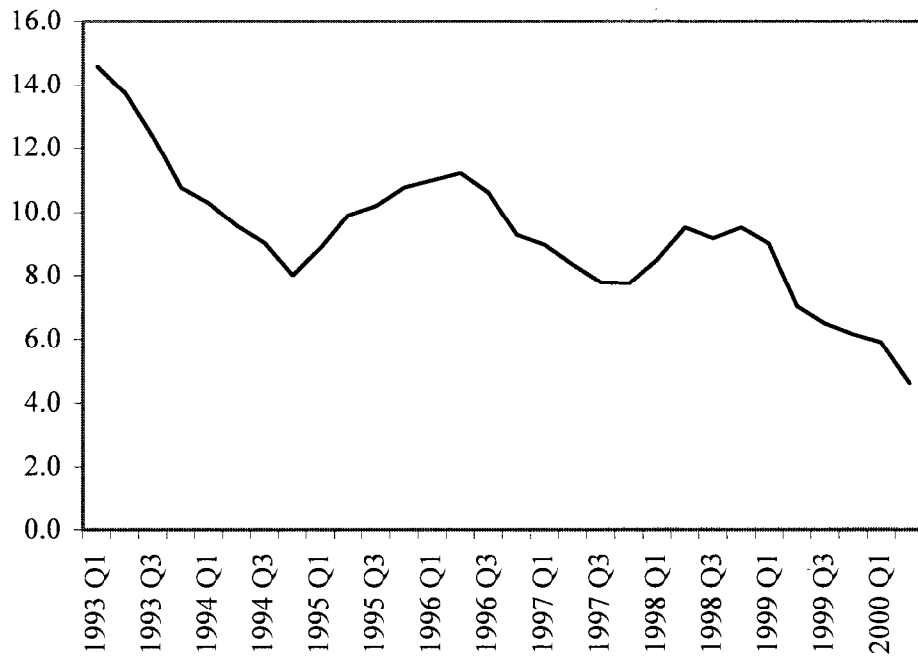


Fig. 2. Private Net Resource Flows to All Developing Countries, 1990-99



Source: *Global Development Finance*, Country Tables, Various Issues.

Fig. 3. Lending Rate Differentials in the 90s



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

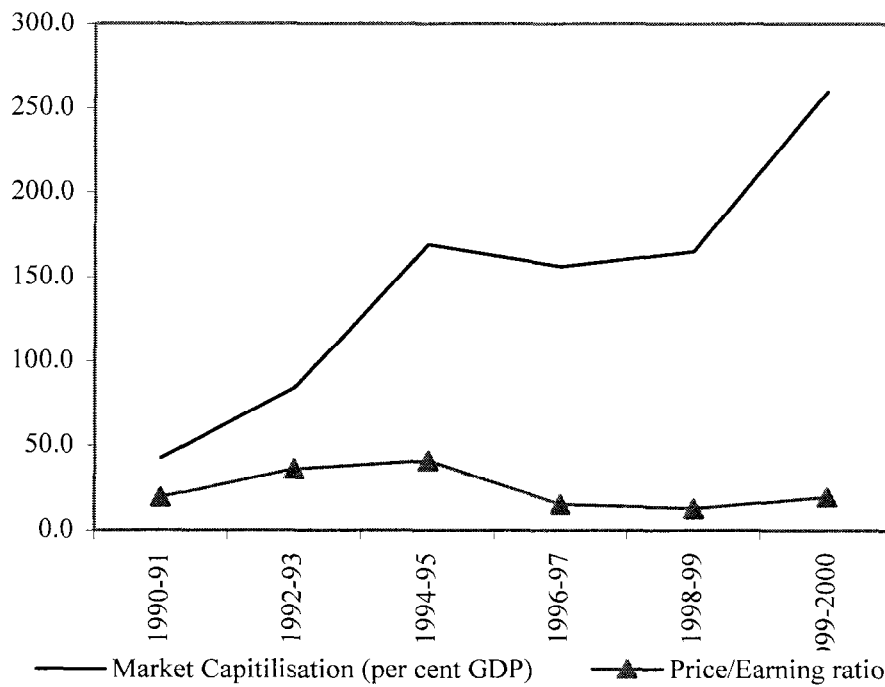
Source: *Handbook of Statistics*, 2000, Reserve Bank of India, *International Financial Statistics*, IMF, Various Issues.

Fig. 4. BSE Share Price Index, 1990-2000



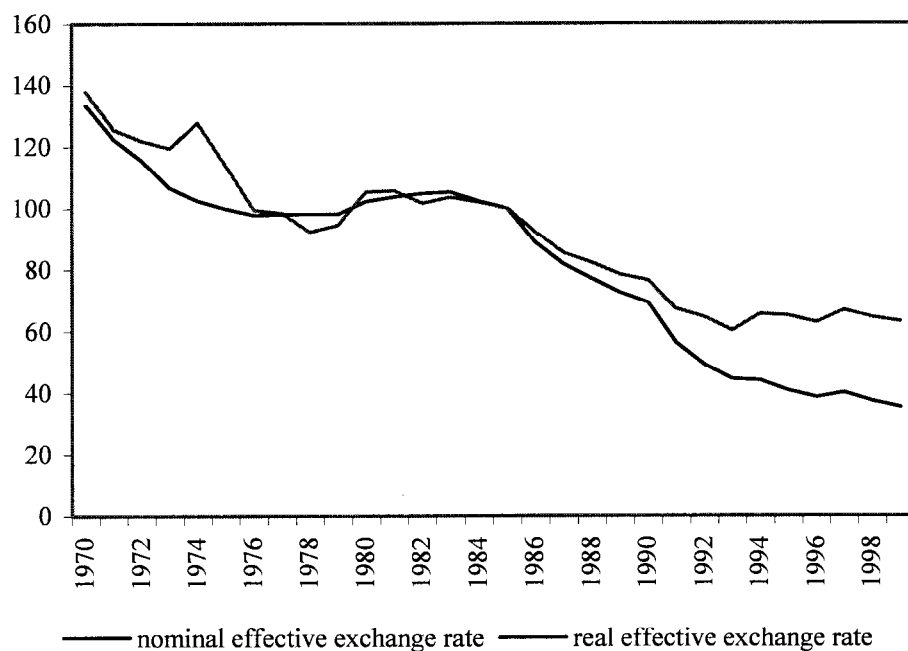
Source : *Handbook of Statistics*, 2000, Reserve Bank of India.

Fig. 5. Stock Market Prices, 1990-2000



Source: *Handbook of Statistics*, 2000, Reserve Bank of India; *Annual Report 1999-2000*, Reserve Bank of India.

Fig. 6. Nominal and Real Effective Exchange Rates (1985=100)



Source: *Handbook of Statistics*, 2000, Reserve Bank of India. The real exchange rate is the 36 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).

Fig. 7. REER versus Capital Inflows

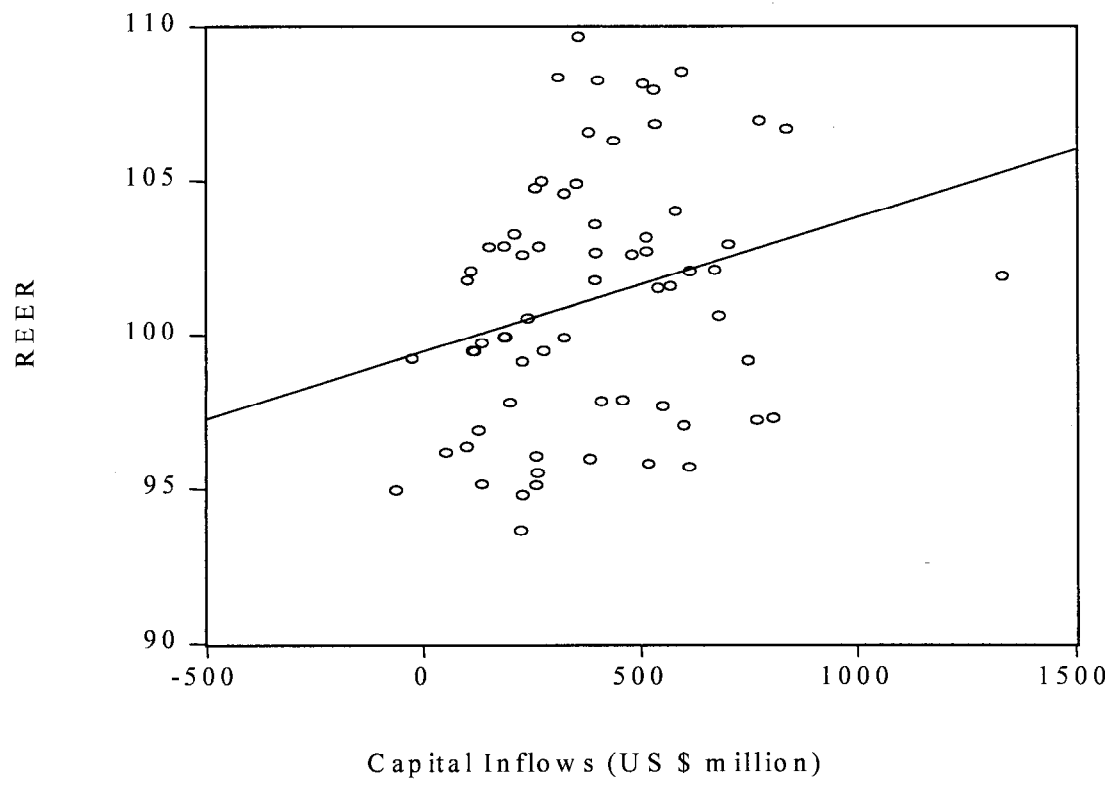
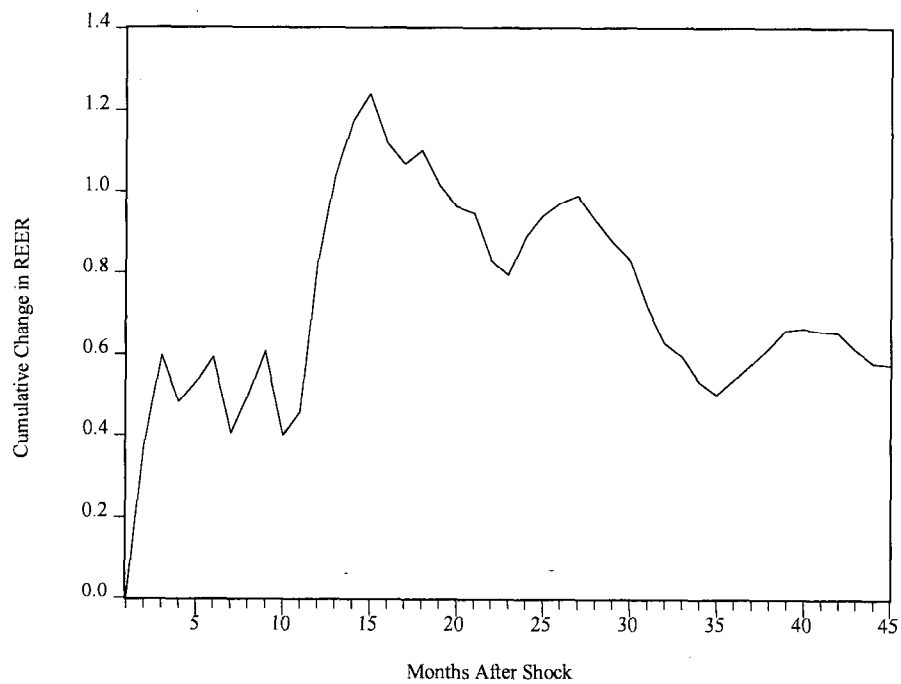
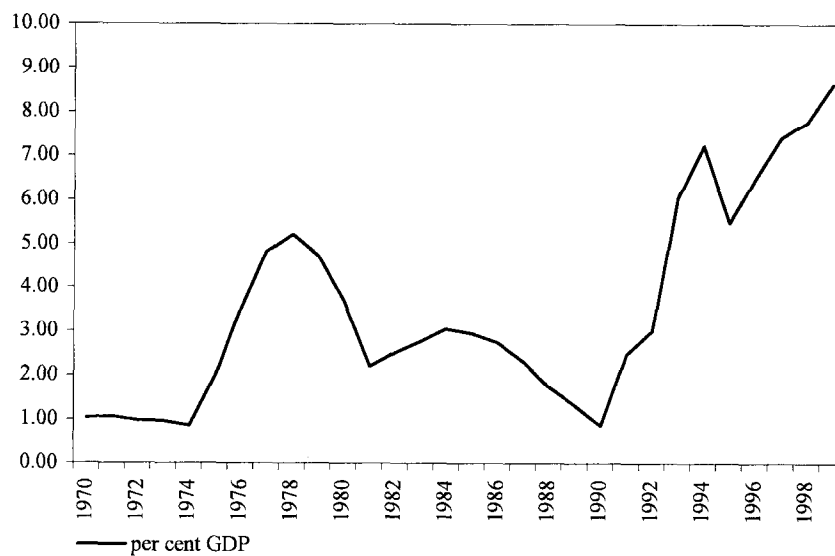


Fig. 8. Response of REER to Innovations to Net Capital Inflows

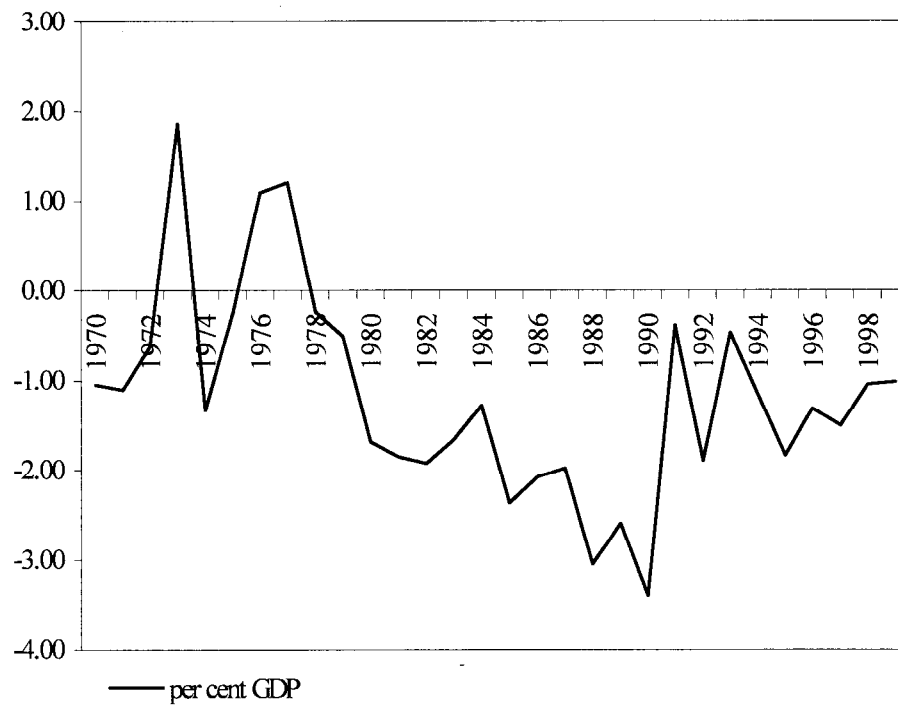


**Fig. 9. Foreign Exchange Reserves
(excluding SDRs & gold)**



Source: *Handbook of Statistics*, 2000, Reserve Bank of India.

Fig. 10. Current Account Balance



Source: *Handbook of Statistics*, 2000, Reserve Bank of India.

Fig. 11. Official Reserves - East Asia (Indonesia, Korea, Malaysia, Philippines, Thailand)

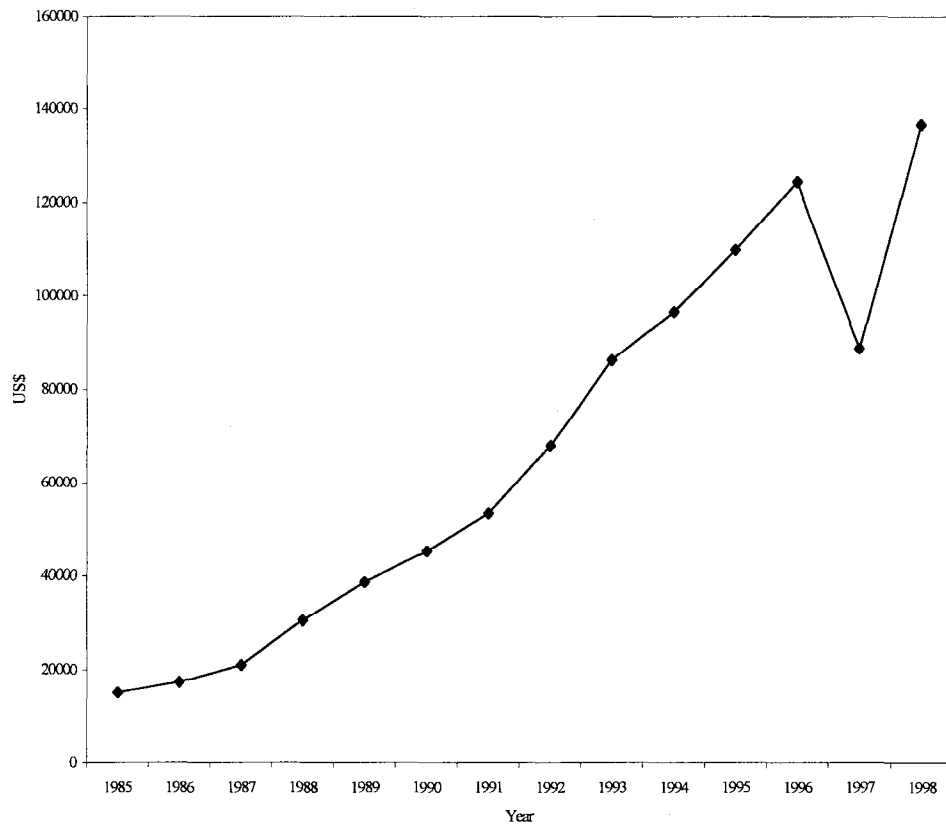
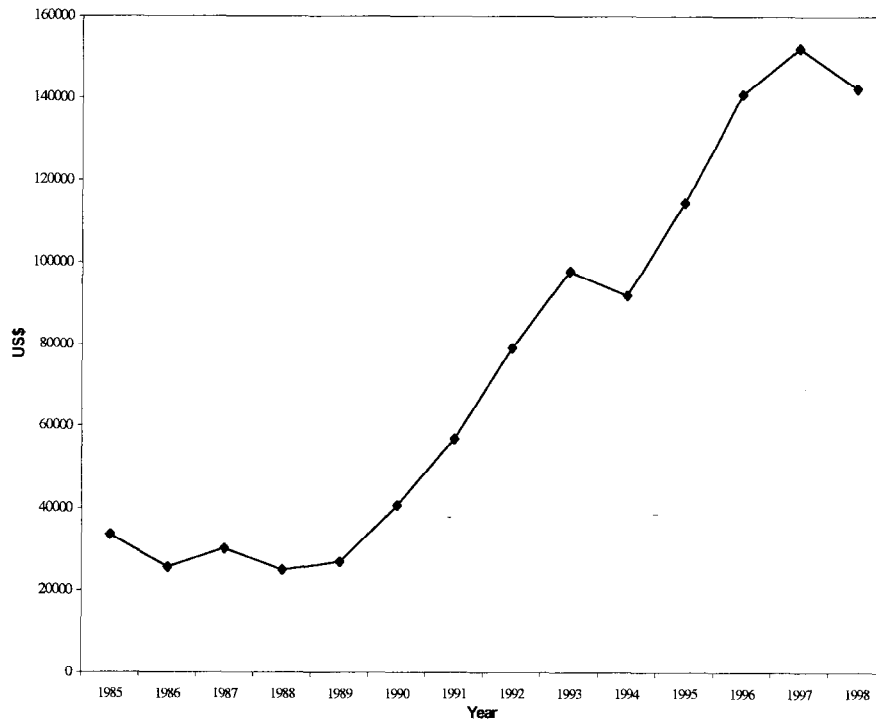
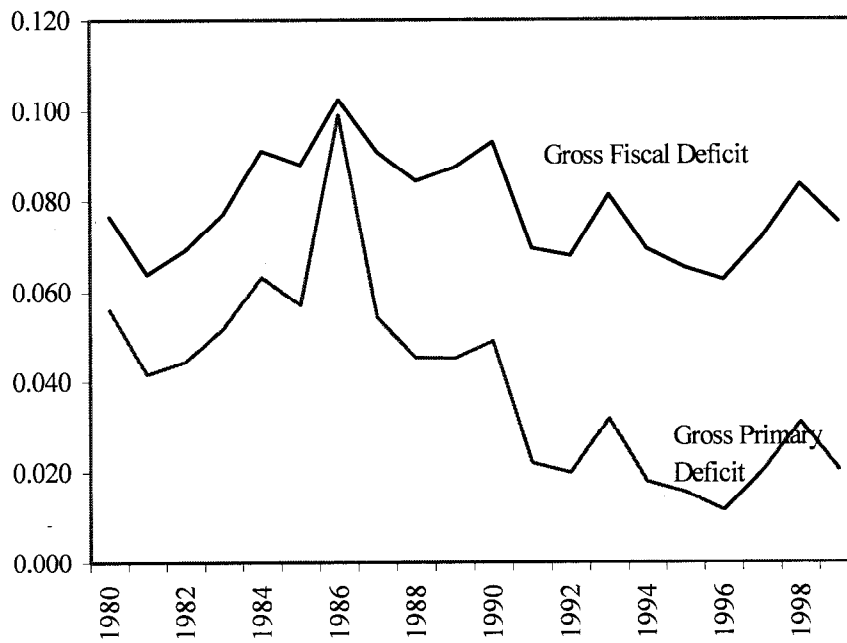


Fig. 12 Official Reserves - Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela)



Source: *World Development Indicators*, World Bank.

Fig. 13. Consolidated Public Sector Deficit
(ratio to GDP)



Source: *Indian Public Finance Statistics*, Ministry of Finance; Department of Economic Affairs, Economic Division, Government of India.

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