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# India's Experience with Capital Flows

## The Elusive Quest for a Sustainable Current Account Deficit

Ajay Shah and Ila Patnaik

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### 13.1 Introduction

Indian economic policy witnessed a marked shift following a balance-of-payments crisis in 1991. Prior to this, India had a “less developed country (LDC) style” composition of capital flows, where current account deficits were financed using official flows and debt flows. As in other countries that were liberalizing capital flows in this period, the conceptual framework underlying the reforms of the 1990s was based on experiences with volatile debt flows, views about the sustainability of debt flows, and views about a desirable composition of flows.

The new approach, which has been broadly stable from 1992 till 2006, consisted of liberalizing the current account, opening up to foreign direct investment (FDI) for domestic and foreign firms, opening up to portfolio flows for foreigners, and restricting debt flows. The currency regime was shifted away from a fixed-but-adjustable exchange rate to a “market-determined exchange rate,” which was pegged to the U.S. dollar through extensive trading on the currency market by the central bank.

Indian capital controls consist of an intricate web of a very large number

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of quantitative restrictions, operated by a substantial bureaucratic apparatus. Liberalization of FDI and portfolio flows was done in a gradual manner, with a large number of incremental and partial changes to the large number of rules. While some major decisions were taken in 1992, there has been a continual process, which continues even in 2006, of changing restrictions in small steps.

Liberalization of the current account has been highly successful. Positive technological shocks and dropping prices of international telecommunications helped India obtain high growth rates of services exports. The removal of quantitative restrictions, and the sharp drop in tariffs, served to spur both imports and exports. Through these, gross flows on the current account rose from 25 percent of gross domestic product (GDP) in 1992–93 to 35 percent in 2003–4.

Major changes took place on the capital account also. The policy bias against debt flows led to an outcome where net debt inflows stagnated at roughly 1 percent of GDP between 1992–93 and 2003–4. Owing to the debt aversion of the policy framework, gross debt flows dropped from 13.5 percent of GDP in 1992–93 to 10.6 percent in 2003–4. Official flows faded into insignificance.

Restrictions on both equity portfolio investors and on FDI were eased in this period. However, net FDI flows into India have remained small, either when compared to Indian GDP or when compared to global FDI flows. In contrast with the Chinese experience, relatively little FDI has come into India in setting up factories that are parts of global production chains. This may be associated with infirmities of Indian indirect taxes and transportation infrastructure. India is more important as a platform for service production as a part of global production chains, where difficulties of indirect taxes and transportation infrastructure are less important. However, service production is less capital intensive and is associated with smaller net FDI flows.

Given the size of the Indian economy, and the relative lack of correlation with the global business cycle, Indian equities have had low correlations with global risk factors. In addition, India has fared well in creating the institutional mechanisms of a modern, liquid equity market. Through these factors, portfolio flows have predominated. India's share in global portfolio flows is higher than India's share in global FDI flows, and net portfolio flows are substantial when compared to Indian GDP.

In many countries, there has been a close interplay between foreign investment and growth in trade. India has increased its share in world trade without having substantial FDI. A partial explanation lies in the low capital intensity of export-oriented production. Another aspect is the initial conditions, which consisted of a strong set of domestic firms. Portfolio flows have delivered capital to these domestic firms, which have gone on to obtain growth in exports. The growth of domestic firms has been assisted

by relaxations of capital controls, which enabled them to engage in out-bound FDI. Consequently, FDI inflows are somewhat larger than the data for net inflows make them appear.

While portfolio flows are sometimes considered volatile, in India's experience, there has been no episode of a significant retreat by foreign investors. Net FDI and net portfolio flows have been fairly stable. Debt flows have been relatively volatile, reflecting frequent changes in capital controls applicable to debt flows, and changing currency expectations.

Through these policy initiatives, gross flows on the capital account grew from 15 percent of GDP in 1992–93 to 20 percent of GDP in 2003–4, along with sharp changes in the composition of flows. In 2003–4, gross portfolio flows amounted to as much as 7 percent of GDP.

The growth of the capital account, and the shift toward less government control of the flows, has generated increasing difficulties in terms of reconciling currency policy and monetary policy autonomy with the increasingly open capital account. Speculative views of the currency have been expressed by economic agents in many ways. For example, in this paper, we find that currency expectations are important in explaining the time series dynamics of portfolio flows.

The ability of economic agents to express speculative views on the currency in an increasingly open economy has generated difficulties in implementing the currency regime that had not been experienced in preceding decades. As an example, from late 2001 to early 2004, the demands of the pegged exchange rate regime involved trading by the Reserve Bank of India (RBI) to prevent rupee appreciation. The private sector had expectations of a gradual INR appreciation, and thus had incentives to bring capital into India. This led to a large increase in inflows on both the current account and the capital account. In order to uphold the pegged exchange rate, the RBI traded extensively on the currency market, with a sharp rise in reserves from \$40 billion to \$115 billion from 2001 to 2004. In 2003–4, net capital inflows of \$21 billion were accompanied by addition to reserves of \$31 billion. This constituted a net outward flow of capital of \$10.6 billion.

In retrospect, India's approach of gradual liberalization of the capital account has worked well in many ways. India has reaped microeconomic benefits of an open current account, and from FDI and portfolio flows. India has encountered no balance-of-payments crisis in the post-1992 period. From the macroeconomic standpoint, there have been episodes where monetary policy autonomy was significantly attenuated in the implementation of the currency regime. One key element of India's original policy quest—the search for a sustainable framework for augmenting investment through current account deficits—has as yet not been achieved.

In this paper, we explore the causes and consequences of the major empirical features of India's experience with capital flows. The paper begins

with a review of India's quest for a current account deficit (section 13.2) and broad empirical features (section 13.3). We review the evolution of the currency regime (section 13.4) and capital controls (section 13.5). We examine FDI and portfolio flows in section 13.6, where we also explore the interplay between currency expectations and portfolio flows. Section 13.7 examines India's experience from the viewpoint of the impossible trinity of open economy macroeconomics, with an accent on the events of 2003–4. Finally, section 13.8 concludes.

### 13.2 The Quest for a Sustainable Current Account Deficit

India had low savings rates in the early period, with values of 9.8 percent in the 1950s, 12.5 percent in the 1960s, and 17.2 percent in the 1970s. Economic policy thinking was very aware of the opportunity to use current account deficits, and net capital inflows, in order to supplement domestic savings, augment investment, and thus enjoy a faster growth trajectory.

However, India persistently encountered difficulties in obtaining a sustained and economically significant current account deficit. In the late 1970s, a combination of high domestic inflation, a world oil price hike, and a pegged exchange rate generated low exports, a large current account deficit, and near exhaustion of reserves. In response to this, India undertook an International Monetary Fund (IMF) program in 1981. Conditionality associated with this program included a revision of the exchange rate (Joshi and Little 1994).

By the late 1980s, India had built up a significant stock of external debt. In a period of political instability in 1990, there was a crisis of confidence, which gave a flight of debt and conditions of a speculative attack on the pegged exchange rate. In response to this, India undertook an IMF program in 1991. Conditionality associated with this program included revision of the exchange rate and a shift to a market-determined exchange rate.

In recent years, several prominent documents in policy analysis have advocated larger but sustainable current account deficits. The expert group on commercialisation of infrastructure projects, chaired by Rakesh Mohan (1996, p. 49) states that

The sustainability of such economic growth would require continuing high growth in exports, perhaps declining from the current 20 per cent annual growth to about 10 per cent by the end of the next decade, giving an average of about 15 per cent annual growth over the period. If this takes place, total exports should reach about \$66 billion in 2000–01 and \$115 billion by 2005–06. At these levels, exports would comprise about 15 per cent of GDP in 2000–01 and 17 per cent of GDP by 2005–06, up from the current levels of about 10 per cent. If exports manage to increase to these levels, it would become feasible for India to sustain a wider current account deficit which is required for the non-inflationary

absorption of external capital inflows. It is suggested that a sustainable level of current account deficit would increase from the current level of 1.5 per cent of GDP to 2.5 per cent in 2000–01 and 3 per cent in 2005–06. It would then be possible for the net capital inflow to rise from the current level of about \$7 billion to \$8 billion to about \$17 billion to \$20 billion by 2000–01 and about \$25 billion to \$30 billion by 2005–06.

As table 13.1 shows, India did better than anticipated. Total exports reached \$118 billion, or 18.4 percent of GDP in 2003–4, and net capital inflows reached \$20.5 billion. However, far from obtaining a larger current

**Table 13.1** Indian capital flows: 1992–93 versus 2003–4

	1992–93 (in US\$ billions)	2003–4 (in US\$ billions)	Growth percent	Percent to GDP	
				1992–93	2003–4
GDP at market prices	239.09	639.90	9.36		
Current account (net)	-3.53	10.56		-1.47	1.65
Merchandise					
Outflows	24.32	80.18	11.46	10.17	12.53
Inflows	18.87	64.72	11.86	7.89	10.11
Invisibles					
Outflows	7.41	26.97	12.46	3.10	4.21
Inflows	9.33	52.98	17.10	3.90	8.28
Capital account (net)	3.88	20.54	16.37	1.62	3.21
Official flows					
Outflows	2.66	6.46	8.40	1.11	1.01
Inflows	4.92	3.34	-3.47	2.06	0.52
FDI					
Outflows	0.03	1.47	42.42	0.01	0.23
Inflows	0.34	4.89	27.25	0.14	0.76
Portfolio equity					
Outflows	0.00	16.86	127.46	0.00	2.64
Inflows	0.24	28.22	54.01	0.10	4.41
Debt					
Outflows	14.99	31.01	6.83	6.27	4.85
Inflows	17.37	37.14	7.15	7.26	5.80
Miscellaneous					
Outflows	2.34	2.27	-0.27	0.98	0.35
Inflows	1.36	5.35	13.26	0.57	0.84
Reserves at year end	6.43	107.45	29.17	2.69	16.79
Addition to reserves	0.70	31.42	41.35	0.29	4.91
Metric of integration	96.60	352.05	12.47	40.40	55.02
Trade integration	59.93	224.85	12.77	25.07	35.14
Financial integration	36.67	127.20	11.97	15.34	19.88

*Notes:* “Official flows” comprise external assistance, rupee debt service with respect to Russia, and IMF-related monetary movements. “Debt” comprises commercial borrowing, short-term loans, and banking capital. “Miscellaneous” is the sum of “Other capital flows” and errors and omissions. The Indian fiscal year runs from April to March, so 2003–4 runs from April 1, 2003, to March 31, 2004.

account deficit, as had been envisaged in this prominent and influential report, India ended up with a current account surplus of 1.7 percent of GDP in 2003–4.

The 10th plan document, which is a medium-term economic policy analysis effort, expresses regrets at the inadequate levels of the current account deficit in recent years (volume 1, paragraph 4.18): “The current account deficit narrowed down and on the average was 0.8 per cent of GDP, less than one half of the 2.1 per cent envisaged in the plan.”

There has been considerable discussion about a development strategy where countries might desire current account surpluses (Dooley, Folkerts-Landau, and Garber 2003). In India’s case, public statements on development policy were in favor of current account deficits. Many economists argued that the current account surplus in 2003–4, of 1.7 percent of GDP, implied a significant opportunity cost in terms of investment forgone and thus lower GDP growth (Lal, Bery, and Pant 2003).

### 13.3 Broad Empirical Features

Broad facts about Indian capital flows are presented in table 13.1, which shows two years: 1992–93 and 2003–4. The year 1992–93 was chosen since it reflects the last year of “the previous regime” of highly restricted capital flows.<sup>1</sup> The year 2003–4 is the most recent year observed.

*GDP:* Over this eleven-year period, GDP measured in current dollars grew by an average of 9.4 percent per annum.

*Current account:* India undertook major initiatives in trade liberalization in this period (Panagariya 2005). This led to growth rates of roughly 12 percent per annum in imports and exports of merchandise, and imports of invisibles. The dropping prices of global telecommunications led to an increase in service exports from India, giving a higher invisibles export growth rate of 17 percent per annum. Putting these together, trade integration (measured as gross current account flows as percent to GDP) rose sharply from 25.1 percent of GDP in 1992–93 to 35.1 percent of GDP in 2003–4: an increase of 10 percentage points in eleven years. In addition, over this period, the current account switched from a deficit of 1.5 percent of GDP to a surplus of 1.7 percent of GDP.

*Net capital flows:* On the surface, net capital flows appear to have changed little, from 1.6 percent of GDP in 1992–93 to 3.2 percent of GDP

1. Significant capital flows through FDI and portfolio investment commenced in 1993–94, which justifies the choice of 1992–93 as the last year of the previous policy regime.

The year-end exchange rate used for 1992–93 incorporates the sharp devaluation that took place when the rupee became a market-determined exchange rate in 1992. Hence, 1992–93 is also the first year for which it is meaningful to convert between rupees and dollars (e.g., for the purposes of reexpressing British pounds in U.S. dollars). All values are shown in U.S. dollars to ease interpretation and international comparison, and to avoid noise induced by domestic inflation volatility in this period.

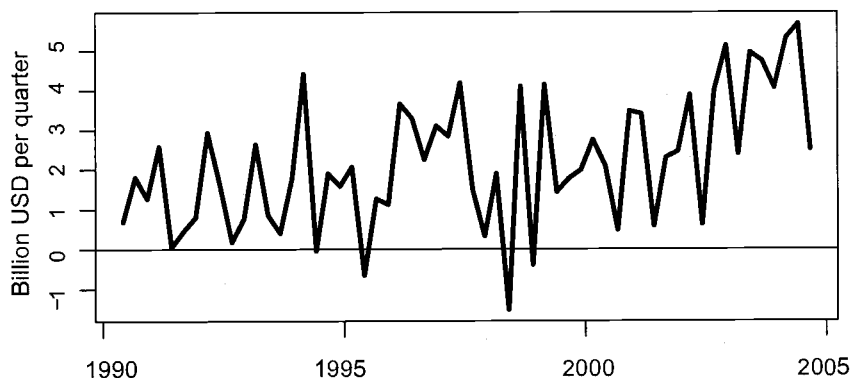


Fig. 13.1 Net capital flows (US\$ billions per quarter)

in 2003–4 (see figure 13.1). Yet major changes took place in the structure of capital flows.

*Debt flows:* In 1992–93, which reflects the previous policy regime, the capital account was dominated by official flows and debt flows. Over this eleven-year period, net official flows switched from +0.9 percent of GDP to –0.5 percent, and net debt flows stagnated at 1 percent of GDP. Given the limited accretion of debt, and high export growth, the debt service ratio dropped from 27.5 percent in 1992–93 to 18.1 percent in 2003–4.

*FDI and portfolio investment:* Major growth was seen in FDI and portfolio investment. Gross flows in these two channels grew sharply from 0.3 percent of GDP to 8 percent of GDP. The average annual growth rate of net FDI flows was 24.2 percent, and that for net portfolio flows was 41.9 percent. Through these high growth rates, over this period, India switched from LDC-style capital flows, emphasizing official flows and debt, to an “emerging market style” structure of capital flows, emphasizing FDI and portfolio investment. Gross flows on the capital account reached 19.9 percent of GDP in 2003–4, an increase of 4.5 percentage points as compared with 1992–93.

Portfolio flows are more prominent when measuring *gross* flows on the capital account, since they involve larger two-way flows of capital. In 2003–4, FDI inflows were 3.33 times bigger than FDI outflows, but portfolio inflows were only 1.67 times bigger than portfolio outflows. Hence, even though net flows through portfolio investment were 3.3 times larger than net FDI flows in 2003–4, gross portfolio flows in 2003–4 amounted to 7 percent of GDP, while gross FDI flows amounted to only 1 percent of GDP.

*Outward flows:* These changes were accompanied by a substantial outward flow of capital through purchases of foreign exchange reserves. The year-end reserves rose sharply from 2.7 percent of GDP in 1992–93 to 16.8



percent of GDP in 2003–4. In 2003–4 alone, the addition to reserves was 4.9 percent of GDP. In this year, net capital inflows of \$20.5 billion and a current account surplus of \$10.6 billion were associated with an addition to reserves of \$31.4 billion.

*Global integration:* The sum of gross flows on the current and capital account serves as an overall metric of integration into the world economy. This rose by 14.6 percentage points over this eleven-year period, from 40.4 percent in 1992–93 to 55 percent in 2003–4.

These data and this description suggest that the two major features of India's experience with capital flows have been

- Rapid growth of foreign investment—particularly portfolio investment—accompanied by slow growth of debt flows.
- A substantial extent of outward flows through reserve accumulation.

This paper seeks to shed some light on the causes and consequences of these major features.

### 13.4 Currency Regime

In India, there has been a rich interplay between policies and outcomes on capital flows and the currency regime. According to the RBI, the Indian rupee is a market-determined exchange rate, in the sense that there is a currency market and the exchange rate is not administratively determined. India has clearly moved away from fixed exchange rates. However, the RBI actively trades on the market, with the goal of containing volatility and influencing the market price.

In India, as in most developing countries, there has been a distinction between the de facto and the de jure currency regime. Patnaik (2003) argues that there is a de facto pegged exchange rate, for the following reasons:

- There is extremely low volatility of the rupee-dollar exchange rate alongside high volatilities of other exchange rates such as the rupee-euro and rupee-yen. Table 13.2 shows that the volatility of daily returns on the rupee-dollar has been 0.277 percent, while the volatility of (say) the rupee-yen has been 0.848 percent per day. The latter value is remarkably close to the dollar-yen volatility of 0.836 percent per day. In the polar case where the rupee-dollar were a fixed exchange, the rupee-yen volatility would be exactly equal to the dollar-yen volatility. Volatilities of the rupee against the British pound, euro, and yen take on large values, similar to those of floating exchange rates such as the dollar-euro or the euro-pound.
- Tests based on Frankel and Wei (1994) show that the U.S. dollar is overwhelmingly the dominant currency in explaining fluctuations of

**Table 13.2** Cross-currency volatility (daily returns, August 1992 to November 2004)

	U.S. dollar	British pound	Euro	Yen
Rupee	0.277	0.634	0.778	0.848
U.S. dollar		0.588	0.738	0.836
British pound			0.601	0.896
Euro				0.932

the Indian currency (table 13.3).<sup>2</sup> The coefficient of the dollar–Swiss franc returns is 0.9345, which is near 1, while other coefficients are near 0. The  $R^2$  of this regression is 87.45 percent.

- India's enormous reserve buildup after mid-2002 cannot be explained by a quest for reserves as insurance.
- Extending the Calvo and Reinhart (2002)  $\lambda$  metric of currency flexibility beyond 1999 shows that there has been no change in this metric over 1979–2003.

The *extent* of pegging has varied through this period. There have been multimonth periods where the rupee-dollar exchange rate was fixed, but there have also been periods where the volatility of the rupee-dollar exchange rate was closer to that of the rupee-euro or the rupee-yen. The facts shown above represent the average behavior over the period from August 1992 to November 2004.

As is typical with pegged exchange rates, the nominal rupee-dollar exchange rate has had low volatility, while all other measures of the exchange rate have been more volatile. As an example, there has been significant volatility of the real effective exchange rate (REER; figure 13.2). A substantial appreciation of the REER took place through a pegged rupee-dollar exchange rate coupled with higher domestic inflation.

## 13.5 Capital Controls

### 13.5.1 Evolution of Capital Controls

Foreign institutional investors (FIIs) were given permission to participate on the Indian market on September 14, 1992. Limits were put in place

2. Frankel and Wei (1994) developed a regression-based approach for testing for pegging. In this approach, an independent currency, such as the Swiss franc, is chosen as a numeraire. The model estimated is

$$d \log \left( \frac{\text{rupee}}{\text{franc}} \right) = \beta_1 + \beta_2 d \log \left( \frac{\text{dollar}}{\text{franc}} \right) + \beta_3 d \log \left( \frac{\text{yen}}{\text{franc}} \right) + \beta_4 d \log \left( \frac{\text{deutsche mark}}{\text{franc}} \right) + \varepsilon.$$

This regression picks up the extent to which the rupee-franc rate fluctuates in response to fluctuations in the dollar-franc rate. If there is pegging to the dollar, then fluctuations in the yen and deutsche mark will be irrelevant, and we will observe  $\beta_3 = \beta_4 = 0$  while  $\beta_2 = 1$ . If there is no pegging, then all the three coefficients will be different from 0. The  $R^2$  of this regression is also of interest; values near 1 would suggest reduced exchange rate flexibility.

Table 13.3 Frankel-Wei regression (daily returns, August 1992 to November 2004)

Parameter	Coefficient
$d \log \left( \frac{\text{USD}}{\text{CHF}} \right)$	0.9345 (72.73)
$d \log \left( \frac{\text{JPY}}{\text{CHF}} \right)$	0.0519 (6.47)
$d \log \left( \frac{\text{EUR}}{\text{CHF}} \right)$	-0.0134 (-0.7)
$d \log \left( \frac{\text{GBP}}{\text{CHF}} \right)$	0.0186 (1.27)
Intercept	0.0151 (2.46)
$T$	2,854
$R^2$	0.8745
$\sigma_e^2$	0.08

Notes: USD = U.S. dollar; CHF = Swiss franc; JPY = Japanese yen; EUR = euro; GBP = British pound.  $t$ -statistics in parentheses.

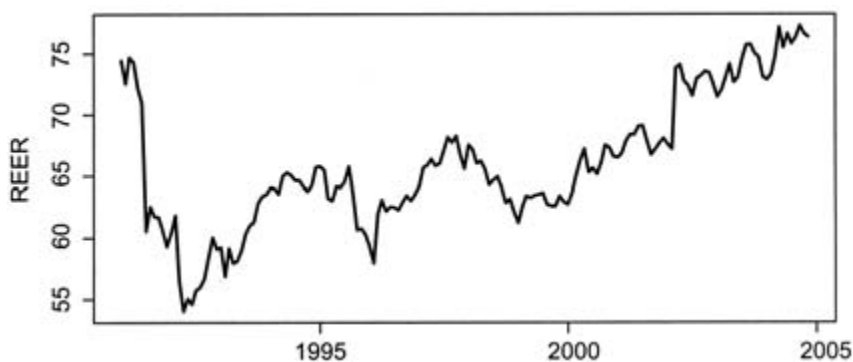


Fig. 13.2 Thirty-six-country trade weighted REER

to ensure that no one FII could own more than 5 percent of a company and all FIIs (put together) could not own more than 24 percent of a company.

From 1992 onward, restrictions on portfolio equity investment have been steadily eased, while sharp constraints on bond investment have been preserved. Table 13.4 shows the major events of the 1992–2004 period in

**Table 13.4****Chronology of easing controls on portfolio flows**

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September 14, 1992	Foreign institutional investors (FIIs) permitted into the country: these included pension funds, mutual funds, endowments, etc., proposing to invest in India as broad-based funds with at least 50 investors and no investor with more than 5 percent. Permitted access to primary and secondary market for securities, and products sold by mutual funds, with a minimum 70 percent investment in equities. Ceiling upon one FII of 5 percent ownership of any firm, and ceiling upon total of all FIIs at 24 percent.
November 1996	New concept of “100 percent debt FIIs” permitted, which could invest in corporate bonds but not government bonds.
April 4, 1997	Ceiling upon total ownership by all FIIs of local firms raised from 24 percent to 30 percent (required shareholder resolution).
April 1998	FIIs permitted to invest in government bonds, subject to a ceiling upon all FIIs put together of \$1 billion.
June 11, 1998	Ceiling upon ownership by one FII in one firm raised from 5 percent to 10 percent. FIIs permitted to partially hedge currency exposure using the currency forward market. FIIs permitted to trade on the equity derivatives market in a limited way.
August 1999	Requirement that FII must have at least 50 investors eased to 20 investors.
February 2000	Foreign firms and individuals permitted access to the Indian market through FIIs as “subaccounts.” Local fund managers also permitted to do fund management for foreign firms and individuals through subaccounts. Requirement that no investor can have over 5 percent of the FII fund eased to 10 percent.
March 1, 2000	Ceiling upon total ownership by all FIIs of local firms raised from 30 percent to 40 percent (required shareholder resolution).
March 8, 2001	Ceiling upon total ownership by all FIIs of local firms raised from 40 percent to 49 percent (required shareholder resolution).
September 20, 2001	Ceiling upon total ownership by all FIIs of local firms raised from 49 percent to “the sectoral cap for the industry” (required shareholder resolution).
January 8, 2003	Limitations upon FIIs hedging using the currency forward market removed.
December 2003	Twin approvals for FIIs at both SEBI and RBI replaced by single approval at SEBI.
November 2004	New ceiling placed upon ownership of all FIIs of all corporate bonds of \$0.5 billion.
February 2006	The ceiling upon ownership of all FIIs of government bonds raised to \$2 billion and ceiling upon ownership of all FIIs of corporate bonds raised to \$1.5 billion.

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the easing of capital controls on portfolio flows. It also gives a sense of the detailed system of quantitative restrictions operated by the RBI and the intricate steps through which reform has come about. Through this reform process, portfolio investors are now able to trade in the spot and derivative markets for both equities and currency. However, the changes in rules have not always been only in the direction of liberalization—sometimes reforms have been reversed.

Under the Indian policy framework, entities eligible to become FIIs have an essentially open capital account, while being required to suffer overhead costs of registration and reporting in India. There are two kinds of entities that do not trade in the Indian market through the FII framework: those that are ineligible and those that find the overhead costs unacceptable. In order to overcome these constraints, an over-the-counter (OTC) derivatives market has sprung up for access products called participatory notes. In this market, eligible FIIs sell call options or linear exposures to others. In early 2006, roughly half of the outstanding FII investments into India had come through access products sold by 17 out of the 733 registered FIIs. The rise of access products underlines the extent to which India's FII framework implies that there is *de facto* capital account convertibility when it comes to equity investment.

While considerable openness on FDI exists, there are restrictions on foreign ownership in certain industries. For example, the foreign company engaging in FDI in insurance is limited to 26 percent ownership. Another major constraint influencing FDI is "Press Note 18," whereby a foreign firm that wishes to start a second project in India is required to take approval of its first domestic partner.

In recent years, some databases have sought to distill the system of capital controls prevalent in a country at a point in time into a simple score (Johnston and Tamirisa 1998). It is instructive to examine their values for India. The IMF single-dummy indexes have India as 1 from 1983 to 1995, a period over which major changes took place. Miniane (2004) reports a composite measure based on fourteen disaggregated indexes and finds that India moved from 0.917 in 1983 to 0.923 in 2000 (an increase in capital controls). The level and the change in both these indexes appear inconsistent with India's experience, where substantial openness has come about through a large number of small steps.

### 13.5.2 Restrictions on CIP Arbitrage

One element of the capital controls consists of barriers to arbitrage on the currency forward market. In an ordinary forward market, arbitrage and only arbitrage defines the forward rate. Even if there are strong speculative views and positions on the market, there is relatively little that can be inferred from forward premium, since this is primarily determined by cov-

ered interest parity (CIP).<sup>3</sup> When violations of market efficiency arise, near-infinite capital should come into play in arbitrage. Through this process, arbitrageurs restore market efficiency and push the forward price back to fair value.

In India, banking regulations place sharp restrictions upon the ability of banks to engage in CIP arbitrage. Importers and exporters are permitted access to the forward market, where they are free to either hedge or not hedge. The supply and demand for forward dollars by these “permitted hedgers” determines the forward price, and banks are prevented from engaging in CIP arbitrage. This serves to break the link between the spot and the derivative.<sup>4</sup> In addition, the empirical experience with the RBI’s trading shows that while the RBI trades extensively on the spot market, the observed forward price tends to be a market-determined rate that is not distorted through trading by the central bank.

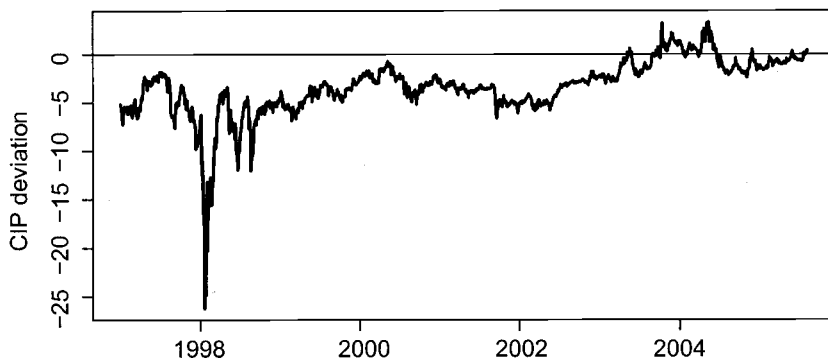
As shown in figure 13.3, in the rupee-dollar forward market, deviations from the covered parity condition have tended to persist over multimonth periods. In an unrestricted market, arbitrage would have wiped out such deviations almost instantly. However, the restrictions against CIP arbitrage that are in force have prevented arbitrage from restoring market efficiency.

This situation—where restrictions on CIP arbitrage are coupled with a largely undistorted forward market—has generated a *remarkable information source* as a side effect. If economic agents expect the rupee to depreciate, there would be a greater interest in selling rupees forward—exporters would stay unhedged, and importers would be likely to hedge. Conversely, if economic agents expect the rupee to appreciate, there would be greater interest in buying rupees forward while those expecting to import would stay unhedged. Lacking adequate arbitrage capital, the forward price does not get restored to the fair value. The deviation between the fair value of

3. The arithmetic of forward pricing in an efficient market is based on “covered interest parity.” Covered interest parity involves comparing two routes for riskless dollar investment. An investor could convert \$1 into  $(1 + r_u)^T$  through  $r_u$ , which is obtained from the U.S. zero coupon yield curve for  $T$  years. Alternatively, the investor could convert into rupees at the spot price  $S$ , invest in the government of India zero coupon yield curve, and obtain a locked-in cash flow of  $S(1 + r_r)^T/F$  by converting back into dollars at the rate  $F$  at date  $T$ . Under no-arbitrage, these two investment strategies have to yield an identical return, through which the fair value for  $F$  can be computed.

4. Currency derivatives can trade either OTC or on exchanges. In India, trading of currency derivatives on exchange is infeasible owing to legal difficulties. Hence, our treatment is limited to currency forwards and does not utilize data from a currency futures market.

Offshore cash-settled forward markets, named “nondeliverable forward (NDF) markets,” exist on the Indian rupee. However, the mere existence of a currency forward market outside the reach of domestic currency controls is not enough to generate informative prices in the sense of a forward market that is immune to CIP. The essential and unique feature of India’s forward market is the restrictions upon CIP arbitrage. If (for example) a forward market existed outside the country, but if arbitrage were feasible, then it would also obey CIP and the prices observed there would be noninformative.



**Fig. 13.3** Deviation between actual and fair trade value of rupee-dollar forward premium

the forward premium and the observed value on the market then serves as a measure of the *speculative* views in the market about the future course of the currency.<sup>5</sup> As figure 13.3 shows, in the period from 1997 to 2000, the CIP deviation was generally negative, which suggests that rupee depreciation was expected. In 2003, the CIP deviation changed sign, which suggested expectations of rupee appreciation.

If arbitrage was unrestricted, the forward premium would not have such an interpretation and would be relatively noninformative. Under the existing policy framework, the CIP deviation is a uniquely useful high-frequency market-based measure of future expectations, one that is not available in most countries where regulators do not inhibit arbitrage.<sup>6</sup>

Given the nature of rules governing importers and exporters, there is little doubt that CIP deviations in India reflect the views of economic agents who are given the choice between hedging and not hedging. However, the extent of correctness of these views is a distinct question. An important question concerns the extent to which the speculative views of the market predict future exchange rate movements.

Two specific episodes can be isolated in which the views of the market proved to be wrong. In 1993 and 1994, with strong portfolio inflows, the CIP deviation was strong and positive, suggesting that private agents expected a currency appreciation. However, the RBI chose to effectively have a fixed exchange rate of 31.37 rupees (Rs), and the expectations of agents

5. Apart from conveying expectations of the market, the deviation between the observed forward premium and its fair value also shows the arbitrage opportunity available to the few economic agents who are permitted to engage in the trading required for doing CIP arbitrage. Their mass has thus far not been large enough to remove CIP deviations.

6. Internationally, empirical research related to currency expectations uses data based on surveys (Frankel and Okongwu 1996). Market participants, central bankers, multinational companies, and economics departments of banks are interviewed on a weekly or monthly basis. Survey data such as the *Currency Forecasters' Digest*, now known as the *Financial Times Currency Forecast*, forms the basis for a number of papers in the field (Chinn and Frankel 1994).

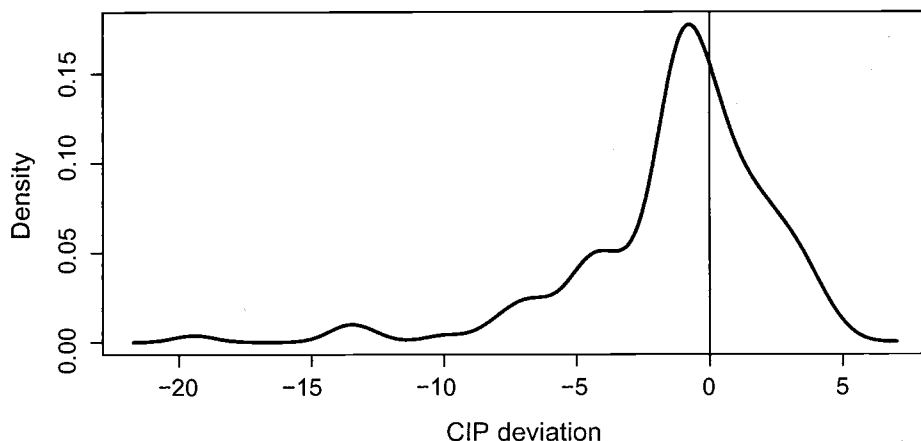


Fig. 13.4 Kernel density plot of CIP deviation

proved to be wrong. In late 1997 and early 1998, in the aftermath of the East Asian crisis, there were strong expectations that the rupee would devalue sharply, giving very large negative values of the CIP deviation (see figure 13.3). In the event, domestic interest rates were raised sharply in an “interest rate defense,” and the rupee did *not* devalue, so the expectations of agents proved to be wrong (Patnaik 2005).

We can test the extent to which lagged CIP deviations explain current changes of the exchange rate. If market expectations are (on average) correct, when past values of the CIP deviation are positive, this should be associated with currency appreciation (negative slopes).

A difficulty faced in this regression is the distribution of the CIP deviation (figure 13.4), where there are some extreme values (from late 1997 and early 1998). These extreme values for the CIP deviation prove to be influential observations in a regression. Hence, in addition to showing ordinary least squares (OLS) results, we investigate this question using a robust regression using an M-estimator (Venables and Ripley 2002).

The results for weekly data (table 13.5) and monthly data (table 13.6) suggest that the CIP deviation at a given point in time is a statistically significant predictor of future currency returns over a considerable future time period.<sup>7</sup>

The picture that the rupee spot and forward markets represent may hence be summarized as the following elements:

7. These regressions are based on a daily time series from January 1, 1997, to February 4, 2005. The last observed value for the week or the month is used in converting to weekly or monthly frequencies. The simplest model (currency returns on lagged CIP deviation) juxtaposes the currency returns of this month with the CIP deviation prevalent at the end of the last month.



**Table 13.5** CIP deviation as predictor of future currency returns (weekly data)

	OLS (1)	OLS (2)	Robust LS (3)	Robust LS (4)
CIP deviation lag 1	-0.025 (-2.83)	0.009 (0.36)	-0.023 (-5.21)	-0.010 (-0.78)
Lag 2		-0.028 (-0.84)		-0.014 (-0.82)
Lag 3		-0.009 (-0.36)		0.001 (0.05)
$R^2$	0.019	0.024		

Notes: CIP = covered interest parity; OLS = ordinary least squares; LS = least squares.

**Table 13.6** CIP deviation as predictor of future currency returns (monthly data)

	OLS (1)	OLS (2)	Robust LS (3)	Robust LS (4)
CIP deviation lag 1	-0.121 (-2.42)	-0.130 (-1.77)	-0.097 (-3.43)	-0.111 (-2.67)
Lag 2		0.171 (1.91)		0.080 (1.58)
Lag 3		-0.205 (-2.78)		-0.099 (-2.36)
$R^2$	0.058	0.134		

1. The rupee-dollar spot market is a pegged exchange rate. It is not a floating rate. It is not a random walk. Violations of market efficiency are detected. It may hence be possible for economic agents to form useful predictions of future currency movements.

2. There are strong restrictions that inhibit CIP arbitrage.

3. Hence, sustained CIP deviations are found.

4. In the absence of adequate arbitrage capital, the CIP deviation reflects the speculative views of economic agents who choose to hedge or not hedge depending on expectations about future exchange rate fluctuations.

5. CIP deviations do have some forecasting power in predicting future exchange rate fluctuations.

### 13.5.3 Capital Controls Prevalent in 2005

The state of capital controls in 2005 may be summarized as follows:<sup>8</sup>

*Current account:* There are no current account restrictions, other than the limit upon individuals of purchasing no more than \$10,000 per year for the purpose of foreign travel.

8. The discussant of the paper, Takatoshi Ito, remarked that these capital controls were reminiscent of Japan in the mid-1960s to the mid-1970s (Ito 1983).

*Restrictions upon the currency market:* Market access to the currency market is severely restricted, primarily to banks. Only economic agents with a direct current account or capital account exposure are permitted to trade in the market. Exchange traded currency derivatives are absent. Importers and exporters face binding restrictions on the size of their currency forward positions.

*Outward flows by individuals:* Individuals are limited to taking \$25,000 per year out of the country.

*Outward flows by firms:* Firms are limited to taking capital out of the country that is equal to their net worth.

*Borrowing by firms:* External borrowing by firms must be of at least three years' maturity below \$20 million and of at least five years' maturity beyond. Borrowing up to \$500 million by a firm "for certain specified end-users" (e.g., expanding a factory, importing capital goods) is allowed without requiring permissions. There is a ceiling whereby approvals for borrowing by all firms (put together), in a year, should not exceed \$9 billion per year. This limit, of \$9 billion, is revised upward roughly every one to two years.

Firms are "required to hedge their currency exposure," but there is no mechanism for verifying this, and substantial restrictions on their activities on the currency forward market are in place.

*Borrowing by banks:* The central bank controls the interest rate at which banks borrow from foreigners through "nonresident deposits."<sup>9</sup>

*Generic restrictions upon portfolio flows:* Only FIIs are permitted to invest in the country.

*Debt investment by foreign portfolio investors:* The aggregate investment in government bonds by all foreign investors cannot exceed \$2 billion. The aggregate bond investments by any one fund cannot exceed 30 percent. The total corporate bond ownership by all foreign investors cannot exceed \$1.5 billion.

*Equity investments by foreign portfolio investors:* The aggregate foreign holding in a company is subject to a limit that can be set by the shareholders of the company. This limit is, in turn, subject to "sectoral limits" that apply in certain sectors. No one foreign portfolio investor can own more than 10 percent of a company. Foreign ownership in certain sectors (telecommunications, insurance, banking) is capped at various levels. Firms are free to issue global depository receipts (GDRs) or American depository receipts (ADRs) outside the country, which can be sold to a broad swathe of global investors. Within these restrictions, foreign investors are fully able to convert currency, hedge currency risk, and trade in the equity spot or derivatives markets.

*FDI:* Foreign ownership in certain sectors (e.g., telecommunications, insurance, banking) is capped at various levels (table 13.7). Foreign compa-

9. Gordon and Gupta (2004) analyze the determinants of nonresident deposits.

**Table 13.7** Ownership restrictions on FDI

Sector	Limit on foreign ownership (%)
FDI prohibited	
Retail, plantations, real estate	0
FDI with limits on foreign ownership	
Broadcasting	20/49
Defense	26
Insurance	26
Petroleum refining	26
Airlines	49
Oil and gas pipelines	51
Trading	51
Petroleum exploration	51 to 100
Petroleum distribution	74
Mining for diamonds, precious stones	74
Coal mining	74
Telecommunications	74
Banking	74
Advertising	74
Airports	74/100
All other areas	100

nies require approval of the first firm they choose to do a joint venture with in the country, if they wish to start a related business.

### 13.6 Investment Flows

#### 13.6.1 FDI

Figure 13.5 shows the time series of quarterly flows of FDI. In order to aid comparability, it has the same scale as figures 13.1 and (in section 13.6.2) 13.6.

In many countries, high exports growth has been strongly associated with FDI. As shown in table 13.1, India has experienced annual dollar growth rates of merchandise exports of 12 percent and services exports of 17 percent. Thus, India's share in world trade of both goods and services has been increasing, without high FDI. Two elements of an explanation might be labor-intensive exports and the strength of India's domestic firms.

#### *Labor-Intensive Exports*

This may partly reflect the higher extent to which FDI into India has emphasized labor-intensive economic activities, such as service exports. As an example, call centers have a capital output ratio of just 0.75; hence, an annual flow of exports worth \$10 billion requires a stock of capital of only

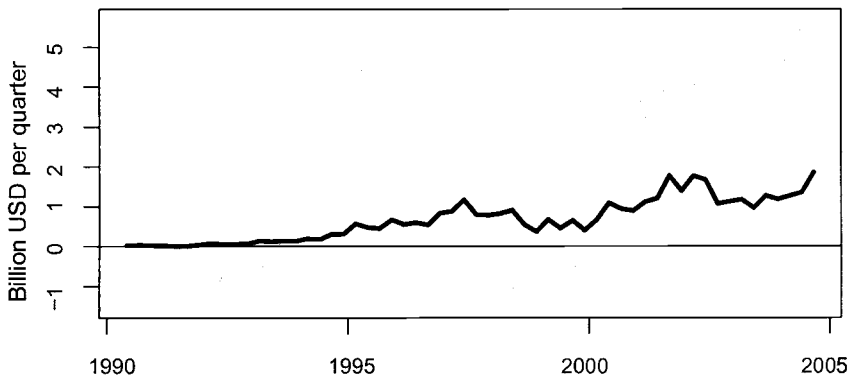


Fig. 13.5 Net FDI flows (US\$ billions per quarter)

Table 13.8 Sectoral composition of FDI: August 1991 to November 2004

Sector	FDI flows (in US\$ billions)	Percent of total
Oil and electricity	2.5	9.8
Telecommunications	2.7	10.5
Transportation	2.9	11.4
Electrical, electronics, software	3.8	15.1
Metals	0.5	1.9
Chemicals	1.7	6.0
Food processing	1.1	4.2
Services	2.2	8.2
Others	15.0	32.9
Total	32.3	100.0

\$7.5 billion.<sup>10</sup> Table 13.8 shows the sectoral composition of FDI, which shows that, like the Indian exports basket, FDI has been diversified across a broad range of sectors. The service sector—which includes export-oriented services and domestic services—accounted for only 8.2 percent of total FDI.

#### *Strength of Domestic Firms*

Unlike many emerging markets or transition economies, India had a strong set of domestic firms in place by the 1990s. A steady flow of startups and initial public offerings (IPOs) has fueled a large domestic corporate sector. These domestic firms were able to engage in export-oriented activities, as opposed to the higher reliance seen in other countries upon foreign

10. The rough financial structure of a 1,000-seat call center, as of 2004, is as follows. The project cost is roughly \$15 million, of which \$10 million is fixed capital (excluding real estate). The annual revenue works out to roughly \$25 million, of which the value added is roughly \$20 million.

**Table 13.9** Country composition of Indian trade and FDI

Country	Share in FDI	Share in trade
United States	18.8	9.6
Japan	8.1	3.0
The Netherlands	7.7	1.0
United Kingdom	7.3	3.8
Germany	5.6	3.2

*Note:* FDI share computed over 1991–2004, trade shares over 1998–2004.

firms who would first bring in FDI and then export. In India's case, the role of foreign capital flows has worked, to a greater extent, through portfolio flows into the domestic equity market, through domestic firms to exports.

Domestic firms have been given an increasingly liberal framework for outward FDI flows so that they can become multinational corporations. In 2003–4, gross FDI inflows of \$4.89 billion were accompanied by gross outflows of \$1.47 billion. Offshore investments by Indian firms made up part of the latter. To this extent, Indian data show lower net FDI flows.

Table 13.9 shows the country composition of FDI into India.<sup>11</sup> In the case of each of the top five countries by FDI share, the FDI share of the country considerably exceeds the trade share of the country. China and United Arab Emirates (UAE) are examples of countries where India has substantial trade but that are not sources of FDI to India.

### 13.6.2 Portfolio Flows

#### *Indian Securities in a Global Portfolio*

In the portfolio optimization of a globally diversified investor, the appeal of Indian securities is related to their lack of correlation with global risk factors. Some correlations of weekly returns, in the period from October 1995 to February 2004, are in table 10.<sup>12</sup>

In many small countries, liberalization efforts in terms of a more open current account, FDI, and portfolio flows have led to increased correlations, which has served to diminish the benefits from diversification. In or-

11. These fractions have been computed using the following adjustment. The largest country that sends FDI to India, in the data, is the island of Mauritius (34.5 percent). India has an advantageous tax treaty with Mauritius, and many investors choose to incorporate in Mauritius in order to benefit from this tax treatment. The values given here show the fraction of countries in the non-Mauritius FDI into India, and are only accurate insofar as the country composition of FDI into India that is routed through Mauritius is the same as the country composition of FDI that comes directly to India.

12. October 1995 is used as the starting point for this data set, since it reflects the point by which the early sharp increase in foreign portfolio flows had been completed, and some major changes in the domestic equity market design had been completed. Hence, the period from October 1995 onward represents a comparable period.

**Table 13.10** Correlation matrix of some stock market indexes

	Nifty Jr.	Kospi	Nifty	S&P 500
<i>A. Full period</i>				
Cospi	0.862	0.254	0.911	0.159
Nifty Jr.		0.233	0.776	0.099
Kospi			0.280	0.312
Nifty				0.221
<i>B. First half of period: October 1995–December 1999</i>				
Cospi	0.868	0.105	0.935	0.101
Nifty Jr.		0.101	0.803	0.023
Kospi			0.155	0.237
Nifty				0.169
<i>C. Second half of period: December 1999–February 2004</i>				
Cospi	0.863	0.424	0.892	0.209
Nifty Jr.		0.377	0.760	0.142
Kospi			0.441	0.396
Nifty				0.272

*Notes:* This table uses weekly returns data from October 1995 to February 2004. Nifty is the Indian stock market index of the top fifty stocks. Nifty Jr. is the second rung of fifty stocks. Cospi is the Indian index encompassing all active stocks, which number around 2,000. Kospi is the Korean stock market index.

der to explore this issue, table 13.10 also breaks the overall period into two halves. The correlation of the overall index (Cospi) against the Standard and Poor's (S&P) 500 doubled from 0.1 in the first half to 0.21 in the second half. However, 0.21 remains a small number by world standards. For example, it is lower than the correlation of Korea's Kospi against the S&P 500 in the first half. It is also significantly lower than the Korean correlation of 0.396 in the second half.

These low correlations suggest that Indian equities can play a useful role in improving the Sharpe's ratio of globally diversified portfolios. As an illustrative example, applying a portfolio optimizer to the historical covariance matrix over this period yields weights of 61.6 percent for the S&P 500, 11.5 percent for the Korean Kospi, and the remainder in India (19.1 percent in Nifty and 7.8 percent in Cospi). This aspect constitutes one feature of understanding India's large equity portfolio inflows.

### *Factors Influencing Home Bias*

In a rational world, decisions about including securities from a given country in global portfolios should be based on the improvements in diversification obtained therein. At the same time, a strong problem that is well known in the literature is that of the home bias, whereby individual and institutional portfolios tend to hold higher weights of local-country securities. In the literature, home bias is believed to be related to informational asymmetries and transaction costs. For example, Portes and Rey

(2001) find that the geography of information—rather than the quest for efficient portfolios through diversification—dominates patterns of cross-border equity flows. Other constraints include size, liquidity, and corporate governance.

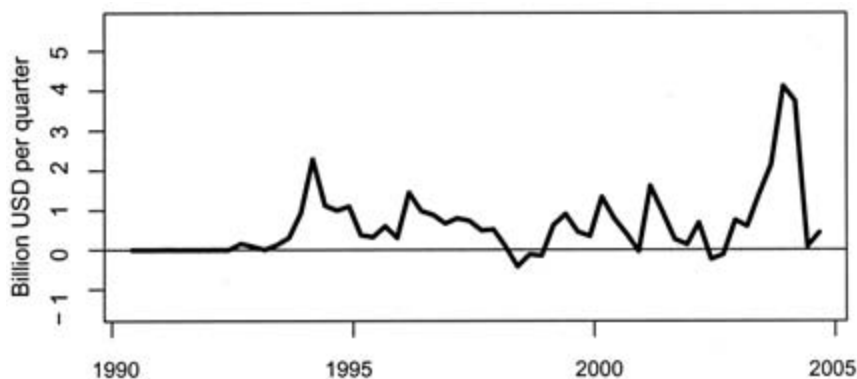
India's success at attracting substantial portfolio flows relates to strengths on these issues of information, size, and liquidity.

*Size:* India is a large economy, with a strong set of domestic firms in place by the 1990s when portfolio flows commenced. A steady flow of start-ups and IPOs has fueled a large domestic corporate sector. As of February 2006, the market capitalization of the equity market was \$600 billion.

*Information:* On the issues of informational asymmetries and transaction costs, India had strengths in terms of a century-old tradition of law, accounting, and stock market trading with extensive participation by domestic households. This implied that many issues about law, information disclosure, and corporate governance, which were important to foreign investors, were broadly in place in India before portfolio flows commenced. India's extensive use of English, and the extensive presence of individuals of Indian origin in global finance companies, has helped reduce the informational asymmetry faced by foreign investors. Familiarity with India among global finance companies was further heightened from the late 1990s onward, when most major global finance companies started moving parts of their production process to India, including areas such as call centers, accounting, back office processing, research, and software development.

*Liquidity:* While the extensive participation by domestic households offered the possibility of a liquid and active stock market, in the early 1990s there were many weaknesses in the market design, which led to high transaction costs. As a response to these weaknesses, many domestic firms chose to disintermediate the domestic securities markets and engage in offshore issuance through ADR or GDR markets. This allowed these firms to exploit the superior market design that was available outside in London or New York. However, securities issued outside the country did suffer from poor liquidity owing to the incompatible time zone and lack of widespread trading interest.

Partly as a response to the difficulties faced by foreign investors on domestic stock markets, India embarked on a major program of modifying incentives and institutions on the securities markets (Shah and Thomas 2000; Thomas 2006). This involved a new securities regulator (SEBI) and a new set of securities trading institutions (NSE, NSCC, and NSDL). These institutions innovated on the market design, introducing all the elements of world-class securities infrastructure: demutualization of the exchange (1993), electronic limit order book market (1994), elimination of entry barriers into intermediation (1994), nationwide access (1994), novation at the clearing corporation (1996), dematerialized settlement (1996), equity de-



**Fig. 13.6** Net portfolio flows (US\$ billions per quarter)

derivatives trading (2000–2001), and T + 3 and then T + 2 rolling settlement (2001, 2002).

This reform program had a profound impact upon transaction costs (Shah and Thomas 1997). It helped foster IPOs, the growth of market capitalization, and foreign investment. It also eliminated the rationale for offshore issuance as a mechanism to disintermediate an inefficient domestic market.

In the process of institution building on the securities markets, India harnessed the scale economies associated with a large number of listed companies and a large number of active speculators. The two stock markets in India—NSE and BSE—are ranked third and fifth in the world by number of transactions. These economies of scale in India were a sharp contrast with the difficulties faced by many small countries in building liquid securities markets (Shah and Thomas 2003).<sup>13</sup>

#### *Growth of Net Portfolio Flows*

Figure 13.6 shows the time series of quarterly portfolio flows. In order to aid comparability, it has the same scale as figures 13.1 and 13.5. India's share of world portfolio flows considerably exceeds India's share in world FDI flows.

#### *FII's and the Domestic Equity Market*

India is a retail-dominated equity market, where institutional investors account for roughly 10.8 percent of spot market turnover and just 3.3 percent of derivatives turnover. The easing of capital controls for foreign port-

13. The bond market experienced a very different trajectory in the domestic reform process, and largely failed to achieve comparable results in terms of liquidity and transparency. However, the prevailing policy environment aimed to discourage debt-related flows. Hence, the weakness of the bond market was not a binding constraint in shaping portfolio flows.



**Table 13.11** Foreign institutional investors (FIIs) on the equity market (in billions of rupees)

	2001	2002	2003	2004
End-year number of FIIs	490	502	540	637
End-year number of subaccounts	1,372	1,361	1,542	1,785
Spot market activity				
Gross buy	518	288	944	1,857
Gross sell	386	253	640	1,467
Net	131	35	305	390
Derivatives activity				
Gross buy	n.a.	n.a.	n.a.	842
Gross sell	n.a.	n.a.	n.a.	861
Net	n.a.	n.a.	n.a.	-19

*Source:* Ministry of Finance (2006).

*Note:* n.a. = not available.

folio investors has led to extensive trading by foreign portfolio investors. Putting the spot and derivatives markets together, in 2004, FIIs purchased Rs2,699 billion and sold Rs2,328 billion (table 13.11). From 2001 to 2004, the number of registered FIIs rose from 490 to 637, and the number of subaccounts rose from 1,372 to 1,785, showing a greater diversity of the foreign investors present.

Derivatives transactions by FIIs were not separately tracked prior to 2004. The inclusion of derivatives data from 2004 onward overstates the increase in FII turnover for 2004, which hence shows a sharp jump from Rs1,583 billion in 2003 to Rs5,027 billion in 2004. While Rs5,027 billion of gross FII turnover—summing across spot and derivatives markets—appears to be a large number, it now makes up only 5.83 percent of the overall Indian equity market (table 13.12).<sup>14</sup>

### 13.6.3 Determinants of Portfolio Flows

Given the prominence of portfolio flows into India, it is important to understand the factors that shape portfolio flows.<sup>15</sup> In the literature on portfolio flows into emerging markets, evidence has been found about the importance of the U.S. interest rate and flows into equity-oriented fund managers in the United States. If foreign fund managers react to information in India with a lag, then lagged output and lagged stock returns should help predict portfolio inflows. If decisions of foreign fund managers are

14. A key feature of measurement in table 13.12 is the use of “gross turnover.” Trading volume data, as normally reported by exchanges, shows volume of Rs100 when one security worth Rs100 goes from a seller to a buyer. However, when data are captured about the gross trading of market participants, this transaction shows up twice, as Rs200 of trades. To ensure comparability, the table reexpresses all data as gross turnover, by doubling the trading volume as reported by exchanges.

15. This question has been recently addressed by Gordon and Gupta (2003).

**Table 13.12** Gross turnover (in billions of rupees)

	2001	2002	2003	2004
<b>Spot market</b>				
NSE + BSE gross turnover	23,416	19,142	26,340	34,168
FII's	904	540	1,583	3,323
<b>Derivatives</b>				
NSE + BSE gross turnover	838	6,927	28,804	51,118
FII's				1,703
<b>Equity spot + derivatives</b>				
NSE + BSE gross turnover	24,254	26,070	55,145	86,286
FII's	904	540	1,583	5,027

Source: Ministry of Finance (2006).

**Table 13.13** Explaining portfolio flows into the equity market: Monthly data, March 1998 to October 2004

	Parsimonious	Kitchen sink		
Intercept	238.245		207.209	
CIP deviation	106.937		74.679	
	(5.26)		(2.09)	
Squared CIP deviation	8.985		4.121	
	(2.10)		(0.76)	
U.S. 90-day rate			-15.686	
			(-0.51)	
		Lag 1	Lag 2	Lag 3
Lagged Nifty returns		-0.350	6.960	8.550
		(-0.06)	(1.18)	(1.47)
Lagged industrial growth		-8.061	27.042	-4.12
		(-0.24)	(0.88)	(-0.14)
Lagged S&P 500 returns		5.052	9.196	4.961
		(0.58)	(1.05)	(0.53)
$R^2$	0.2668		0.3396	
Adjusted $R^2$	0.2477		0.2213	

shaped by expectations about the currency, then the CIP deviation should help predict portfolio inflows.<sup>16</sup>

Portfolio flows into government bonds are highly restricted by India's capital controls. Hence, we focus on portfolio flows into the equity market. Table 13.13 shows two OLS regressions that explain portfolio flows into the equity market. The time span available is short, from March 1998 until

16. As of late 2004, the Indian  $r_f$  was 4.5 percent, the historical equity premium was roughly 8 percent, and the annualized volatility of the equity index was roughly 20 percent. The Sharpe's ratio of the equity index—as viewed by a foreign investor—would hence be significantly affected by currency views of (say)  $\pm 5$  percent on an annualized basis.

**Table 13.14** Volatility of capital flows: Summary statistics of quarterly data from 1995:Q1 to 2004:Q2 (in US\$ millions)

	Minimum	25th percentile	Median	75th percentile	Maximum	Interquartile range
<b>Raw data</b>						
Portfolio	-423	260	594	899	4,111	624
FDI	365	595	886	1,175	1,768	564
Debt	-1,257	270	826	2,330	3,895	1,825
Official	-2,657	-738	-24	210	857	921
Total	-1,514	1,436	2,426	3,969	5,315	2,496
<b>Residuals about time trend</b>						
Portfolio	-1,278	-531	-19	311	2,903	815
FDI	-534	-137	-26	115	666	246
Debt	-2,448	-826	-230	1,083	2,833	1,806
Official	-2,249	-555	261	511	1,214	1,017
Total	-3,648	-771	224	1,317	2,340	2,018

October 2004. None of the explanatory variables are significant in the “kitchen sink” model, other than the CIP deviation. The parsimonious model is a quadratic in the CIP deviation, where bigger flows come into the equity market when the currency is expected to appreciate, with a nonlinearity in response where bigger deviations induce bigger inflows.

These results suggest that in India’s short experience, traditional explanatory variables appear to be relatively less important, and currency expectations do play a role in shaping portfolio flows into the equity market.

#### 13.6.4 Volatility of Capital Flows

India’s stance on liberalization of the capital account was strongly motivated by certain priors about the volatility of capital flows, and about the extent to which different kinds of capital flows would impinge upon implementation of the prevailing currency regime. In the literature, there has been disagreement about the volatility of the various kinds of capital flows, and the interplay between the currency regime adopted and the volatility of certain kinds of capital flows.<sup>17</sup>

We can use quarterly balance-of-payments data in order to review India’s experience with volatility of the four components of capital flows. In order to avoid the formative period where large changes were taking place in response to the first easing of capital controls, we focus on the period after 1995. This helps us obtain information about the behavior in the postreform period.

Table 13.14 shows summary statistics about the four components of net

17. Alfaro, Kalemli-Ozcan, and Volosovych (2004) find that in Asia, in the decade of the 1990s, the volatility of capital flows was 1.2 for FDI, 15.4 for portfolio equity flows, and 1.6 for debt. They define volatility of capital flows as the standard deviation of per capita net capital flow divided by the average of gross inflow and gross outflow.

capital flows, using data for thirty-seven quarters from 1995:Q1 to 2004:Q2. Since the data often have unusual distributional characteristics, the interquartile range is used as a relatively nonparametric measure of dispersion.<sup>18</sup>

The raw data show that a net outflow was never observed in the case of FDI. FDI and portfolio flows have similar values for the interquartile range. Debt and official flows seem to be much more volatile than FDI and portfolio flows.

When expressed as residuals about a time trend, all four components have experienced significant negative outflows in the worst quarter. Viewed in this fashion, FDI flows seem to be highly stable, and more stable than other components. The ranking of volatility of components, when viewed in this fashion, appears to be debt > official > portfolio > FDI.

Over this period, fluctuations in debt and official flows frequently reflected changes in the policy framework. Capital controls and other policy levers were frequently used to encourage or discourage debt and official flows, depending on the tactical exigencies of implementing the currency peg. On some occasions, offshore borrowing was effectively initiated by the government, and banks were encouraged to borrow abroad at high rates (set by the RBI). At other times, strict controls have been placed on offshore borrowing, and the interest rate at which banks borrow has been cut (Gordon and Gupta 2004). Hence, there is need for caution in interpreting the characteristics seen therein, which may reflect factors such as policy volatility and currency expectations. The volatility of debt flows and of official flows might have been very different if India's policies on capital controls had been stable, or if the currency regime had been different.

The results for the volatility of India's portfolio and FDI flows reflect the characteristics of these flows and of the Indian economy, since they reflect the outcomes obtained under a broadly stable policy framework, subject to a steady process of liberalization whereby controls have been slowly relaxed over the years, with an essentially one-way direction of reforms.

### 13.6.5 Evaluating India's Experience with the Composition of Capital Flows

India represents an unusual situation of a developing country where portfolio flows have been particularly important. Net portfolio flows are presently roughly three times the size of net FDI flows. India's experience is hence an opportunity to illuminate our understanding of the composition of capital flows.

Where many economists have argued in favor of FDI given that FDI is

18. The prob values obtained using the Shapiro-Wilk test of normality for the five time series are as follows: portfolio ( $4.672 \times 10^{-6}$ ), FDI (0.081), debt (0.035), official (0.0018), and total (0.57). Hence, we avoid the use of the standard deviations as a measure of dispersion.

“bolted down” and cannot flee in the event of a crisis, recent research has brought new perspectives to bear on this question. Hausmann and Fernandez-Arias (2000) find that when countries develop, while total capital flows go up, the share of FDI in capital flows goes down. They argue that portfolio flows require more sophisticated institutions and a greater degree of trust on the part of the investor. Their analysis suggests that a domination of FDI is found in countries with the weakest institutions. In addition, Fernandez-Arias and Hausmann (2000) argue that FDI is not necessarily “bolted down”: a firm faced with a currency crisis can find many instrumentalities to take capital out, such as borrowing in the country against physical assets as collateral, and taking financial capital out of the country.

In this context, Bird and Rajan (2002) offer striking evidence from Malaysia. In the period from 1990 to 1997, Malaysia had no portfolio inflows, and FDI dominated their capital inflows. Yet Malaysia went on to experience a currency crisis.

The Indian experience is interesting from the viewpoint of this debate. India represents a large country where sophisticated institutions have helped obtain high success in attracting portfolio flows.

### 13.7 Impossible Trinity

As highlighted in table 13.1 early in this paper, the size of the current account and the capital account rose sharply from 1992–93 to 2003–4. Gross flows on the current account, expressed in U.S. dollars, grew at a compound rate of 12.77 percent per annum, and gross flows on the capital account grew at a similar rate of 11.97 percent per annum. Both these growth rates were faster than the growth of GDP expressed in nominal U.S. dollars of 9.36 percent per annum. Hence, the overall measure of integration (gross flows on capital account and current account, expressed as percent of GDP) rose sharply from 40.4 percent of GDP in 1992–93 to 55 percent in 2003–4.

Under these conditions, considerable movements of capital can take place in response to speculative views about the currency. As an example, the regression results of table 13.13 show that speculative views reflected in covered interest parity (CIP) deviations are an important explanatory variable in the model seeking to explain portfolio flows.

The period 2003–4 serves as a valuable illustration of how capital flows would behave under conditions where the currency regime induced a currency spot price process that gave private agents significant opportunities for speculative trading on the currency. When economic agents have views about future currency movements, all avenues are utilized for currency speculation. It is well known in the literature on capital controls that the current account can be used for implementing capital movements and currency speculation, through overinvoicing, underinvoicing, prepayment,

and delayed payments (Patnaik and Vasudevan 2000). These issues have become more pertinent, given the sharp rise in the size of the current account, from 25 percent of GDP in 1992–93 to 35 percent in 2003–4. FDI and portfolio flows are fairly open. Even with the constraints that are in place in India on debt flows, it is striking to notice that in 2003–4, debt flows worked out to roughly \$6 billion out of total net capital flows of \$20 billion.

These arguments suggest that the impossible trinity is an increasingly important constraint faced by Indian macro policy (Joshi 2003). Patnaik (2005) examines how monetary policy was attenuated through implementation of the currency regime in two prominent episodes in the recent eleven-year period. The pressures in implementing the pegged exchange rate were heightened in 2003 and 2004, and while no public announcement has been made about a change in the currency regime, nominal rupee-dollar volatility rose significantly from 0.129 percent per day in some months to 0.355 percent per day in other months.

India continues to grapple with the trade-offs associated with the impossible trinity. On January 12, 2005, the head of the central bank proposed that India should reexamine the existing framework of capital controls and possibly introduce a fresh set of restrictions including quotas or ceilings on portfolio flows, enhancing “quality of flows” by restrictions upon eligible foreign investors, price-based measures such as taxes, and monitoring and restrictions upon voting rights of nonresidents. While no decisions were taken to introduce such capital controls, the speech highlights the tensions faced in Indian macro policy and the difficulties faced in the existing combination of a pegged exchange rate and a fairly open capital account.

As argued in section 13.3, a major feature of India's recent experience with capital flows has been the outward flows of capital taking place since the RBI's purchase of reserves exceeded net capital inflows. The recent experience with the stock of reserves and the flow of net purchases by the RBI on the currency market is shown in figures 13.7 and 13.8.

This shows a striking buildup of reserves, from roughly \$40 billion to \$115 billion, over the period from late 2001 to early 2004. Through this period, RBI purchases on the currency market went up to \$7 billion in April 2004. Patnaik (2003) argues that this reserve buildup was related to implementing the currency regime. Through this period, India experienced current account surpluses. This was a paradoxical turnaround compared with the starting point of the reforms. A goal of the early reforms was to find a sustainable mechanism to sustain the import of capital (i.e., a current account deficit). In 2002, India found itself in a situation with persistent export of capital.

The currency regime has continued to evolve in response to the tensions between capital flows and the pegged exchange rate. In 2003, reserves grew

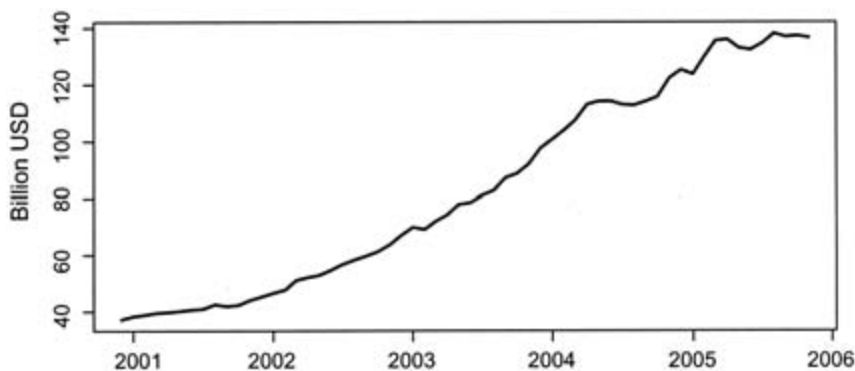


Fig. 13.7 Foreign currency reserves

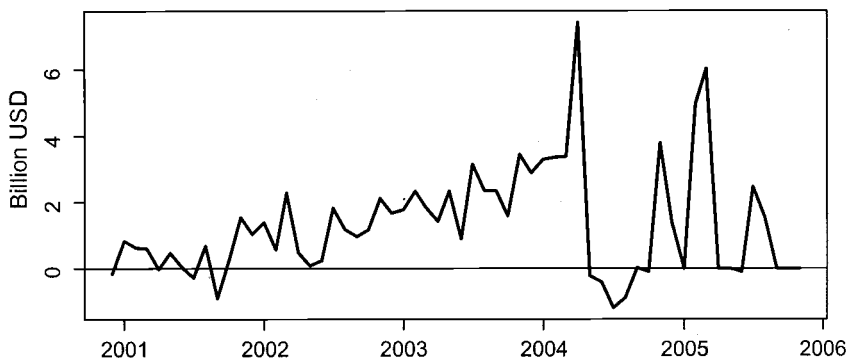


Fig. 13.8 RBI purchases on the currency market

dramatically while the steady currency appreciation, under the pegged rate, gave a one-way bet to private agents. This led to a change in the currency regime in March 2004. Table 13.15 shows the small daily fluctuations of the rupee-dollar rate going up to March 19, 2004, and the larger volatility from that date on. The first nine days shown in this table had a zero change in the exchange rate; the second nine days shown had an appreciation of 3.4 percent. In the period from January 1, 2000, to March 19, 2004, daily rupee-dollar returns had a volatility of 0.129 percent. For some of the following months (March 22, 2004, to February 11, 2005), the volatility had nearly tripled, to 0.355.

Such sharp changes in the time series process of the rupee-dollar spot price reflect the pressures of implementation of the pegged exchange rate in an increasingly open economy. Across these events, however, no changes in the currency regime were officially announced. The private sector suddenly saw an unexpected and sharp change in currency volatility.

Even in months when little trading was done by the RBI, reserves con-

**Table 13.15** The rupee-dollar exchange rate, March 9 to April 5, 2004

Date	Rate	Returns (%)
March 9	45.21	-0.09
March 10	45.23	0.04
March 11	45.25	0.04
March 12	45.27	0.04
March 15	45.25	-0.04
March 16	45.24	-0.02
March 17	45.25	0.02
March 18	45.22	-0.07
March 19	45.22	0.00
March 22	45.15	-0.15
March 23	44.93	-0.49
March 24	44.76	-0.38
March 25	44.75	-0.02
March 26	44.73	-0.04
March 29	44.12	-1.37
March 31	43.39	-1.67
April 2	43.77	0.87
April 5	43.67	-0.23

tinued to fluctuate owing to the currency composition of the portfolio, and returns are earned on the fixed income instruments in which reserves are invested.<sup>19</sup> In addition, the period after May 2004 was one in which the U.S. dollar depreciated significantly against the euro. Since India held significant euro-denominated assets but reported foreign currency reserves in dollars, this showed up as higher reserves.

### 13.7.1 Lack of Sustained Current Account Deficit

As emphasized in section 13.2, India has long sought to augment domestic savings using capital flows so as to achieve a higher investment rate. As argued above, the currency regime chosen by India led to a failure to achieve this goal, despite considerable success in attracting sustained capital flows.

Table 13.16 shows how from 1995–96 to 2003–4 India lost 3.4 percent of GDP of an investment rate owing to the change in the current account balance. In the table, the savings rate rose strongly by 3.0 percentage points of GDP over an eight-year period, but the investment rate actually dropped by 0.6 percentage points of GDP.

19. India does not disclose the currency composition of the reserve portfolio. On April 30, 2004, disclosures under the IMF *Template on International Reserves* showed that of the reserve portfolio of \$113 billion, \$40 billion were held as securities, and \$72.9 billion were held as "currency and deposits." Of the securities portfolio, the U.S. Treasury disclosure system (Sobol 1998) (<http://www.ustreas.gov/tic/mfh.txt>) showed that in December 2004, India had \$12.9 billion of U.S. government bonds.



**Table 13.16** Saving, investment, and current account balance

Year	Savings	Investment	Current account balance
1995–1996	25.1	26.9	-1.7
1996–1997	23.2	24.5	-1.2
1997–1998	23.1	24.6	-1.4
1998–1999	21.5	22.6	-1.0
1999–2000	24.2	25.3	-1.0
2000–2001	23.7	24.4	-0.6
2001–2002	23.4	22.6	0.7
2002–2003	26.1	24.8	1.2
2003–2004	28.1	26.3	1.7

### 13.8 Conclusion

India serves as an interesting case study in integration into the world economy. The initial conditions involved a small trade-GDP ratio and a highly repressed capital account. At the same time, India had many potential strengths for participating in financial globalization. These included strong traditions of law and accounting, a long tradition of equity ownership and price discovery on speculative markets, and an absence of a history of default.<sup>20</sup>

The goals of the reforms of the early 1990s were articulated by the policy makers of the time as comprising three elements:

1. Avoiding debt flows, particularly short-term debt flows, which were viewed as being potentially destabilizing.
2. Increasing India's trade integration into the world.
3. Spurring Indian growth by harnessing the growing global FDI and portfolio flows.

In the postwar period, two successful "Asian development models" are known. The first is the approach of a completely closed capital account, with no FDI and no portfolio flows, which was followed by Japan (1950s–1960s) and Korea and Taiwan (1970s–1980s). There is the alternative approach of encouraging FDI and having restricted portfolio flows, followed by Singapore (1970s–1980s), Malaysia and Thailand (1980s–1990s), and China (1980s). Both these models used substantial rigidity in the currency regime. India appears to have embarked on a different path, with considerable freedom for both FDI and portfolio flows, modern institutional development of securities markets, considerable success in attracting port-

20. As emphasized in Reinhart and Rogoff (2004), some countries are "serial defaulters" and pose high risks to foreign sources of capital. India has been through two IMF programs in situations where a fixed exchange rate regime was challenged owing to near exhaustion of reserves (in 1981 and 1991). However, India has never defaulted.

folio flows, and a pegged exchange rate regime with greater currency flexibility as compared with some Asian peers.

India did not engage in “big bang” liberalization. The full policy implications of this broad position were worked out through a steady pace of numerous reforms initiatives in the 1992–2004 period. The 2004 framework of tariffs, restrictions against FDI, and restrictions against portfolio flows implies that the reform agenda on the current account, on FDI, and on portfolio flows remained incomplete as of 2004.

Looking back, some of the goals have been achieved to a significant extent:

1. Net debt flows were at roughly 1 percent of GDP in both 1992–93 and 2003–4. Gross debt flows actually dropped sharply, from 13.5 percent of GDP in 1992–93 to 10.6 percent in 2003–4.

2. Trade integration has gone up sharply, with gross current account flows rising from 25 percent of GDP in 1992–93 to 35 percent in 2003–4.

3. FDI and portfolio flows have gone up sharply. India has fared particularly well in the institutional transformation of the equity market, which helped Indian equities obtain acceptance in global portfolios. The experience with FDI flows, while showing strong growth rates when compared with the initial conditions, lags behind that of other Asian countries, both in absolute terms and when expressed as percentage of GDP.

In an open economy, these three aspects of policy are closely intertwined with the currency regime. India has been in a quest for openness in trade, FDI, and portfolio flows, while continuing to have capital controls in most other respects, and trying to have both an independent monetary policy and a pegged exchange rate. A strong consensus exists in India about the usefulness of extensive trading by the central bank on the currency market in implementing currency policy. Indeed, issues about the currency regime were not debated in the 1992–2002 period.

As a consequence, India's experience with capital flows is deeply intertwined with India's experience with the currency regime. Capital flows have shaped the currency regime, and the currency regime has shaped capital flows.

Openness on the trade account, FDI, and portfolio flows has given economic agents opportunities to express speculative views about currency movements, and thus has thrown up new problems in the implementation of pegging. India differs from China in the importance of portfolio flows. Portfolio flows involve robust inflows *and* outflows. For example, in 2003–4, portfolio inflows were only 1.67 times bigger than portfolio outflows, and gross portfolio flows amounted to 7 percent of GDP.

Difficulties faced by the central bank in implementing the currency regime have continually influenced the pace of removal of controls on capital flows. In particular, there has been significant policy volatility with re-

spect to debt flows, ranging from periods with government-sponsored offshore borrowing to periods with sharp restrictions upon offshore borrowing. Similarly, policies on outward capital flows have been ambivalent and have lacked the consistent direction of reform that was found on the current account, on FDI, and on portfolio flows.

The implementation of the currency regime has led to large capital outflows. One of the key goals of the reforms of the 1990s was to augment domestic GDP growth by attracting FDI and portfolio flows. In 2003–4, the total net capital inflows of \$20.5 billion were accompanied by an outward official capital flow of over \$31.4 billion. This leads to concerns about whether this policy framework has succeeded in serving the interests of accelerating GDP growth. India has undoubtedly reaped *microeconomic* benefits from the new presence of FDI and foreign investors on the equity market. However, the pegged exchange rate regime has not allowed capital inflows to augment domestic investment on a sustained basis.

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