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## Do Capital Controls Matter in India?

**ABSTRACT** India's capital account liberalization began 20 years ago, but a lot of controls still remain. The central bank's strategy has been to open financial markets cautiously while ensuring risk management systems and competencies are in place to ensure the system's resilience to foreign shocks. Has the regulation insulated Indian markets from global shocks?

This paper estimates uncovered interest parity relationships and finds that capital controls continue to provide a certain degree of autonomy to the central bank when setting policy rates. Vector Autoregressive (VAR) models are constructed to derive impulse response functions illustrating the transmission of a shock to foreign capital inflows through the different segments of India's financial sector. To provide a sense of the complexity of the regulation on capital account transactions, the paper provides a primer on the controls in place, which it uses to identify coefficient restrictions in the Structural VAR model.

**Keywords:** *Financial Market Integration, Capital Account Liberalization, Financial Architecture, Spillover, India*

**JEL Classification:** *F36, G15, G18, O16*

### Introduction

The world's investors have been eager to venture deeper into India's fast-growing economy. And Indian investors have been thirsty for more cross-border diversification opportunities. But entry and exit points in India's financial system have been limited. The stakes are high. Deeper financial integration would provide better opportunities for risk-sharing,

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improve the allocation of capital, promote productive investment, and ultimately, strengthen the resilience of India's economic growth. However, further capital account liberalization also opens wider channels for the transmission of global instability to Indian financial markets.

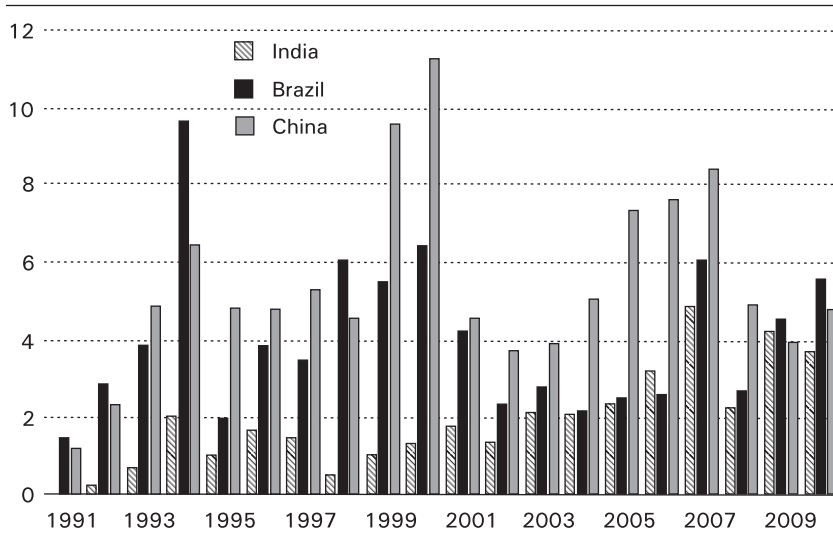
Following the balance of payment crisis of 1991, the Indian government followed a strategy of cautious liberalization, biased in favor of nondebt creating flows. In addition, the RBI has been intervening on the foreign exchange market to mitigate the impact of capital flows on the economy. In 2006, the government set up a committee to undertake a comprehensive review of capital account liberalization to seize up opportunities from further financial integration (Tarapore, 2006). This committee recommended relaxing some of the existing controls on debt inflows. Will the current financial crisis result in a reconsideration of the intention to further capital account liberalization?

India's stock market is currently the most open segment of the domestic financial system. Equity inflows have been converging toward their level in other large, open emerging markets. They tripled between the start of the 1990s and the end of the 2000s. In comparison, debt inflows rose just ½ a point of GDP in the period. At its peak before the September 2008 Lehman collapse, stock market capitalization, at about \$1 trillion, was the tenth largest in the world and the third in emerging Asia. It represented some 95 percent of India's GDP. Foreign participation on the stock market accounted for about 20 percent of trading in 2004. In contrast, India's bond market is mostly closed to foreign investors, who hold just about 1 percent of the public debt stock. The domestic debt market is neither very deep nor liquid.

A key question is whether India's discriminative approach to openness has arrested the transmission of foreign shocks affecting the stock market to the rest of the financial system. Global events have had a visible impact on India's stock market returns. This is particularly true for events originated in the United States and the Euro Area, which affect global risk aversion. The current economic and financial crisis is a striking illustration.

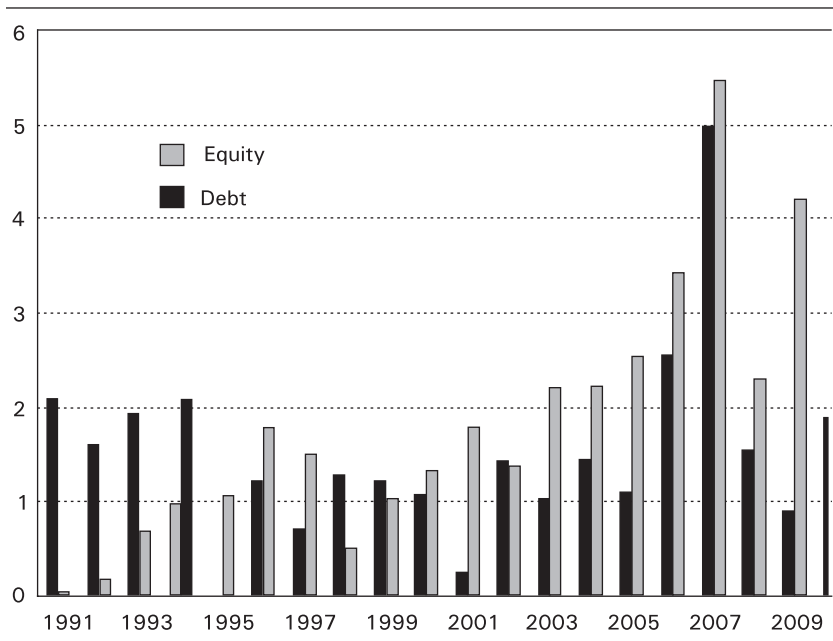
In this context, the objective of this paper is to assess the responsiveness of India's domestic financial markets to shifts in foreign capital flows entering India through its open stock market. The exercise may also help inform the debate on the course of reform with capital account liberalization. This paper is not an event study around a crisis period and differs from papers looking at international transmission mechanisms. Many papers examine the extent of contagion by looking at the rise in the correlation of local and foreign returns following a crisis compared to precrisis levels. Forbes and Rigobon (2002) provide a review of the literature in this area and conclude

**FIGURE 1. FDI and Portfolio Flows (Gross, Percent to GDP)**



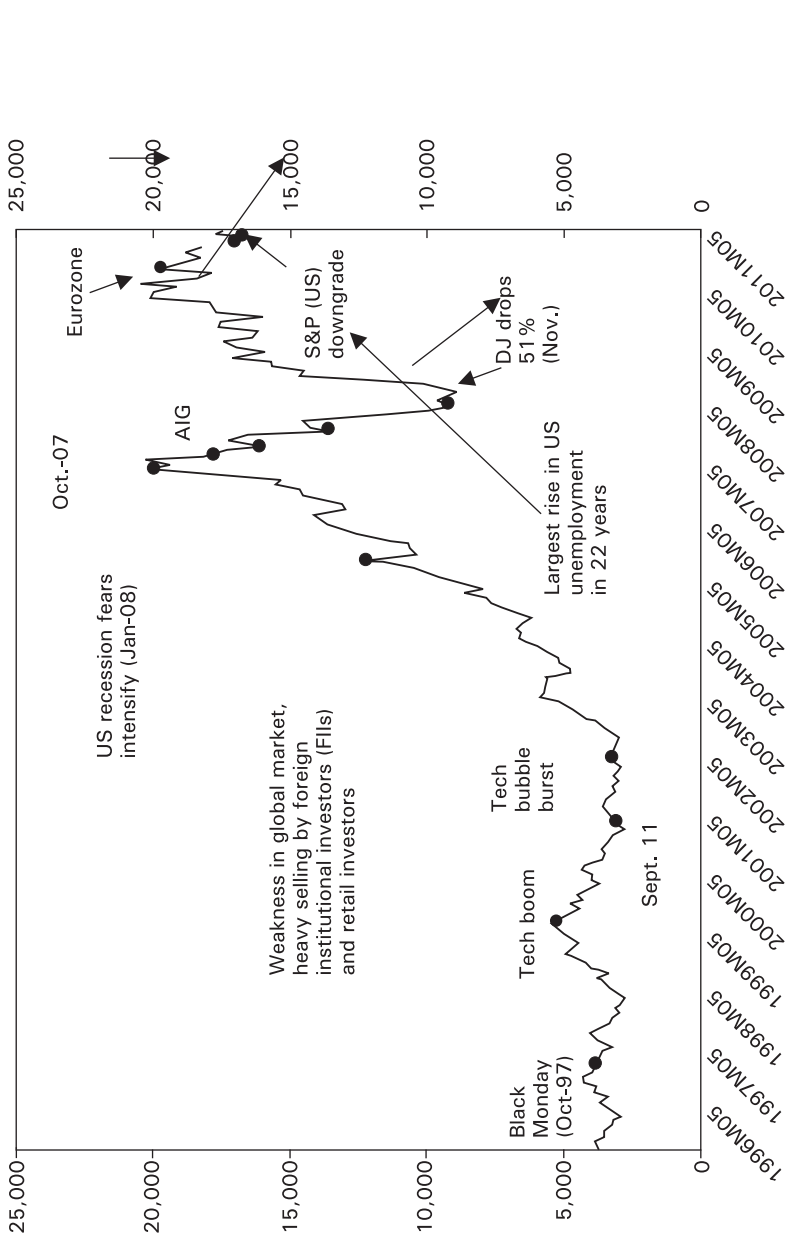
Source: Authors' calculations.

**FIGURE 2. Capital Inflows to India (Gross, Percent to GDP)**



Source: Authors' calculations, drawing on the Zeileis/Shah/Patnaik dates of structural breaks.

**FIGURE 3. Foreign Pressures on the Indian Stock Market (Sensex Index)**



Source: International Financial Statistics and authors' calculations.

that if two markets show comovement during periods of stability, and if this continues—or increases—after a crisis, this does not necessarily constitute contagion but is rather evidence of interdependence. The approach followed in this paper is to identify the dynamics of propagation of a foreign shock to equity inflows to the domestic economy, looking in particular at whether it spills over to the closed segments of the financial system.<sup>1</sup>

We find evidence that capital restrictions on foreign participation in the Indian bond market insulate the bond market—but not fully. Arbitrage behaviors trigger a domestic channel of propagation between domestic financial markets. There is also evidence that central bank intervention temporarily dampens the exchange rate response to shocks to foreign equity flows. Partial sterilization leaves room for a response of interest rates, but with a lag. Inflation ends up higher than otherwise, but we find no significant impact on real variables. In sum, incomplete financial integration resulting from existing capital controls in the bond market provides a degree of short-term monetary autonomy to the central bank. Real economic activity appears relatively insulated from financial shocks. Regulation seems to have promoted the system's resilience.

The paper is organized as follows. Capital restrictions in India are complex and fastidious, and we take stock in section “A Primer on the Barriers to Capital Flows in India” of their composition at the start of 2011. Controls are disaggregated by type of flows (portfolio, debt, and foreign direct investment [FDI]), direction (inward and outward), and investors (individuals, banks, and corporations). The recent dynamics of liberalization is summarized to provide guidance on the government's intentions with this web of controls. To examine whether these controls are binding, section “Are the Controls Binding? Evidence from Uncovered Interest Parity” runs uncovered interest rate parity tests. It finds a persistent wedge between domestic and foreign interest rates adjusted for exchange rate differentials. Section IV examines whether regulation has been effective in terms of ensuring India's resilience to foreign shocks. We use VAR models to simulate the pass-through of foreign capital shocks to Indian markets, based on our understanding, from section “A Primer on the Barriers to Capital Flows in India,” of how controls apply. And the last section draws conclusions.

1. This paper focuses on the financial channel of transmission and abstracts from spillovers through trade, which may also affect financial markets through exchange rate and output movements.

## A Primer on the Barriers to Capital Flows in India

After successive reviews of the liberalization process in India, the capital account has remained not fully open and debt flows are tightly managed. Mohan (2008) gives a clear account of the logic behind this approach: the government considers that capital inflows in excess of the domestic absorptive capacity can lead to overheating in the economy and create asset price bubbles. Abrupt reversals of short-term debt inflows, in particular, can be detrimental to the real economy. Regulation discriminates against debt flows in two ways:

- Foreign investors' participation in the domestic government bond market is capped.
- Indian corporates can borrow abroad above a minimum maturity and below a maximum interest cost. These limits vary per economic sector, depending on perceived needs.

## Restrictions on Inflows

### *By Issuers*

The main route for foreigners to invest in India is to register as a Foreign Institutional Investor (FII) with the Securities and Exchange Board of India (SEBI). The status of FII was introduced in 1992, and there are currently some 1,700 FIIs registered.<sup>2</sup> Instead of direct registration, foreign corporates, individuals, institutions, or funds can open a subaccount with an FII, which can make investments on their behalf.<sup>3</sup>

- The FII status gives permission to buy and sell securities, open foreign exchange (FX) and rupee accounts, and remit and repatriate funds.
- Issuing a participatory note to an FII has been an alternate route of entry. The extent of foreign participation through this route varies with India's attractiveness; at the peak of the boom in June 2007, it

2. The following entities/funds are eligible for registration as FIIs: pension and mutual funds, insurance companies, banks, investment trusts, university funds, endowments, foundations, and charities can register; asset management companies, institutional portfolio managers, trustees, and power of attorney holders proposing to invest on behalf of broad based funds can also register as FIIs.

3. There were about 6,000 of them in November 2010.

accounted for 56 percent of all portfolio investments. In December 2010, it had fallen to 15 percent.<sup>4</sup>

- To take large stakes, a foreigner must request approval by the Ministry of Industry's Foreign Investment Promotion Board (FIPB) and the RBI, or only the RBI depending on the size of the investment and the sector in which the investment is to be made. Any foreign participation in financial services requires approval of the FIPB (e.g., to set up joint ventures (JV) in stock broking, asset management, or merchant banking).

Domestic investors are allowed to raise finance abroad, but with tight controls. Most transactions are permitted, but approval is needed to borrow above certain limits; there are price ceilings; and restrictions on end use of funds apply. Conditions are least restrictive for corporates and most restrictive for individuals, with banks an intermediate category. For the sovereign, external borrowing is mostly from multilateral and bilateral sources and on concessional terms. State governments are not allowed to borrow abroad directly.

### *Debt*

The external borrowing of corporates is capped in amount, maturity, and cost. Beyond these caps, it is contingent on the specific approval of the central bank. There is an overall cap, set annually, which varies with macro-economic conditions.

- Domestic corporates can borrow from abroad for commercial use up to US\$500 million per year under the automatic route; those in the services industry can only do so up to US\$100 million annually. Nongovernmental organizations engaged in microfinance can do so up to an annual US\$5 million.
- Such external commercial borrowing (ECB) must have a minimum average maturity of three years for amounts up to US\$20 million, and of five years for amounts between US\$20–US\$500 million.<sup>5</sup> Additional

4. This has become contentious in recent times, with the RBI recommending that participatory notes be banned (see Ministry of Finance, 2004). They were banned in 2007, in the wake of large, persistent capital inflows, but the ban was lifted in October 2008 in response to capital outflows during the global financial crisis. They are now restricted to 40 percent of assets under management.

5. These maturities have to be maintained in case of refinancing.

loans of up to US\$250 million can be raised if they have an average maturity of 10 years.

- Funding cost must be below Libor plus 300 basis points (bps) for maturities between three to five years, and Libor plus 500 bps for maturities greater than five years. These restrictions were temporarily removed in 2009 as a crisis response to the rise in credit spreads in international markets.
- Finally, the end use of these loans is restricted: external financing for real estate,<sup>6</sup> stock market investment, repayment of existing rupee loans, domestic acquisitions, on-lending, and use as working capital are forbidden.

Banks and nonbank financial institutions must seek approval to borrow abroad. End-use restrictions on the funds apply as for corporates. There is an exception for banks and financial institutions engaged in infrastructure financing,<sup>7</sup> export financing, and debt restructuring packages, in which case the resources borrowed abroad can be used to finance acquisitions, equity investments, or on-lending of loans. All classes of borrowers are encouraged to hedge the associated foreign exchange exposure.

Banks can borrow abroad up to 50 percent of Tier I capital or US\$10 million, whichever is higher. The short-term portion of the funds (with maturity of a year or less) is capped at 20 percent of unimpaired Tier I capital. Amounts borrowed abroad under this “automatic” route, which, thus, do not require prior approval, have to respect open position and maturity mismatch limits (GAAP limits). These limits exclude (a) all borrowings in the form of subordinated debt placed by foreign banks’ headquarters with their branches in India as Tier II capital; (b) capital funds augmented by issue of innovative perpetual debt instruments (IPDI); and (c) other foreign borrowing requiring the RBI’s specific approval.

Short-term external borrowing is subject to severe quantitative restrictions. A US\$20 million ceiling applies to import-linked short-term loans, per transaction, and for permissible imports. Trade-related foreign loans with

6. An exemption is accorded to the “development of integrated township” as a permissible end-use, which was withdrawn in May 2007 and subsequently restored in January 2009 as a crisis response measure.

7. In April–May 2010, such institutions can borrow abroad up to 50 percent of their owned funds under the automatic route, and beyond with RBI approval. Eligible borrowers—in the sea port and airport, roads, bridges, and power sectors for the development of new projects—can also refinance domestic currency loans through a take-out finance arrangement with prior approval and subject to conditions.



one-to-three-year maturity and up to US\$20 million are allowed to import capital goods. Overall funding costs cannot exceed 200 bps over six-month Libor for credit of one-to-three-year maturities.

Since October 2004, all ECBs availed with the general or specific permission of the RBI can be converted into equity if a set of conditions is met:

- The activity of the company is covered under the automatic route for FDI (see later), or if the foreign lender has obtained the Indian government's approval for taking equity participation in the company.
- The foreign equity stake after the conversion is within the sectoral cap for foreign participation, if any.
- The pricing of shares conforms with SEBI guidelines, as well as the Competition Commission of India's (CCI).
- The equity participation complies with other relevant statutes and regulation.

Since September 2008, Indian companies can tap foreign exchange resources against the equity holdings of their listed group companies with prior approval of the RBI. The foreign currency-exchangeable bonds of five-year minimum maturity can be issued in any freely convertible foreign currency, at a specified exchange price;<sup>8</sup> the rate of interest payable has to be within the all-in-cost ceiling under the ECB policy. Resources mobilized cannot be utilized for capital market or real estate investments and must be retained and/or deployed overseas.

Foreign investors of Indian origin (nonresident Indians, or NRI) can hold deposits in Indian banks, for a minimum period of 1 year. (The deposits themselves are also referred to as NRI.) The RBI modifies the rate of reserve requirements on such deposits to regulate the size of inflows. Rupee deposits receive a more favorable treatment than those in foreign currency.

- For one-to-three-year maturities, the interest rate on repatriable rupee deposits is capped at the Libor swap rate for US dollars of corresponding maturities plus 100 bps; and below the Libor swap rate for the respective currency and corresponding maturity for both fixed and floating rate foreign currency deposits. Banks can hedge this exposure.

8. At the time of issuance, the exchange price of the offered listed equity shares must be at least an average of the highest and lowest price of the share in the two weeks preceding the decision to raise capital abroad.

- Three-year deposit rates are applicable if the maturity extends beyond three years.
- Banks are free to levy penalty for premature withdrawal at their discretion. Banks may also, at their discretion, levy penalty to recover the swap cost of deposits. Where premature deposit withdrawal takes place before completion of the minimum stipulated period of a year, in which case no interest is payable, banks may at their discretion levy penalty to cover the swap cost. If the depositors are not informed of the penalty provisions at the time of acceptance of deposits, the exchange rate loss arising out of premature withdrawal has to be borne by the bank.

### *Bonded Debt*

Foreign investment in domestic bonds is restricted. It is only allowed for foreign investors registered as FII. Until recently,<sup>9</sup> there was a ceiling on debt instruments at 30 percent of total investment, including units of domestic mutual funds, for FII participation in the Indian bond market; the remaining had to be held in equity. Setting up a 100 percent debt fund requires specific approval from SEBI. Their investment is capped at US\$10 billion for government bonds and US\$20 billion for corporate bonds; US\$5 billion of these must be invested in bonds of minimum five-year maturity. In addition, 100 percent debt funds are restricted from buying unlisted corporate debt (this does not apply to the mixed fund category above). Since December 2006, FIIs can invest each year an incremental five percent of total net issuance in the previous financial year in government bonds. FIIs can also invest in debt capital instruments of domestic banks subject to an overall cap of 49 percent and individual cap of 10 percent of each issue for Tier I capital and the corporate debt limits in the case of Tier II capital.

### *Portfolio Investment*

Portfolio investment in India was liberalized early, although some limitations remain.<sup>10</sup> First, it is restricted to approved FIIs. Also, an FII can only take equity participation up to 24 percent of its capital, as mentioned previously, subject to the following restrictions:

9. In October 2008, SEBI removed the 70:30 restriction on the share of investment in equity and debt, to give flexibility to FIIs in portfolio allocation.

10. Portfolio investment is defined in India in line with international standards, as an equity participation that represents less than 10 percent of a company's capital.

- A single FII can invest up to 10 percent in any company. Investment by firms and individuals registered as sub accounts of an FII is restricted to 5 percent. There are no restrictions on the repatriation of profits. Short-term gains (below a year) are taxed at 10 percent; longer-term gains are tax-exempt.
- Total holdings of all FIIs/subaccounts put together cannot exceed 24 percent in any company, but can be increased to the sectoral cap/statutory limit (as discussed later), as applicable, with the approval of its Board.
- Sectoral caps apply to FIIs as a category of investors. There is a separate cap on FDI and a composite cap on FII and FDI. Private sector banks, telecom, and media have composite caps.

Indian companies can raise capital abroad through Global Depository Receipts (GDRs) and American Depository Receipts (ADRs). Indian companies listing on registered exchanges are free to access the ADR/GDR markets without prior approval. There is no ceiling either. However ADR/GDR proceeds cannot be used to finance investment in real estate and stock market at home.

### *Foreign Direct Investment*

Until January 2009, FDI guidelines consisted of different regimes for calculation of indirect foreign equity, i.e., proportionate (telecom/broadcasting sectors), regulation (insurance), and equity caps (banking, aviation, information technology, etc.) with sector-specific guidelines. In January 2009, FDI guidelines were revised to collect all types of foreign investments, i.e., FDI, investment by FIIs, NRIs, ADRs, GDRs, foreign currency convertible bonds, and convertible preference shares—for the computation of indirect foreign investment. The distinction is now based upon “ownership” and “control” by residents or nonresidents to decide upon overall foreign investment limits, direct as well as indirect.

Since 2000, foreign investors can acquire a 100 percent FDI stake in all industries, except for a list. For investment in those sectors on the list, case-by-case approval by the FIPB is required, except in six industries where FDI is totally prohibited. FDI also requires official approval when the foreign investor has an existing venture in the same field (Table 1).

### *Derivatives Investment*

A registered FII may participate in all exchange-traded derivative contracts subject to limits prescribed by SEBI:

**TABLE 1. India—Foreign Ownership Restrictions**

	<i>Sectors</i>	<i>Ceilings (in percent of paid-up equity capital)</i>
No FDI allowed	Retail trading Atomic energy Lottery; Gambling Housing and real estate business, except for bridges. Development of townships, construction of residential/commercial premises, roads or bridges. Some agriculture business (plantations except tea) Trading in Transferable Development Rights Manufacture of tobacco/tobacco substitutes Atomic Minerals Private banks 1/ Telecoms 2/ Satellites Single brand product trading Air transport services Investing companies in infrastructure/services Asset reconstruction companies Cable networks Commodity exchanges Credit information companies Infrastructure companies in securities markets, Petroleum refining by public sector firms Defense Insurance 3/ Oil refining Publishing news and current affairs Radio 1/ Public sector banks 4/ Everything else, including SEZ, nonbank financial companies	100
Less than 100 percent FDI		74 51
Up to 100 percent FDI allowed		49 26 20 0

Source: Government of India, 2006.

Notes: For the "less than 100 percent FDI" category, the ceiling applies to aggregate foreign participation across investment types. Details are as follows: 1/ For FII and FDI; 2/ For the sum of FDI, FII, NRI, FCCBs, ADRs/GDRs, etc.; 3/ Not to operate but as joint venture; 4/ subject to Banking Companies (Acquisition & Transfer of Undertakings) Acts 1970/80.

- Individual stocks. The FII position limit in derivative contracts on a particular underlying stock, i.e., stock option contracts and single stock futures, is 20 percent of the market-wide limit up to overall limit of ₹0.5 billion.
- Index options contracts. The position limit on a particular underlying index is ₹2.5 billion, or 15 percent of the total open interest of the market in index options, whichever is higher. This limit applies on open positions in all option contracts on a particular underlying index.
- Index futures. The position limit for contracts on a particular underlying index is ₹2.5 billion or 15 percent of the total open interest of the market in index futures, whichever is higher. This limit applies on open positions in all futures contracts on a particular underlying index. Hedge positions are permitted. In addition, FIIs can take exposure in equity index derivatives subject to the following limits:
  - Short positions in index derivatives (short futures, short calls, and long puts) must not exceed (in notional value) the FII's holding of stocks.
  - Long positions in index derivatives (long futures, long calls, and short puts) must not exceed (in notional value) the FII's holding of cash, government securities, T-Bills, and similar instruments.
- Interest rate derivative contracts. The maximum notional value of gross open position of a FII in exchange-traded interest rate derivative contracts is US\$100 million. FIIs may take additional exposure in exchange-traded interest rate derivative contracts equal to the book value of their cash market exposure in government securities. The position limits for a sub-account in near month exchange-traded interest rate derivative contracts is ₹1 billion or 15 percent of the total open interest of the market in exchange-traded interest rate derivative contracts.
- FIIs are not allowed to participate in currency futures.

Nonresident Indians may also invest in exchange-traded derivative contracts in India. The instruments must be approved by SEBI and financed out of rupee funds held in India on a nonrepatriable basis.<sup>11</sup>

11. Repatriable funds are up to US\$1 million per calendar year and held on account of legacy, bequest, inheritance, or sale of property.

## Restrictions on Outflows

Indian corporates can participate in portfolio investment or FDI abroad subject to restrictions and ceilings:

- They can enter JV or start wholly owned subsidiaries (WOS) abroad up to 400 percent of their net worth without prior approval; investments exceeding this limit are allowed with RBI approval in the energy and natural resources sectors. This ceiling includes participation through capital contributions, loans and 100 percent guarantees on behalf of the JV/WOS. The ceiling is not applicable if the investment is made out of balances held in Exchange Earners' Foreign Currency account of the Indian party or out of funds raised through ADRs/GDRs. Domestic firms can also invest abroad through a Special Purpose Vehicle.
- Proprietorship concerns and unregistered partnership firms in the exporting sector can set up JVs/WOS abroad with the prior approval of the RBI and subject to certain eligibility conditions. The same applies to registered trusts and societies engaged in the manufacturing, education, and hospital sectors.
- Indian companies are prohibited from investing in foreign firms that are real estate or banking. Firms investing in the financial services industry overseas must be registered with domestic regulators in India for undertaking such activity, profitable for three preceding years, obtain approval from regulatory authorities in both countries, and meet the capital adequacy requirements in India.
- Listed Indian companies can invest up to 50 percent of their net worth in shares, and bonds issued by listed overseas companies, rated not below investment grade by accredited/registered credit rating agencies. Listed shares or bonds in companies that hold at least a 10-percent equity participation in a listed Indian company and in rated fixed income securities. This applies to mutual funds as well, with an overall cap of US\$3 billion.
- Registered mutual funds can invest upto US\$ 7 billion in ADRs/GDRs of Indian and foreign companies, equity of overseas firms, as well as initial and follow-on public offerings for listing at recognized stock exchanges abroad. They can also invest in foreign debt securities in countries with fully convertible currencies, short- term and long-term debt instruments, money market instruments, repos (not connected to own borrowings), sovereign bonds and short-term deposits with overseas banks, and all of investment grade rating. In addition,

mutual funds can also invest in derivatives traded on recognized stock exchanges overseas for hedging and portfolio balancing with underlying as securities, units/securities issued by overseas mutual funds registered with overseas regulators. Few can also invest up to a cumulative US\$1 billion in overseas Exchange Traded Funds. And domestic venture capital (VC) funds registered with SEBI can invest in equity and equity linked instruments of offshore VC undertakings, subject to an overall limit of US\$500 million.

- Indian companies may retain funds raised abroad through ADRs/GDRs for any period to meet their future foreign exchange requirements. Furthermore, resident shareholders of Indian companies can offer their shares for conversion to ADRs/GDRs and can receive the sale proceeds in foreign currency subject to the approval of the FIPB.
- Resident entities having overseas direct investments can hedge their exchange rate risks from such investments.
- Foreign corporates operating in India are free to repatriate benefits, after fulfilling tax requirements. The profits of foreign companies are taxed 41.8 percent, higher than the 33.7 percent rate that applies to local corporates. The tax rate on dividend and interest income for foreign companies, at 20 percent, is also higher than the 14 percent rate applying to local companies.

There is little liberalization of capital outflows for individuals:

- Convertibility of domestic assets (bank deposits) by residents is not permitted.
- Domestic residents can open foreign currency accounts at banks subject to certain restrictions (e.g., using foreign exchange earned and/or gifts received from close relatives and repatriated to India through normal banking channels by resident individuals). Foreign exchange earnings can also be brought in from the export of goods and services and royalties. These accounts are noninterest bearing only.
- Rupees cannot be bought abroad.
- Remittances overseas are allowed, but limited to US\$200,000 per year after declaration of purpose.
- There is no limit on individuals' investment in overseas companies if these companies (a) are listed on a recognized stock exchange; (b) hold shares of at least 10 percent in an Indian company listed on a stock exchange in India.

- Individuals are free to invest in rated fixed-income securities abroad.
- Individuals can take interest-free loans up to US\$250,000 with a minimum of one-year maturity from close relatives abroad.
- Indian students are considered NRIs and can borrow unlimited amounts outside India.

Banks operating in India are subject to restrictions on their foreign investments:

- They are permitted to invest abroad in money markets, mutual funds, and foreign stock markets up to the limits approved by their respective boards, subject to the Banking Regulation Act (1949) and open position limits.<sup>12</sup> Such investments must have a residual maturity less than a year and at least an AA(-1) rating.
- They can borrow from overseas branches and correspondents up to 50 percent of the unimpaired Tier I capital as the close of the previous quarter or US\$10 million, whichever is higher.
- Banks can invest nonresidents nonrepatriable foreign currency deposits abroad in long-term fixed income instruments of maturity below that underlying these deposits, and subject to the securities having a rating of at least AA-.
- They can extend fund/nonfund based facilities to Indian JVs and WOS abroad up to 10 percent of unimpaired capital, and make rupee loans to NRIs with repayment debits to NRI accounts.
- They can open offshore banking units subject to the Foreign Exchange Management Act (FEMA) regulations.

## A Historical Perspective

The current capital account restrictions reflect the order and sequencing of capital account liberalization that India followed.<sup>13</sup> The stock market was the first to open to foreign investors in 1993. Several factors contributed to this choice:

12. This Act stipulates that the assets of any bank in India shall not be less than 75 percent of the demand and time liabilities held at the close of business on the last Friday of each quarter.

13. For a detailed account of the process of capital account liberalization in India, see Reddy (2000), Kohli (2005), amongst others.



- Unlike most developing countries, India had a reasonably well-developed equity market when liberalization began in the 1990s, due to historical developments and a series of measures taken in the 1980s that established a sound institutional base for intermediating foreign capital with relative ease.
- The 1991 balance of payments crisis reinforced the urgency to reduce foreign currency debt and reorient the country's external financing pattern from expensive debt-financing toward cheaper equity-financing, along with risk-sharing.<sup>14</sup> These factors effectively shifted the weight of liberalization toward foreign portfolio equity capital, as even FDI at the time depended critically upon other economic reforms, including the sustainability and certainty of economic policies to inspire the confidence of long-term commitment of foreign investors.

The objective to avoid another macroeconomic crisis has been guiding India's strategy as regards its capital account opening strategy since the early 1990s. This strategy, first articulated in the Tarapore Committee I in 1997 and restated in the Tarapore Committee II in 2005, aims at striking a balance between fulfilling the country's foreign capital needs while ensuring balance of payments sustainability. The reports clearly link the dismantling of key capital account transactions with the achievement of macroeconomic objectives, like inflation reduction, fiscal consolidation, and monetary–fiscal separation. Since such critically interdependent reforms are slow to come about, in contrast to relatively easier-to-implement financial sector reforms, capital account liberalization has been a slow, evolving process.

As a result, the cautious opening to foreign investors of the domestic debt markets echoes the country's slow pace of fiscal consolidation and strong dependence on the domestic banking system for financing at a reasonable cost. In the early stage of liberalization, India's large fiscal deficit, traditionally financed by the vast public sector banking system through “financial repression,” ruled out the opening of the domestic debt market to foreigners before reforms like interest rate deregulation and a reduction in fiscal dominance was achieved. But foreign participation in the debt market has been increased incrementally to support public debt issuance needs, and while a fiscal responsibility framework is implemented.

14. The High-level Committee on the Balance of Payments (1993) suggested this shift from debt to equity. Foreign liabilities were then mostly in the form of NRI bank deposits—India counted on these to finance the external gap. These were not eliminated but guarantees on interest rates and exchange rate risks were gradually phased out and passed over to depositors.

The sequencing of capital account liberalization must be understood in this historical context, reflecting the management of macroeconomic and external vulnerabilities (Reddy, 2000).

- In view of the external financing gap, restrictions on capital inflows have been removed before those on capital outflows—in times of surpluses, outflows have been liberalized fairly fast.
- Nondebt creating inflows have been preferred to debt-creating inflows to minimize liquidity and interest rate risks for firms.
- Long-term borrowings have been favored over short-term ones to enhance the productive capacity of the economy and lessen liquidity and roll-over risks from a sudden reversal.
- Fear of capital flight and the nonreadiness to make the currency convertible can explain why nonresidents' flows have been liberalized more than those of residents. Resident transactions are relatively easier to monitor and can be readily restricted, should the need arise, without affecting credibility in international markets. On the contrary, nonresident transactions can be discouraged by sudden policy reversals, damaging sovereign credibility and creating regulatory uncertainty. Residents thus remain the most restricted investor category to date. Within this class, the removal of restrictions for firms has preceded that for individuals.

The pace of capital account opening—slow and gradual—has often been commented upon by observers. This is not specific to capital account liberalization alone; much of India's reform process is characterized by gradualism (Ahluwalia, 2002). When compared with that in major OECD countries, however, the pace of liberalization in India has not been that slow. From the adoption of the OECD code on capital movements in the early 1960s to the complete dismantling of controls in the 1980s, Japan, the United States, the United Kingdom, and Germany took an average 20–25 years to fully liberalize their capital accounts (Griffith-Jones et al., 2000).

Historical experience does not obviously make the case that India's choices are different from others. However, it is hard to argue with the evidence that financial openness remains limited in India today, particularly when comparing with many other emerging market economies. The Chinn–Ito index of financial openness, which measures a country's degree of financial openness,<sup>15</sup> accords a score of  $-1.13$ —the lowest, or the least

15. The index measures a country's degree of financial and was initially introduced in Chinn and Ito (Chinn and Ito, 2006). It is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's

capital openness—to India in 2007, compared to 0.99 for Brazil, 1.18 to Indonesia,  $-0.09$  to Malaysia, 0.14 to Philippines, and  $-1.13$  to Thailand. It is doubtful, however, as to how good a proxy it is for India for the index is unchanged since 1970, except for a minor blip in 2000, despite such a large change in India's external openness (Mohan and Kapoor, 2009).<sup>16</sup>

### **Are the Controls Binding? Evidence from Uncovered Interest Parity**

There is an abundant literature arguing for a limited effectiveness of capital regulation in avoiding transmission. Magud and Reinhart (2006) provide a review of the arguments. It is, in any case, difficult to estimate the net gain provided by an open capital account from less volatility in capital flows but costlier domestic finance. As regards India, Ma et al. (2004) find significantly higher interest rates domestically than abroad, with the spread between onshore and NDF-implied offshore interest rates ranging between 400 and 1,000 basis points during 1999–2003. This spread narrowed in recent years, to a range of some 200–500 basis points. The fact that the onshore–offshore rupee yield differential failed to equalize over time suggests its declining trend owes more to inflation convergence than a significant liberalization, or circumvention of, capital controls.

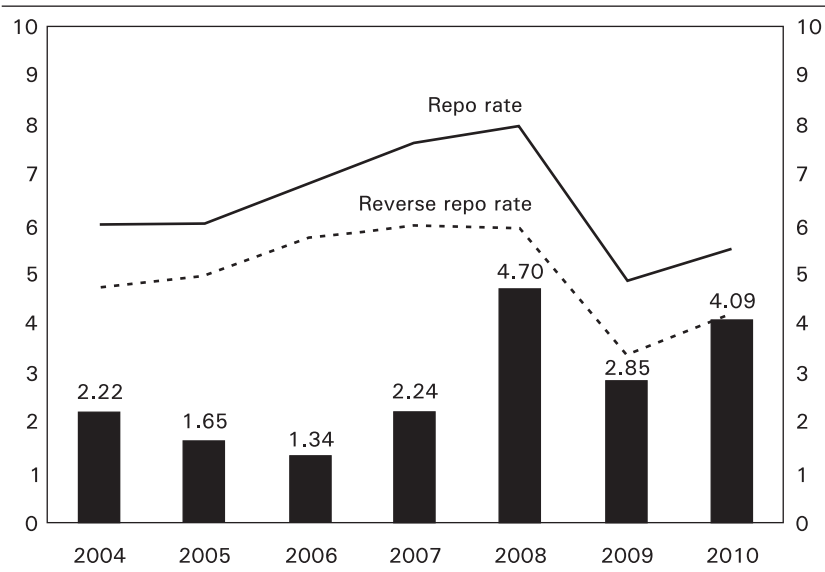
There is, however, some evidence that capital controls have been partly circumvented in India, so that their effectiveness may not be as strong as desired by the authorities. A channel through which this has happened is the over-use of promissory notes (PNs). These are instruments issued offshore by investors wishing to take positions on the Indian equity and debt markets beyond the regulatory limits, or trying to avoid costly registration and capital gains tax. Singh (2007) reports that the stock of PNs amounted to \$90 billion in 2007; he suggests that they had an impact on stock market fluctuations at times, e.g., through inflows for margin calls.<sup>17</sup>

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Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) (Chinn and Ito, 2008). The index takes into account the following four categories of restrictions: (a) presence of multiple exchange rates; (b) restrictions on current account transactions; (c) restrictions on capital account transactions; and (d) requirement of the surrender of export proceeds (Chinn and Ito, 2008). The authors have constructed the index for 182 countries for the period 1970–2007.

16. Mohan and Kapoor (2009) point out that likewise, indices for Thailand, Korea, and Philippines are also seen to suffer from inertia for extended periods. They attribute it to the fact that such studies and the IMF's AREAER view capital account openness as a binary event: either open or closed, when in fact it should be seen as a process.

17. In the dialectics between regulators and markets, the RBI has taken measures that closed this loophole in the course of 2009, but there may be others.

**FIGURE 4. Onshore–Offshore Spreads and Policy Rates (Percent)**

Source: Bloomberg and authors' calculations.

Note: 1/This is then spread between 1-year government paper and NDF (nondeliverable forwards) implied yields, calculated as  $\text{Forward (NDF)/Spot} * (1 + \text{Libor}) - 1$  for INR/US\$ at 1-year maturity.

The routes for domestic investors to arbitrage the interest rate differential at home and abroad, though growing, are still quite limited barring disguised current account transactions (or trade mis-invoicing). A popular route in recent times has been “overseas loans” by resident Indian firms. In the 2006–07 capital inflow surges, foreign capital entered India largely as portfolio flows (nonresident equity investments) and foreign loans taken by residents. The latter doubled to 3.4 percent of GDP between December 2006 and March 2007. They remained at these elevated levels until March 2008, when they came off sharply with the sudden deterioration in the external environment. Although some of these loans taken abroad financed the strong domestic investment growth, their sudden rise and reversal suggest they were possibly a leaky route for carry trade by residents. Domestic investors reportedly raised foreign currency loans abroad and deposited the converted rupees into domestic accounts through illegal routes.<sup>18</sup> The temporary rise in nondeliverable forward (NDF) trades during volatile market

18. There are other illicit routes for offshore–onshore arbitrage by residents. For instance, Indian promoters of publicly traded companies are reported to have raised personal loans offshore from large European banks against their equity holdings (these are worth at least \$15 billion). The amount of such loans outstanding was reported to be \$4–5 billion in 2007–08

conditions is also attributed to resident investors with trade-linked foreign currency exposures.<sup>19</sup>

The offshore market for NDFs has sprung up to circumvent controls, opening up new arbitrage opportunities. The active rupee derivatives market in Singapore is often cited as illustration, which allows investors to get an exposure to Indian interest rates and the rupee–dollar exchange rate, almost as they would onshore. Limited data are available on the volumes traded, that is, on the relative sizes of the offshore and onshore markets. This makes it difficult to gauge whether arbitrage is successful in eliminating the onshore–offshore interest gap—and whether, when convergence is obtained, it is a temporary or persistent phenomenon. BIS data highlights the growth of the offshore FX market (measured as the average daily turnover in dollar/rupee) between 2007 and 2010.<sup>20</sup> Gyntelberg and Remolona (2007) show that the rise in the offshore market turnover partly reflects leveraged trades, with short investment horizons and driven by carry-trade motives. However, trading activity is segmented due to market structure, indicating a limited potential of cross-border arbitrage. Nonresidents' participation is limited (it was 10 percent of daily onshore FX turnover in 2007). The share of financial investors in the total daily FX turnover, at 17 percent, is the lowest in Asia—the major driver of activity in the Indian currency market comes from exporters and importers (Tsuyuguchi and Wooldridge, 2008).

To test how biting capital controls are in India, we run tests of the UIP. The UIP condition postulates that capital mobility should equalize interest

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and the money raised was brought in through an informal remittance system that operates outside traditional banking channels (“*hawala*”) and through the accounts of nonresident Indians (see *Mint*, 2009).

19. The *Economic Times*, September 15, 2008 reported:

The recent attack on the Korean won and its ripples across currency markets in Asia have turned out to be a money-making opportunity for players with overseas presence (...) Multinational banks operating in India, large corporates, and diamond houses have cashed in on the difference in the dollar-rupee exchange rate between the Mumbai currency market and the unregulated, unofficial, offshore markets in Singapore, Dubai and London (...) Corporates and institutions that have the means and flexibility have profited by buying the dollar in India and selling it on the offshore market, better known as the nondeliverable forward (NDF) market. Having undertaken such trades for years, many Indian corporates enjoy credit lines with banks abroad for NDF trades.

See Kohli (2009) for a fuller discussion.

20. In April 2010, it stood at \$42.7 billion, twice the size of the onshore market (BIS 2010). In contrast, daily turnover on the offshore market was only estimated at \$750 million in 2007, against \$2–3 billion in onshore trading (2007 BIS survey).

rates across borders by arbitraging domestic and foreign returns expressed in the same currency.

The implication is that a regression of exchange rate returns on the interest differential should have an intercept of zero and a slope of unity. We acknowledge that this hypothesis has been consistently and decisively rejected in the data (see Engel, 1996, for a survey of the literature). Our goal is also to size the residual in the regression, often characterized as risk premium.

Estimations for either the full 2000–09 decade, or limited to its second half when controls were reduced, show that the UIP does not hold. The tests are run for short-term interest rate differentials, using both Indian and US overnight rates (the call rate and US federal funds rate) and three-month rates (Indian and US Treasury bill rates, as well as Mumbai interbank and US treasury bill rates). The rupee–dollar interest differentials are significantly different from zero for the full sample (Appendix table A.1). On average, the overnight and three-month interest differentials are in a statistically significant range between 480 and 313 bps over 2000–09 for two different measures of interest rates and for the two subsample sets. When we focus on the 2006–09 period, the result holds as well despite the rise in capital mobility.

We next examine whether deviations from the mean are transitory (before capital flows eliminate some of the arbitrage opportunity) or permanent (the result of historical barriers to capital flows). In this goal, we assess the dynamics of UIP over time, or its stationary properties. If the interest rate differential converges to some nonzero equilibrium level determined by India's sovereign risk considerations, this differential should be stationary. Unit root tests strongly reject the stationarity of uncovered interest differentials (except for short overnight rates), indicating that deviations from the mean are permanent (Appendix table A.2, upper panel). This implies that capital mobility, the equilibrating mechanism that would restore the parity condition, is insufficient to lead to convergence. The result is confirmed if restricting the test to the most recent period.

Finally, we assess the speed at which the empirical interest differential converges to the nonzero “equilibrium” level of the differential. The empirical interest rate differential is the level of the differential that reflects capital account restrictions and, in some way, represents a tax on domestic investors since domestic funding costs are higher than external ones. The “equilibrium” differential represents the country risk premium. The speed of convergence between the two differentials should depend on the degree of domestic capital market development and the degree of capital mobility—the

higher the restrictions to capital flows, the slower the speed of adjustment to equilibrium. Under the assumption that the interest differential follows a univariate process (Cheung et al., 2003), the closer to one the coefficient in the autoregressive (AR) process, the more biting the capital controls.

The regressions continue to support the result of imperfect integration (Appendix table A.2, lower panel). The interest rate differential follows a strong AR pattern, with up to four statistically significant lags for the three-month Treasury bill rate—although it is the most liquid instrument in the Indian term money market. The AR(1) coefficient is close to unity for three out of four of the Indian rates used in the study. The adjusted R-squares are above 75 percent in all cases (data available on request).

The estimated UIP residual amounts to about 430 bps during the “tranquil” first half of the decade and 600 in the more volatile second half. The average credit risk premium for India (using credit default swaps) amounted to some 70 bps and 250 bps in each period respectively, indicating that the estimated deviation from UIP likely reflects a number of costs to investing in India beyond a pure reward for credit risk. These findings indicate that capital controls make the deviation persistent and predictable, as markets are not able to arbitrage it away, despite any anecdotal means found to circumvent them. The results hold over the full sample and in the most recent period as well. In the latter period, however, the persistence of the deviation has diminished as lagged coefficients are less significant. While the capital account has been more open, controls continue to provide some degree of short-term monetary autonomy to the central bank when it changes interest rates.

### **The Financial Market Transmission of Foreign Shocks: Evidence from Vector Autoregressions**

The absence of full cross-border interest rate arbitrage in India raises the question of the magnitude of the impact of shocks to foreign capital flows on the domestic economy, through their effect on interest rates. The question is whether the existence of controls on capital flows insulated India from the domestic transmission of financial shocks during the recent global financial crisis, given both the large outflows that took place when the crisis struck and the large inflows experienced when global liquidity-supportive measures were adopted. Was capital account regulation useful in this context?

There are a number of reasons why capital inflows may affect interest rates in India:

- The link between the capital account and the exchange rate is significant in a country running a current account deficit, since financially driven capital flows can help offset trade-driven capital outflows if they are positive, or amplify the issue if not.
- The RBI has stated that its interventions do not aim at keeping the exchange rate from being market-determined over time but at smoothing its volatility. If it buys dollars to limit rupee appreciation following capital inflows, it will try partly to sterilize the impact on domestic interest rates of its intervention by entering reverse repo operations for liquidity absorption (selling bonds on the secondary market). This may put upward pressure on interest rates, depending on overall liquidity conditions. This may smooth the downside impact of inflows on interest rates.
- RBI intervention may also create room for an impact of capital flows along the yield curve. For example, if a large amount of short-term debt securities are sold to sterilize FX intervention, this may raise short-term rates and flatten the yield curve. If longer bonds or hikes in reserves requirements are used to remove liquidity instead, long rates may rise (requirements are met with long-term bonds). This steepens the yield curve. Liquidity considerations are known to have a large impact on India's yield curve.
- Finally, foreign inflows may indirectly reduce interest rates because rising equity prices lead to wealth effects, which may increase domestic bond demand (for diversification or savings purposes), and thus bond prices.

The economic literature has much examined the relationship between international capital flows and growth (see, e.g., Kaminsky, 2005). There is a variety of channels through which capital inflows may affect the real economy, including by providing liquidity to capital markets and accelerating domestic capital accumulation. Investment and consumption spending are promoted by wealth effects. The rise in savings supports demand in bond markets. Policy responses, in particular in the management of these inflows, may impact inflation. Based on these premises, we simulate the propagation of foreign financial shocks through domestic markets by estimating reduced-form VAR models. While these models have their shortcomings, they have been extensively used to investigate transmission mechanisms across countries or markets. They take into account the dynamics of interactions and feedback between the variables, including the endogenous policy response



to shocks via monetary policy and FX intervention. We include the industrial production index to track the real effect of foreign shocks.

Key to VAR models is the identification of shocks based on restrictions derived from economic theory and practical considerations. We use two model specifications:

- First, a standard VAR specification defines each variable as a function of its own lagged values, as well as those of the other variables, thereby capturing the endogeneity over time of foreign and domestic financial variables. We apply the Choleski decomposition—a recursive decomposition of errors—that assumes a specific ordering of the endogenous variables to obtain impulse responses to observe a stylized representation of the Indian financial market. We order the less-controlled stock market first as the most exogenous segment of the financial system. We look at the response of financial and real variables to shocks to this market to assess whether it acts as a channel of transmission of external shocks.
- A structural VAR model is estimated next. The contemporaneous interactions between domestic and foreign variables are restricted based on the strictness of regulations on foreign capital flow by segment of the Indian financial market, as identified in section “A Primer on the Barriers to Capital Flows in India.”

### *Data Specification*

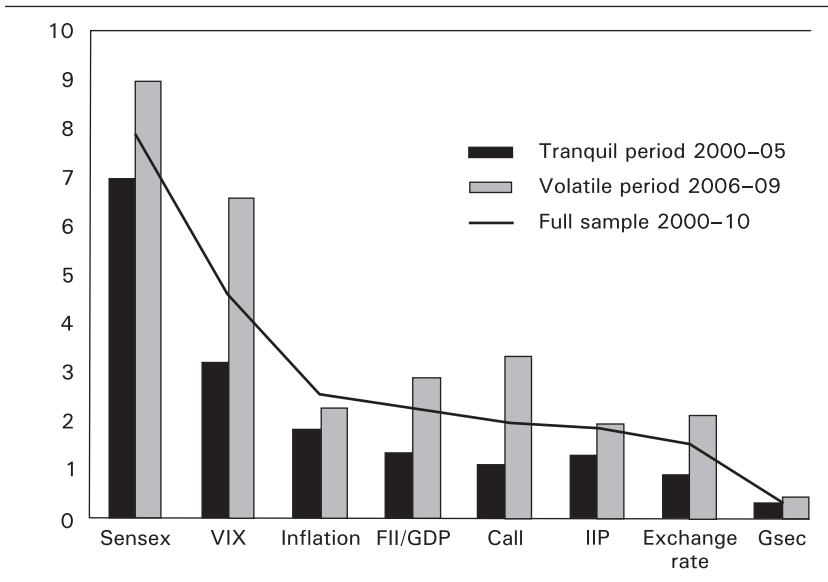
We use monthly data from January 2000 to October 2010. The foreign disturbance is captured by a shock to net portfolio investments inflows (denoted *FII*) to India, scaled by GDP. Short-term bonds are represented by the Treasury bill rate (*tbr*). We also check for robustness using the overnight interbank market rate, or call rate (*call*). Long-term yields are those of government bonds (*GSec*). The Sensex index captures stock market returns. The exchange rate is noted *INR/USD*. The monthly index of industrial production (*IIP*) provides an indicator of real activity. Finally, a set of macroeconomic variables, including the Libor interest rate and oil prices, are included to control for common shocks that affect all variables simultaneously. Variables are expressed in logarithms, except for interest rate and FII. Data sources are provided in the Appendix.

Over the sample period, variables are stationary in first differences, except for the call rate and inflation which are stationary in levels (Table A-3). First differences are taken month-on-month to preserve as much information

as possible on the short-term pattern of interactions between endogenous variables. This transformation is sufficient to provide stationary time series. Likelihood ratio tests suggest the inclusion of one lag for each variable.

We isolate two subperiods for the analysis, 2000-05 and 2006-10, to test for changes in the extent of transmission in the latest crisis period of 2007-09. The period from 2000 to 2005 is a period of relative “tranquility.” Then, a surge in capital inflows in 2006-07 was followed by a sudden reversal, triggered by the collapse of Lehmann Brothers in September 2008. This later period is characterized by a marked increased in the volatility of portfolio flows and other financial market variables (Figure 5).

**FIGURE 5. The Surge in Volatility in the Second Half of the Decade**



Source: Reserve Bank of India, Chicago Board of Exchange, and authors' calculations.

The models we use are symmetrical to a positive or a negative shock to capital inflows, and we simulate the impact of an unexpected rise in inflows. The positive one-standard deviation shock that we simulate represents a 2.3 percent increase in the ratio FII to GDP over the last decade. In the volatile period (2006-09), capital inflows display a standard deviation about doubles that in the more tranquil first half of the sample (2.9 versus 1.3). On average, foreign portfolio inflows represent 1.3 percent of GDP, and rise from 0.9 percent in the first half of the decade to 1.6 in the second half.

## Stylized Facts from a Recursive VAR

We first apply the Choleski decomposition—a recursive decomposition of errors—that assumes a specific ordering of the endogenous variables to obtain impulse responses to observe a stylized representation of the Indian financial market. Such a model is unidentified: the errors are serially uncorrelated, but share common components across equations, so that a shock cannot be identified as originating from a particular variable. Identification is achieved by imposing and testing restrictions on the contemporaneous correlations of the variables at each time. The identifying restrictions imply a specific decomposition of these errors into orthogonal components, thereby recovering the original innovations driving the dynamics of the system.

### *Ordering*

Financial markets are ordered by their degree of sensitivity to foreign capital flow shocks. As discussed in section “A Primer on the Barriers to Capital Flows in India”, the Sensex stock market is the only significant recipient of foreign capital inflows, thus it is ranked first. The short-term money market comes next, as capital inflows impact liquidity conditions. The government bond market is ordered third. The exchange rate is ranked fourth. It is subject to central bank intervention, who explicitly aims at smoothing its volatility; its observed level may thus result from both foreign capital flows and the extent of intervention. Real activity is ranked last.<sup>21</sup>

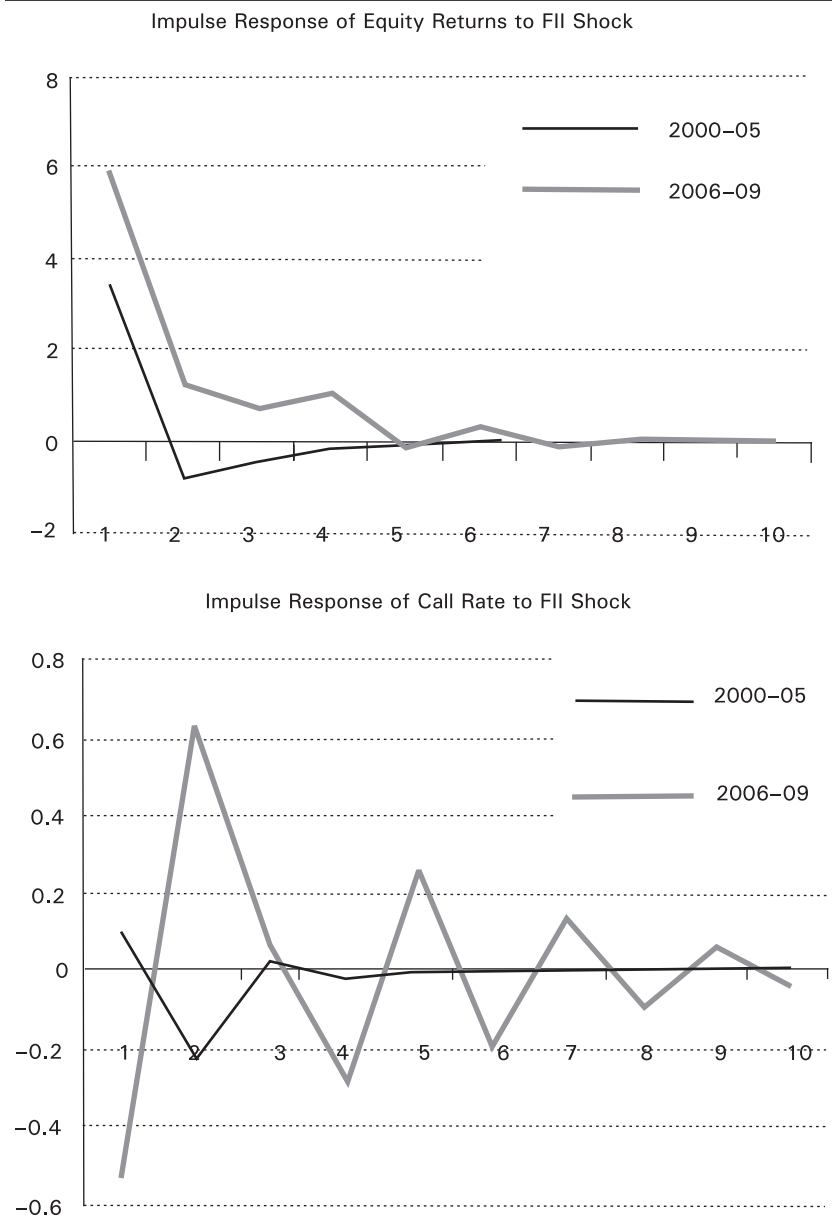
### *Impulse Response Functions*

The IRF show a much larger response to shocks to foreign portfolio flows in the volatile period than in the tranquil period (Figures 6.1–6.5). In the volatile second half of the decade, it appears that controls did not arrest the pass-through of foreign shocks:

- In the volatile period, the exchange rate appreciates at a faster pace and for a longer time than previously.
- The magnitude of the pass-through of the capital flow shock to the bond market is much smaller than to the stock market, the result of

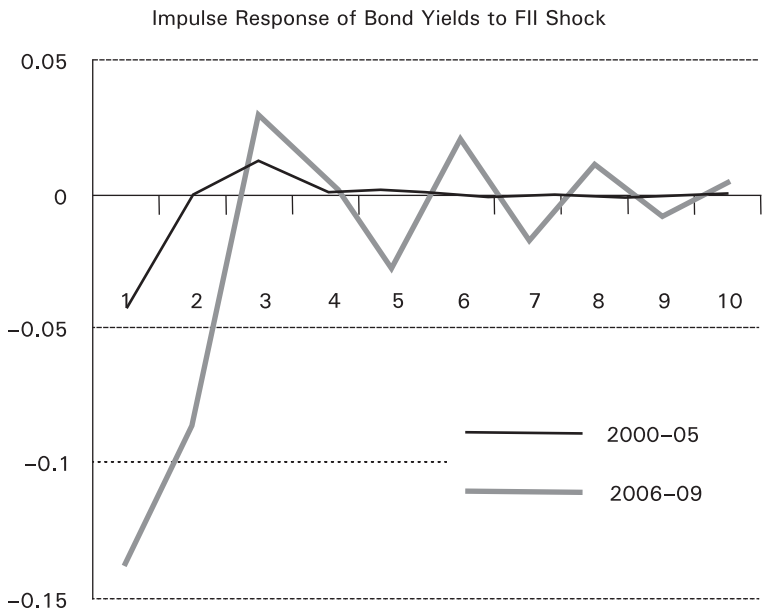
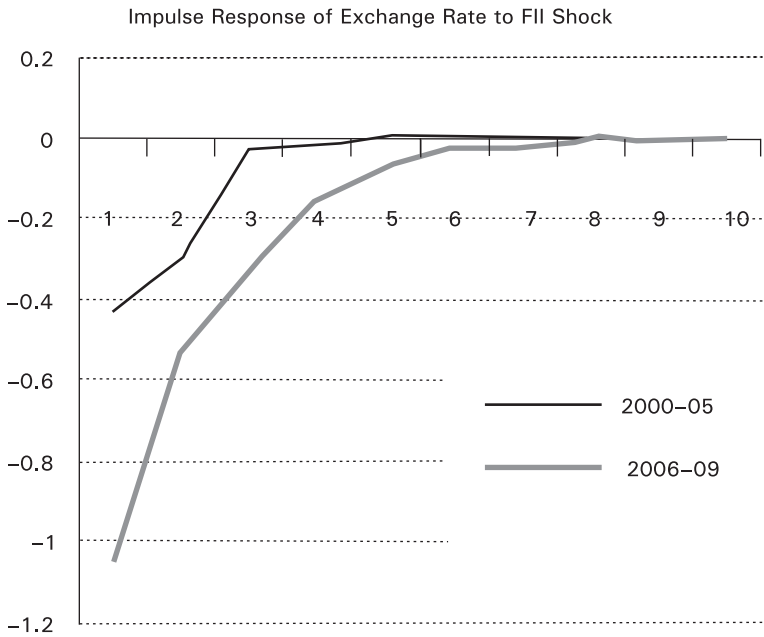
21. By ranking real activity last, we handicap our simulations since we bias the regression against a contemporaneous impact of capital inflows on industrial production. Any result of the existence of an impact, thus, cannot be attributed to our ordering assumption but to pass-through in the system.

**FIGURES 6.1-6.5. Impulse Response Functions to a Positive One Standard Deviation Shock to FII Flows**



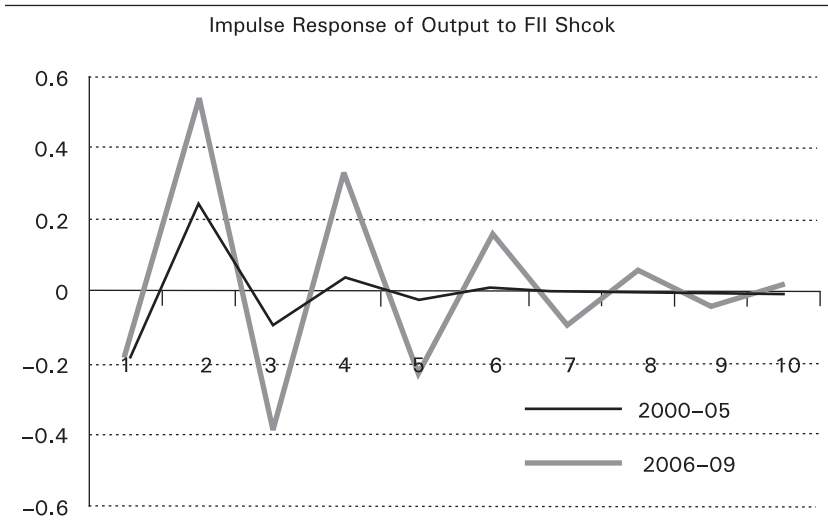
*(Figures 6.1-6.5 continued)*

(Figures 6.1–6.5 continued)



(Figures 6.1–6.5 continued)

(Figures 6.1–6.5 continued)



Source: Authors' calculations.

the presence of capital controls. However, the bond market spillover in the volatile period is large: it is more than proportional to the rise in the volatility of capital flows in the data.

- There seems to be a liquidity channel of transmission at play. Short-term interest rates and bond yields fall after the shock in the volatile period. The reasons cannot be identified by the model, but an RBI effect—a reduction of liquidity through the sterilization of FX operations, which should cause a rise in yields—is not visible. It is likely that the RBI did not fully sterilize its FX intervention at that time. In addition, stronger stock market performance may have resulted in a rise in bond demand by wealthier investors, for savings diversification purposes.
- The cumulative impact of the positive shock to capital inflows appears beneficial to activity. Activity is not insulated from the higher volatility; month-to-month volatility is large in the later period. It also takes longer to return to the steady state.

We check for robustness of the results by substituting the Chicago Board's index of implied volatility (or VIX) to FII inflows. This is a foreign shock truly exogenous to other VAR variables, as India does not, at least so far, influence global risk appetite. In this specification, the effect of innovations

in the VIX on each of the dependent domestic variables may be better identified, given its low correlation with the other variables. This also reduces the order-dependent problem present in the Cholesky decomposition. To illustrate the equivalent of a positive shock to FII inflows, we simulate a negative one-standard deviation shock to the VIX. A fall in volatility is generally supportive of risk appetite, and equities tend to perform well. In all recent crises, from the collapse of LTCM to that of Lehman Brothers, this index spiked and risk assets sold off. The IRF confirm the results obtained in the previous specification and are presented in the Appendix for illustration (Figure A-1).

### Structural VAR

A structural VAR (SVAR) model is estimated next, following Kim and Roubini (2000). We impose contemporaneous short-run restrictions on the relationship between endogenous variables, so that correlations can be interpreted causally with the help of identifying assumptions. The identification approach combines economic theory (e.g., Sims, 1986 and Bernanke, 1986) with a set of priors about the structure of Indian financial markets derived from the analysis in section “A Primer on the Barriers to Capital Flows in India.”

The identifying restrictions are summarized in Table 2:

**TABLE 2. Contemporaneous Interactions of Variables**

<i>Shock to Effect on</i>	<i>FII</i>	<i>Sensex</i>	<i>Short-term rate</i>	<i>Exchange rate</i>	<i>Inflation</i>	<i>Long-term rate</i>
FII	1	X	X	X	0	0
Sensex	X	1	X	X	X	0
Short-term rate	0	0	1	0	0	0
Exchange rate	X	X	0	1	X	0
Real activity	0	1	0	0	1	0
Long-term rate	0	0	0	0	0	1

Source: Authors' tabulation with information from Ministry of Commerce, Government of India.

Note: X denotes a nonzero contemporaneous regression coefficient estimated by the multivariate model.

- FII flows are restricted to respond contemporaneously to shocks to stock market returns, the exchange rate and the short-term interest rate.
- Stock prices are assumed to react contemporaneously to all shocks, except long-term government bond yields.

- The exchange rate is treated as responding contemporaneously to innovations in foreign capital inflows, stock market performance, and inflation. However, given the absence of full arbitrage of domestic and foreign interest rate differentials evidenced in section “Are the Controls Binding? Evidence from Uncovered Interest Parity,” the exchange rate does not respond to interest rate shocks.<sup>22</sup>
- We remove any contemporaneous response by the bond market to foreign innovations, given the restricted presence of foreign participation in sovereign and corporate debt market (section “A Primer on the Barriers to Capital Flows in India”).
- Real activity is assumed not to respond contemporaneously to any shock in the model.
- The SVAR is overidentified. We can recover the structural shocks, in particular the capital inflows shock, using the IRF.

Over the full sample (2000–10), the likelihood ratio test for overidentifying restrictions shows that the null hypothesis that the restrictions are valid is accepted with an 8 percent probability of fitting the data. In the high volatility sample period (2006–09), the fit of the model improves significantly. The probability that the overidentifying restrictions are justified increases to 30 percent. These results suggest that the capital inflows shock in the SVAR is well-identified. The improvement in fit possibly reflects the deeper integration of global and domestic markets, leading to greater interaction between larger foreign capital flows and domestic asset prices. The still relatively low probability value is also a result of the lack of a sufficient period of estimation.

The IRFs provide the following results:

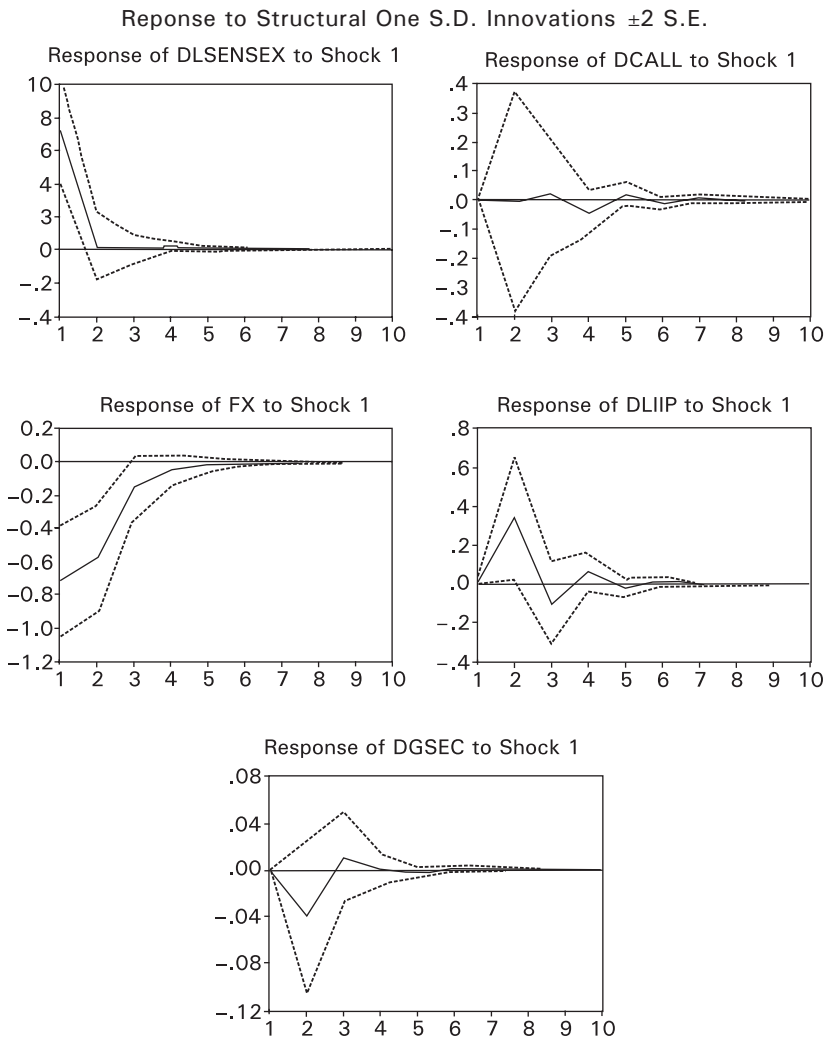
- In the full sample as well as the high volatility subperiod, both stock market and exchange rate responses to capital inflow innovations in the structural decomposition are higher than those traced in the Cholesky decomposition (Figures 6.6 and 6.7).

22. Investors do exploit small, short-term arbitrage opportunities. Foreigners usually have no incentive to trade the short-term rate onshore as the Offshore Interest rate Swap (OIS) curve provides the same return as the local MIBOR rate, but paid in US\$. Differences between the offshore and onshore MIBOR floating rates would be arbitrated away by both local and foreign investors shifting liquidity to the most profitable leg, but onshore–offshore spreads can persist.



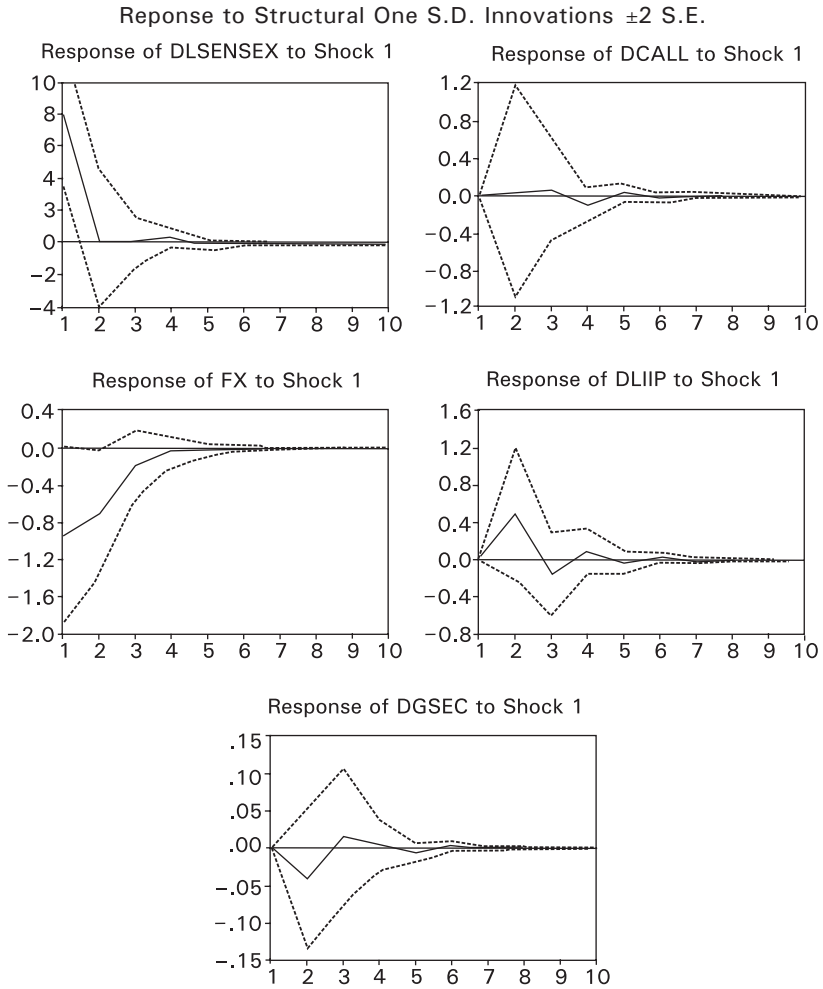
- The response of the bond market is more muted here. Bond yields fall, but even less in the volatile period than in the standard VAR specification. There may be domestic factors at play contributing a more significant role in determining bond yields, such as government deficit and the high food price-driven inflation in this latter period.

**FIGURE 6.6. SVAR—Impulse Response Functions to a Positive One Standard Deviation Shock to FII Inflows, 2000–10**



Source: Authors' calculations.

**FIGURE 6.7. SVAR—Impulse Response Functions to a Positive One Standard Deviation Shock to FII Inflows, 2006-09**



Source: Authors' calculations.

- Economic activity is impacted in the second month after a positive inflows' shock, rising and then falling to oscillate for two to three months before reverting to equilibrium. Output volatility appears to increase in the volatile period following a shock.
- Replacing FII flows with the VIX confirms the previous results. The impact of an external shock increases in the 2006-09 period of volatility.

Volatility seems to be the main result after the shock; it has increased in India over the course of the last decade. We decompose the source of this volatility according to the variables examined here, using the IRF to a shock to capital inflows in India. We find the following main results:

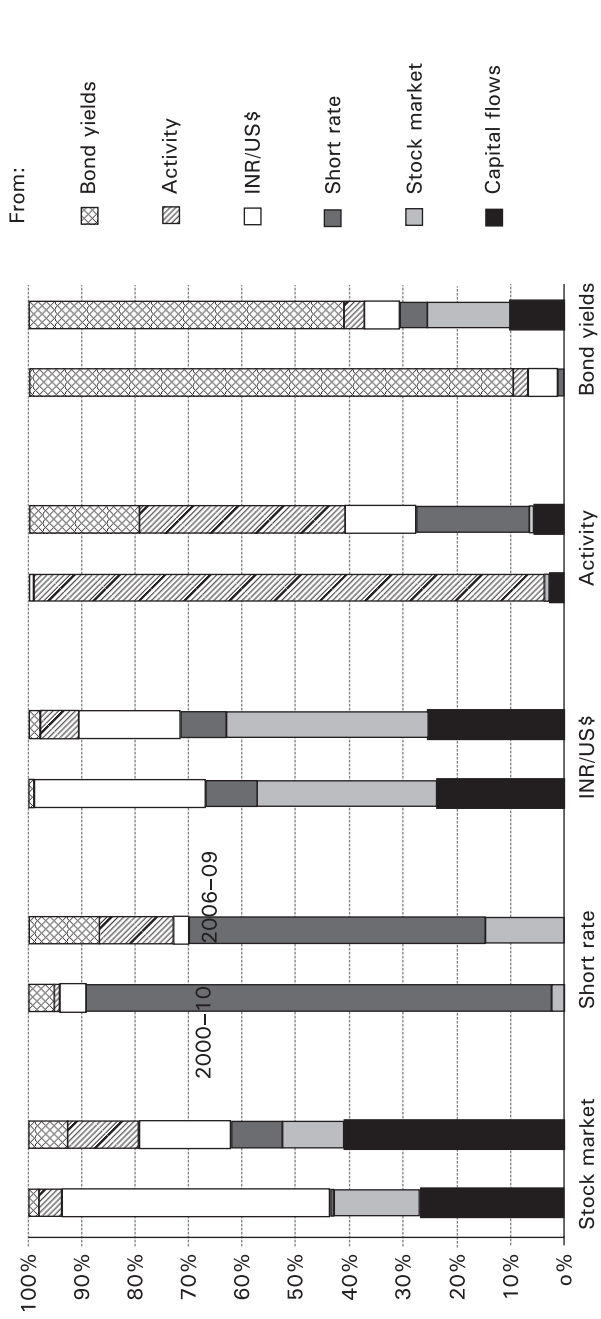
- Over the full period, shocks to equity capital flows have explained more than 25 percent of stock market volatility.
- Together with stock market volatility, shocks to equity capital flows explain about 60 percent of the dollar–rupee volatility.
- Shocks to capital flows are not associated with any interest rate volatility.
- In the second half of the decade, the impact of capital flow volatility on all variables has increased. In particular, capital inflows volatility now explains a quarter of the volatility in bond yields, despite the fact that bond market is closed to foreign investors.
- Over the whole decade, none of the variables examined here contributes much to volatility in real activity. This hides a change in the most recent period: interest rates mattered more for real activity (the policy rate moved a lot in both directions then), as well the exchange rate. This likely explains why it still matters today to the authorities to control FX volatility through some degree of capital flow restrictions.
- The impact of short-term rate changes on long yields has increased over the decade.

## Conclusion

This paper points to the conclusion that capital controls have been effective in the period of relative tranquility that characterized the first half of the 2000s, but may have lost effectiveness in the second half, when volatility in capital flows was high. It is, of course, impossible to assess the counterfactual—maybe with no capital flow regulation, the pass-through to domestic markets would have been even higher.

There are other areas where the lack of counterfactuals makes a positive judgment difficult. The paper finds evidence that controls on capital flows do result in an unfavorable, positive wedge in the cost of finance at home and abroad. UIP estimations indicate that existing capital mobility fails to reduce the international interest rate differential. This incomplete financial integration resulting from remaining capital controls, especially in the bond market, nonetheless provides a degree of short-term monetary autonomy to

**FIGURE 7. Variance Decomposition: Contributions to Volatility in 2000–10 and in the Turbulence Subsample 2007–09**



the central bank. These findings match those of Magud et al. (2011) who find that capital controls seem to make monetary policy more independent in their recent survey. The bulk of the empirical evidence on the effectiveness of capital controls also shows that the area where capital controls have been most successful is in providing more autonomy for monetary policy and altering the composition of capital inflows. Success on reducing the volume of inflows and exchange rate pressures has been mixed (Clements and Herman 2009).

As regards the channel of transmission of shocks to capital entering the stock market to the rest of the less open financial system, it appears that a standard liquidity channel is at play. Unexpected capital inflows appreciate the rupee exchange rate versus the dollar (the full impact is unobservable due to RBI intervention, and only the ex-post exchange rate is available). In the absence of full sterilization of FX intervention by the RBI, the net impact of capital inflows remains a rise in domestic liquidity. Interest rates fall. The impact is larger on government bond yields than on the short-term interbank rate. It is possible that investors save part of the increase in wealth from an unexpected rise in the stock market in government bonds. Capital flow and stock market volatility are found to explain a larger part of bond yield volatility in the recent period compared to the first half of the 2000s.

Real activity appears insulated from shocks to foreign capital flows shock. A similar conclusion is reached by the RBI in its recent analysis of the impact of the global financial crisis upon India (Report on Currency and Finance, July 2010). It is notable, however, that the direction of the response to a positive shock to inflows is itself positive. A stronger stock market and lower interest rates would certainly explain this effect. The exchange rate appreciation does not seem detrimental.

There may be some policy implications from these findings.

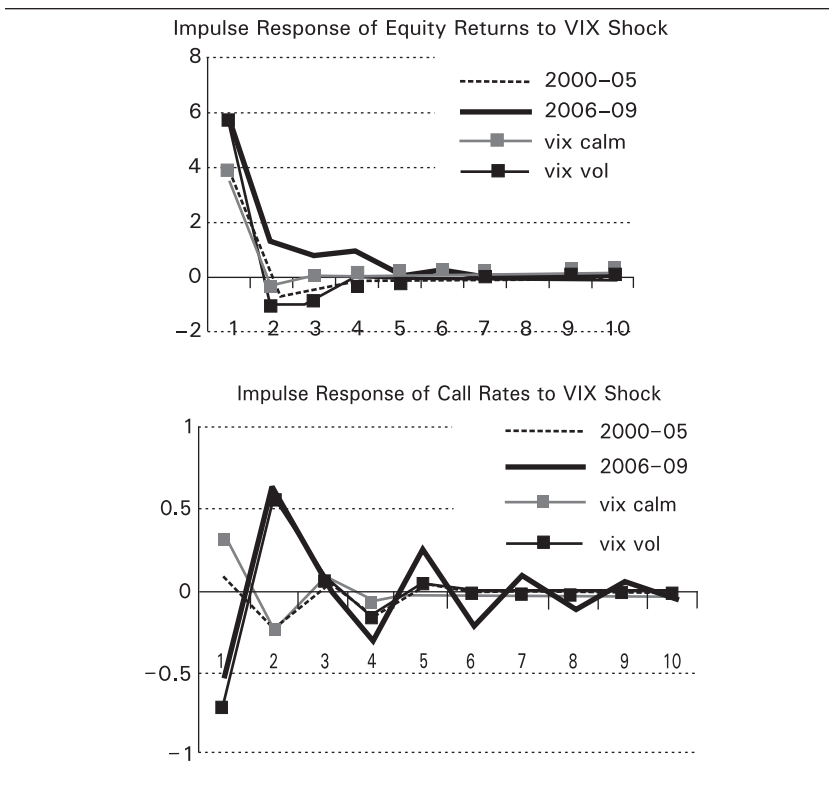
- Issuing domestic debt in local currency and limiting the entry of foreign investors on the domestic debt market during capital account liberalization, while keeping equity inflows relatively unrestricted, could be a useful pattern for other countries to study while liberalizing capital accounts. This combination appears to reduce volatility at home and allow monetary autonomy, while permitting the liberalized segment of the financial market to contribute to improving the pool of available capital at lower costs.
- Adopting a discriminative approach to the liberalization of different segments of the financial markets, and varying the pace of liberalization, can be successful in limiting the transmission of foreign shocks.

Financial liberalization could otherwise exacerbate vulnerabilities and threaten financial and macroeconomic stability. This, of course, has also a cost in terms of funding for investments.

- The increased intensity of transmission of global financial shocks in times of higher volatility in foreign capital flows may be partly attributable to India’s rising financial integration, after some capital account regulation was relaxed in the mid-2000. However, the list of regulation remains long and complex, as evidenced by this paper, and the recent rise in the pass-through of foreign shocks points to the unavoidable need to strengthen financial markets infrastructure so as to improve resilience to shocks.

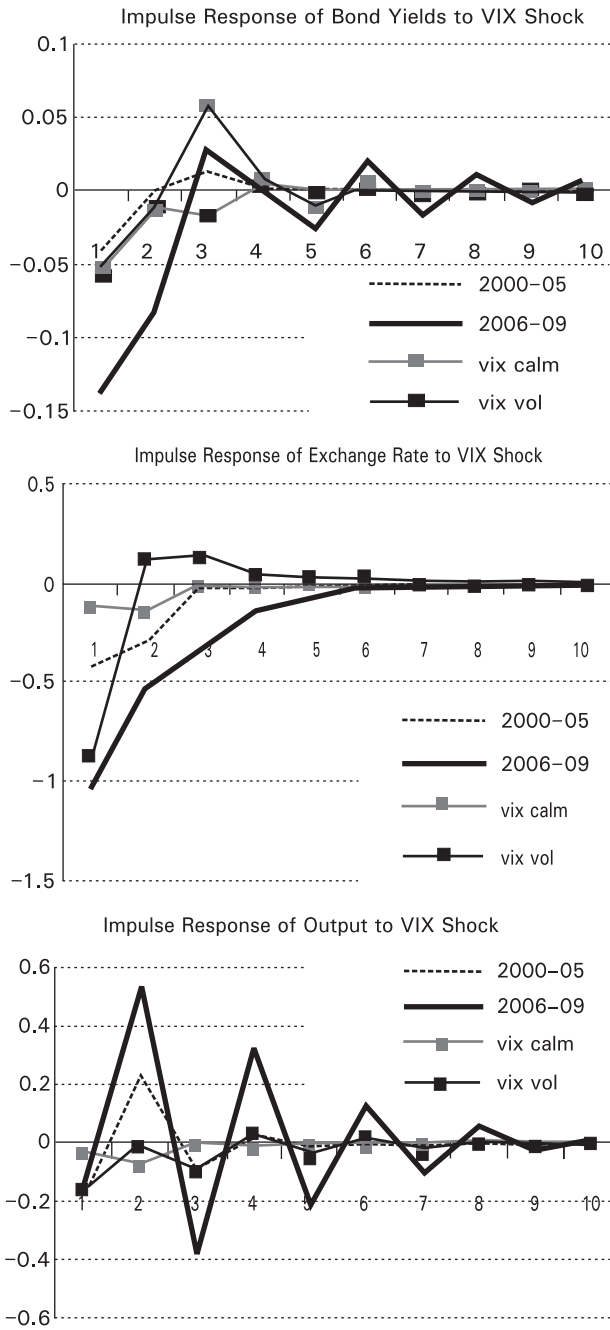
### Appendix

**FIGURE A - 1. Robustness Check: Impulse Response Functions to a Positive One Standard Deviation Shock to Global Risk Appetite (the Inverse of the VIX Index of Volatility)**



(Figure A-1 continued)

(Figure A-1 continued)



Source: Authors' calculations.

**TABLE A - 1. India–US Interest Rate Differentials, Significance Tests**

<i>Overnight</i>	<i>Average differential</i>		<i>Trend</i>	
	<i>Full sample</i>	<i>2006–09</i>	<i>2000–05</i>	<i>2006–09</i>
Repo-FFR	4.73*	2.09**	–0.08	0.09**
Call-FFR	3.25**	1.71	–0.13	0.04**
3-month				
Treasury bill	3.13**	1.95***	–0.03	0.09***
MIBOR	4.80*	2.51**	–0.05	0.13***

Source: Authors' computations.

Note: Regressions report average uncovered interest differentials for full sample, 2001:01–2009:02, with dummy for 2006–09 to capture monetary policy shift in the period. Trend coefficients in columns 3 and 4 are intended to test for decline/rise in differentials in different regimes.

\*, \*\*, \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively; regressions include AR(1) term, not reported Durbin-Watson test statistic lies in 1.96:2.26 range, indicating absence of serial correlation Adjusted R-square is 0.79–0.89 for all regressions.

FFR = US Federal Funds rate; MIBOR = Mumbai interbank overnight rate.

**TABLE A - 2. Time-series Properties of India's Uncovered Interest Parity ( $i - i^* - \Delta S_t$ )**

	<i>Repo-US FFR</i>	<i>Call-US FFR</i>	<i>1-month Mibor-US Libor</i>	<i>3-month India-US TBR</i>	<i>3-month Indian MIBOR-US TBR</i>
<i>Unit root tests for stationarity</i>					
<i>2000–09</i>	<i>No, I(1)</i>	<i>Yes, I(0)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>
<i>2005–09</i>	<i>No, I(1)</i>	<i>Yes, I(0)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>
<b>Persistence 2000–09</b>					
Ar (1)	1.36*** (16.70)	0.55*** (5.42)	0.79*** (7.96)	0.73** (7.45)	1.05*** (10.58)
Ar (2)	–0.23 (1.67)	0.03 (0.26)	0.11 (0.86)	0.18 (1.50)	–0.13 (0.92)
Ar (3)	–0.38** (2.97)	0.07 (0.59)	0.04 (0.33)	0.12 (0.95)	0.10 (0.75)
Ar (4)	0.46*** (6.63)	–0.02 (0.19)	–0.20 (1.58)	–0.20* (1.62)	–0.20 (1.80)*
Ar (5)	–0.26*** (6.52)	0.10 (0.91)	0.16 (1.57)	0.09 (0.85)	0.17 (1.59)
<b>2005–09</b>					
Ar (1)	1.16*** (7.57)	0.57*** (3.97)	0.83*** (5.54)	0.71*** (4.71)	1.06*** (7.11)
Ar (2)	–0.77 (0.66)	0.10 (0.59)	0.13 (0.69)	0.26 (1.41)	–0.11 (0.48)
Ar (3)	0.41 (1.56)	–0.02 (0.16)	0.13 (0.66)	0.19 (0.98)	0.11 (0.48)
Ar (4)	–0.13 (0.48)	0.29 (1.54)	–0.28 (1.32)	–0.22 (1.14)	–0.26 (1.14)

(Table A-2 continued)



(Table A-2 continued)

	<i>Repo-US FFR</i>	<i>Call-US FFR</i>	<i>1-month Mibor-US Libor</i>	<i>3-month India-US TBR</i>	<i>3-month Indian MIBOR-US TBR</i>
<i>Unit root tests for stationarity</i>					
<i>2000-09</i>	<i>No, I(1)</i>	<i>Yes, I(0)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>
<i>2005-09</i>	<i>No, I(1)</i>	<i>Yes, I(0)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>	<i>No, I(1)</i>
Ar (5)	-0.35* (1.86)	-0.33 (1.53)	0.05 (0.30)	-0.02 (0.88)	0.13 (0.74)

Source: Authors' computations.

Note: \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1 percent levels. T statistics are in parenthesis. i is one of the following domestic interest rates. Repo denotes the Indian policy rate; Call is the Indian overnight money market rate; Mibor is the Mumbai interbank overnight rate; 3-month India is the Indian Treasury bill rate.

i star is one of the following foreign rates. US FFR is the Federal Funds rate; US TBR is the US Treasury bill rate. S is the INR/US\$ exchange rate.

The Call rate equation includes a dummy for March 2007. Adjusted R-squares (not reported) range between 0.75-0.94.

**TABLE A-3. Unit Root Tests (2000:01-2010:10)**

	<i>Level</i>	<i>First difference</i>
VIX	2.61	9.64
FII_GDP	-9.62	
Sensex (log)	2.33	10.27
Call rate	9.19	13.98
GSec rate	2.26	10.04
INR/US\$ (log)	2.29	7.68
IIP (log, s.a)	2.27	12.78
Inflation	6.46	
RBI intervention	7.78	
TBR	2.37	12.94

Source: Author's calculations with data from RBI.

Note: Augmented Dickey-Fuller tests reject the presence of a unit root in the variables in first differences, as well as in inflation in level, at the 5 percent significance level.

**TABLE A-4. Data**

<i>Variable</i>	<i>Source</i>
Call rate	CEIC Data Company
Mibor (3-month Mumbai Interbank Overnight Rate), Libor (USD Deposits, 1 month)	
Indian Treasury bill rate (3 month, Secondary market)	
Indian Government securities yields (1 year, 10 year)	
US Federal Funds rate	
Sensex Index (BSE Sensitive 30)	CEIC Data Company
Index of Industrial Production	CEIC Data Company
Exchange Rate (INR/US\$)	CEIC Data Company
NDF rates	Bloomberg Database
VIX (Chicago Board of Trade)	Bloomberg Database

# Comments and Discussion

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**What Is the Interesting Question?** In thinking about this field, it is useful to start with an analogy. Recall the time when India had trade barriers. Suppose an economist asked the question: Does this drive a wedge between the Dubai and Bombay price? Suppose the researcher built up the datasets, and found that this holds for TV sets, but not for gold or diamonds.

This finding would have been interesting in saying that controls were not effective for a few commodities: gold and diamonds. For most commodities, the controls were effective. There is little doubt that trade barriers interfere with goods arbitrage.

The main body of international economics did not focus on the fact that hair dryers cost more in Bombay than in Dubai. The fact that hair dryers cost more in Bombay than in Dubai did not mean the controls were wise.

The really important questions that deserve focus are: Why did policy makers introduce the controls in the first place? What was their goal? In the trade context, this may have uncovered explanations such as an infant industry argument. This would have motivated an examination of the extent to which the controls catered to these goals, and the costs that were involved in pursuing such goals.

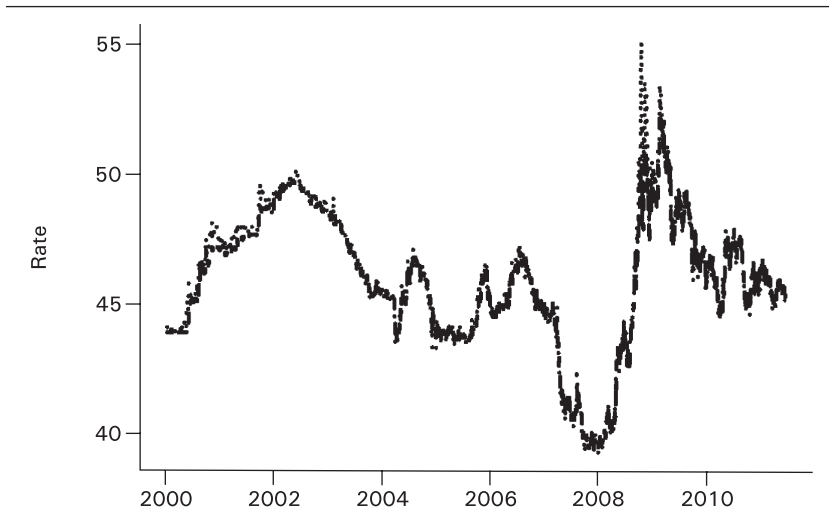
**India's Missing De jure Capital Account Liberalization** The Chinn-Ito measure, which is the most widely used database of de jure openness, reports that India's controls have been unchanged, with a score of  $-1.18$ , from 1970 onward. Most countries have moved forward with greater capital account liberalization than India, as measured by the Chinn-Ito score. In 1970, half of the countries of the world were as closed as India or worse. In 2009, one-third of the countries of the world were as closed as India or worse. India is increasingly an outlier, by world standards, on the extent of capital account restrictions.

With this very limited opening, what are we going to find in the data? We're likely to find big wedges between onshore and offshore prices. This

has been observed in previous work by Sergio Schmukler, Robert McCauley, etc. If, in some respects, we find that onshore and offshore are integrated, we're going to be surprised.

**How Integrated Are the Onshore and Offshore Markets?** Figure 1 shows the onshore and offshore INR/US\$ 90-day forward exchange rate. What is remarkable in this graph is the extent to which the two time-series move closely together. This suggests that despite substantial *de jure* capital controls, a substantial extent of arbitrage is taking place. This data is inconsistent with the assertion in the Kohli and Belaisch paper that the onshore–offshore rupee yield differential failed to equalize over time.

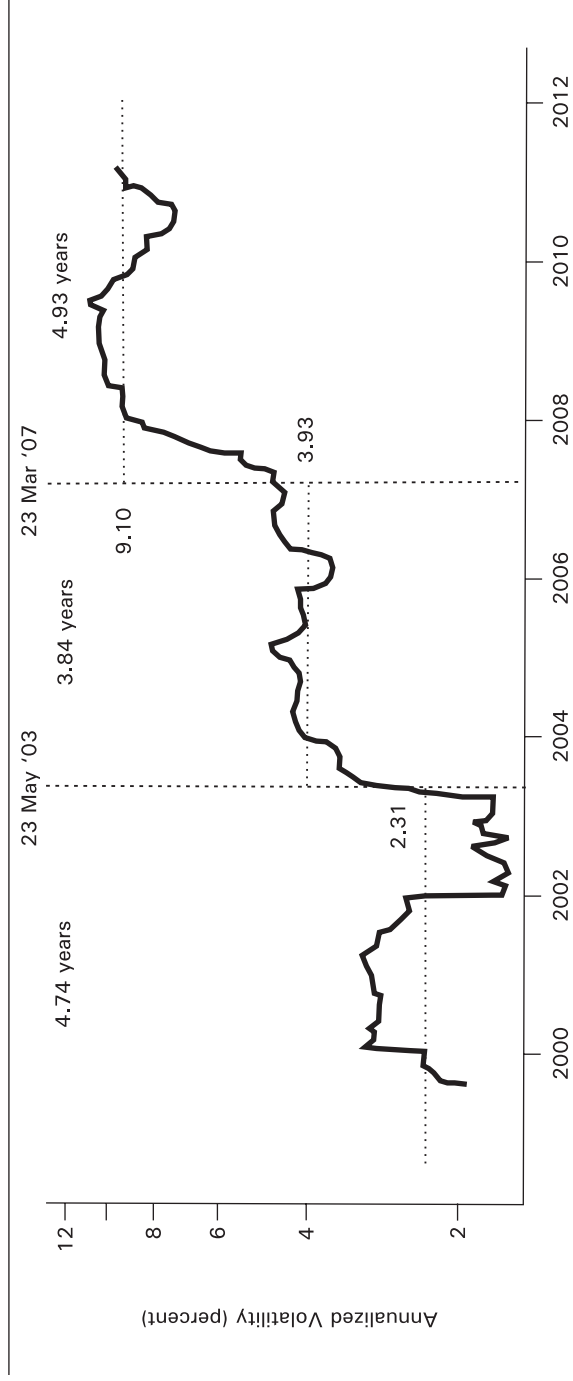
**FIGURE 1. Onshore and Offshore INR/US\$ Exchange Rate, 90 Days Forward**



**The Interesting Question** Why did India employ capital controls? The major macroeconomic policy goal was to get to the corner of the impossible trinity where a pegged exchange rate was rendered compatible with freedom of maneuver for monetary policy. We should judge the capital controls regime by the extent to which it delivered on the goal of upholding the exchange rate regime (see Patnaik and Shah, 2011).

Figure 2 shows the evolution of the INR/US\$ exchange rate volatility. We started out with a period of 4.74 years with a *de facto* pegged exchange rate, with an annualized volatility of 2.31 percent. The capital controls were

**FIGURE 2 . Evolution of INR/US\$ Volatility**



not effective enough for upholding this, and exchange rate volatility went up to 3.93 percent. This lasted for 3.84 years. Once again, the capital controls were not effective enough for upholding this, and exchange rate volatility went up to 9.1 percent, i.e., almost a floating exchange rate. This exchange rate policy framework has been the most durable one: it has lasted a full 4.93 years.

The key point is that India's system of onerous de jure capital controls were not able to uphold exchange rate pegging: India had to move to the floating exchange rate anyway.

On a side note, the presence of these structural breaks in the exchange rate regime implies that the estimation of the VAR of the Kohli and Belaisch paper needs to be done within each subperiod separately.

**Summary** India is one of the most closed economies of the world. It is not surprising or interesting that capital controls have driven a wedge between onshore and offshore prices. What is remarkable is the extent to which onshore/offshore arbitrage is effective, despite the prevailing capital controls. The really interesting question is: Did the capital controls deliver on the goals that they were intended for? With the abandonment of de facto exchange rate pegging in 2003 and then 2007, the answer seems clear: the capital controls were porous enough that pegging induced a substantial loss of monetary policy autonomy.

## **Mythili Bhusnurmath**

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I must confess the contrast between Ajay and me is not only in terms of his very technical approach and my very definitely nontechnical approach. There is another difference as well. To put it bluntly, we are poles apart—both in our views and in how we have approached the paper. I am approaching it from an entirely different perspective, partly because it has been many years since I passed out of Delhi School of Economics (and this is no reflection on Professor Bardhan here from whom I learnt international economics), but also because my 11 years in Reserve Bank of India and subsequent almost 18 years in journalism have taught me that a purely econometric approach to many real-world problems does not work. In fact, I think what the financial crisis has taught us is that if you approach economics as a physical science,

it does not work. It is a social science. So my approach is to look at the graphs and equations that many modern-day economists are fond of, as no more than tools that help improve our understanding. One must remember that we are dealing with human beings who are often irrational. One human being is very different from another human being; indeed the same human being also changes, minute to minute.

The issue is: did capital controls work? Ajay was very emphatic they did not work. To my mind they did work for the simple reason that the Indian economy came through the crisis without too much upheaval. Why do I say that? Because for a country like ours with a very large number of people living below the poverty line, what matters is that we were able to cushion them from the shocks of the external economy. That, to my mind, is a measure of success. So when it comes to capital controls, your equations may show you something, your graphs may show you something else. And yes, I may not have an answer as to why the Negotiated Dealing System (NDS) volumes are so high, but I do know that we did escape the worst of the crisis and that clearly shows we must be doing something right. However, I am not sure everybody in this room will agree with this very practical approach of judging the success of a policy by its outcome.

With those preliminary remarks let me now address Renu's paper. It focuses on the question of whether capital regulations are effective in insulating the domestic economy; the financial as well as the real sector, from foreign shocks. But first, why do countries want to insulate their domestic economies. Typically, there are four reasons. One, if your exchange rate is volatile, that has repercussions for your exports. Then you need to worry about hot money flows, loss of monetary autonomy, and large flows which are destabilizing in the short run, particularly if you don't have absorptive capacity like in the Indian context. Needless to say, I think that postcrisis one thing that has certainly happened—a very dogmatic view on capital controls is an absolute no, and rushing into capital account convertibility is no longer fashionable. I think even institutions like the International Monetary Fund (IMF) have realized that there may be a place for capital controls depending on each country's sensitivity and vulnerability. So certainly I think we have moved from a position where capital controls were an absolute no, no to yes, possibly, we should have capital controls.

Despite the broad endorsement of capital controls, there is very little agreement really on the kind of capital controls. Should they be the kind that we have, very convoluted? We have controls on almost every conceivable

thing; we are constantly tweaking one or another aspect on both inflows and outflows. Or, should we do something like Chile and Malaysia that opted for restrictions like additional reserve requirements and quantitative restrictions on outflows.

In this context, Renu's paper is useful because she looks at capital controls in India and their effect. There have been many discussions starting from Tarapore Committee report talking about the need for capital controls and providing some kind of a blue print, but very few of these studies have been data based. Renu's study fills the gap. As Magott and Reinhart, quoted in a paper, say that the literature on capital controls has at least four various serious apples to oranges problems. One, there is no unified theoretical framework to analyze the macroeconomic consequences of control; two, there is significant heterogeneity across countries and time in the control measures implemented; three, there are multiple definitions of what constitutes success (this is where Ajay and I differ); and four, the empirical studies lack a common methodology. Furthermore, they are significantly outweighed by a couple of country cases such as Chile and Malaysia. If you look at international literature, there is not much on the Indian experience. So Renu's study really fills a gap.

However, I have a slight problem with Renu's interpretation of efficiency because I think efficiency of any instrument must be seen from the perspective of the objective and as far as capital controls in India are concerned; frankly I can give you a number of objectives, apart from the need to insulate the domestic market. Building up reserves, for instance, is a very important objective because when we opened up we had low reserves and so building up reserves was very important.

I think from my limited knowledge of econometrics, the exercise is very rigorous. The conclusion is also unexceptionable. Intuitively, one would expect that capital controls would be less effective in a period of greater volatility without doing all these exercises. It is nonetheless good to have one's gut feeling reaffirmed by rigorous analysis. At the same time, one also needs to factor in whether the reduced effectiveness in the second period is partly because of the steady opening up of our controls. Ajay says we are one of the most closed economies but subsequently when he talked about the rupee exchange dollar rate, he talked about much greater volatility. Clearly these two statements are inconsistent. You cannot have a completely closed economy which did not show much change and at the same time talk of much greater volatility. The reality is we were opening up in the second period, which is why controls were less effective.

Let me now come to some specific points, where I have some reservations. As evidence of capital controls being partly circumvented, Renu talks about the overuse of participatory notes. I am not clear what she means by saying these participatory notes (PNs) were issued to offshore investors, wishing to take positions on the Indian equity and debt market beyond their regulatory limit. To my mind, PNs were issued because the registration procedure is cumbersome and also because the money that was coming through PNs was not quite kosher. A lot of it, my fellow journalists and I are convinced, though we have no proof, was Indian money that had escaped the tax net. Holders of PNs did not want to declare the beneficial owners. This was subterfuge and not really a capital controls' issue because limits on FII were fixed regardless whether money came in through PN or not. I don't think registration per se can be looked at as a capital control. Most countries have some registration requirements, thanks to the greater worries about terror financing and awareness brought about by the OECD's Financial Action Task Force (FATF). Yes, maybe our controls were more cumbersome, but that is not the point.

Again, using the IIP data to assess the impact on the real economy seems a bit flawed given the fact that manufacturing industry accounts for a very small share of our GDP. I think GDP would be a better measure. Yes, I agree there is a problem since you don't get GDP data except on a quarterly basis. Even so I am not sure that industrial production is the right indicator to take as a measure of rural activity, for instance.

While ranking financial markets according to their degree of sensitivity to foreign capital flows, the paper has placed the forex markets at No. 4. However the impact results show that the full period shock to capital flows explains only 25 percent of the stock market volatility and about 60 percent of the Rupee–Dollar volatility. The paper says “it unsurprisingly explained 60%.” If that is so, I wonder why it has been ordered No. 4. Should it not rank higher?

Another suggestion is that within the overall portfolio flows one could perhaps look at whether equity flows are affected differently from debt flows and also whether capital controls have affected FDI. Have they affected FDI differently than the portfolio investments of FII? That leads to the related question of China's capital controls, how would one measure their success given that China has received much more FDI rather than FII, whereas we have much more FII vis-à-vis FDI? In fact there was only one year when we have had the happy position where FDI was more than FII, but that again unfortunately has reversed.



My last point—this is actually more a rejoinder to Ajay. He spoke of every other country being much more open than us. I am not sure that there is a great virtue in following the herd because the crisis has shown that many countries that rushed in and did whatever was fashionable are regretting their actions today. So maybe it makes sense to take into account country-specific factors, for instance, the problems peculiar to a country as multidimensional and multifaceted as India. We have a vast number of poor, each state is very different. So maybe there is no great virtue in following the herd. Rather, you need to do things your own way.

Critics often say that India wants to do everything its own way and we like to say we are different. But to me the litmus test is really that we have come through relatively unscathed. I say relatively because maybe financial markets are not happy, but yes, I think that the average Indian is certainly better off in today's circumstances than he would have been had we been like an Indonesia in the 1998 crisis. Let me end with a quote from Keynes, now that Keynes is back in fashion. He said, "Above all let finance be primarily national," and I think that is something that we still need to think about.

## General Discussion

T.N. Srinivasan sympathized with Ajay Shah's belief that the controls were largely ineffective. He argued that it was not possible to conclude that the financial controls were responsible for India's economy being relatively unscathed by the global financial crisis because the paper did not provide a model that integrated the financial and real sectors. Thus, there was no basis for determining outcomes in the absence of the controls. Abhijit Banerjee also spoke about the importance of a more developed theoretical model. He questioned the definition of "big" or "small" frictions and wondered how much volatility could be expected under normal conditions, and he thought that a theoretical model could help in clarifying those issues.

Rajnish Mehra also agreed about the need for a stronger theoretical model. He questioned the reliance on UIP because it was known to fail even in the absence of controls. He thought it would be more effective to focus on the NDF market and covered interest parity. It might be possible to determine if there was an arbitrageable region. He also thought that the huge size of the 2008 shock would dominate the regression analysis. Finally, he pointed out the response of the bond market to a foreign shock should be muted relative to that of the equity market even in the absence of controls. Equity

yields are very sensitive to growth rates, whereas the bond rate would only change in situations that altered expectations of default.

Ashok Lahiri expressed concern that capital controls could be easily circumvented. He also thought that, while the controls might reduce volatility, they would also reduce investment in India. How should that trade-off be evaluated?

## References

- Ahluwalia, M.S. 2002. "Economic Reforms in India since 1991: Has Gradualism Worked?" *Journal of Economic Perspectives*, 16 (3): 67–88.
- Bernanke, B.S. 1986. "Alternative Explanations of the Money-income Correlation," *Carnegie-Rochester Conference Series on Public Policy*, 1 (25): 49–99.
- BIS. 2010. "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in 2010—Final Results," December.
- Capital Flows, BIS Papers No. 44.
- Cheung, Y., M.D. Chinn, and E. Fujii. 2003. "The Chinese Economies in Global Context: The Integration Process and Its Determinants," NBER Working Paper no. 10047.
- Chinn, Menzie D. and Hiro Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics*, 81 (1): 163–92.
- . 2008. "A New Measure of Financial Openness," *Journal of Comparative Policy Analysis*, 10 (3): 309–22.
- Clements, Benedict and Kamil Herman. 2009. "Are Capital Controls Effective in the 21st Century? The Recent Experience of Colombia," IMF Working Paper WP/09/30, February.
- Engel, C. 1996. "The Forward Discount Anomaly and the Risk Premium: A Survey of Recent Evidence," *Journal of Empirical Finance*, 3: 123–92.
- Forbes, K. and R. Rigobon. 2002. "No Contagion, Only Interdependence: Measuring Stock Market Comovements," *Journal of Finance*, 57 (5): 2223–61.
- Government of India. 1993. *Report of the High Level Committee on the Balance of Payments*. New Delhi: Government of India.
- . 2006. "Foreign Direct Investment Policy," Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, April.
- Griffith-Jones, S., R. Gottschalk, and X. Cirrera. 2000. "The OECD Experience with Capital Account Liberalization," Paper presented at the UNCTAD Workshop on Management of Capital Flows, Cairo, Egypt, 20–21.
- Gyntelberg, J. and E.M. Remolona. 2007. "Risk in Carry Trades: A Look at Target Currencies in Asia and the Pacific," *BIS Quarterly Review*, December: 73–82.
- Kaminsky, G.L. 2005. "International Capital Flows, Financial Stability and Growth," DESA Working Paper no. 10, December.
- Kim, S. and N. Roubini. 2000. "Exchange Rate Anomalies in the Industrial Countries: A Solution with a Structural VAR Approach," *Journal of Monetary Economics*, 45 (3): 561–86.
- Kohli, R. 2005. *Globalization: Liberalizing Capital Flows—India's Experience & Policy Issues*. New Delhi: Oxford University Press.
- . 2009. "Financial Integration, Capital Controls and Monetary Independence," *Economic & Political Weekly*, 44 (26 and 27; June 27–July 10).
- Ma, G.C. Ho, and R.N. McCauley. 2004. "The Markets for Non-deliverable Forwards in Asian Currencies," *BIS Quarterly Review*, June: 81–94.

- Magud, N. and C. Reinhart. 2006. "Capital Controls: An Evaluation," NBER Working Paper no. 11973.
- Magud, Nicolas E., Carmen M. Reinhart, and Kenneth S. Rogoff. 2011. "Capital Controls: Myth and Reality—A Portfolio Balance Approach," Peterson Institute Working Paper 11–7. Washington: Peter G. Peterson Institute for International Economics, February.
- Ministry of Finance. 2004. *Report of Committee on Liberalization of FII Investments*, June.
- Mint*. 2009. "Discreet Loans Raise Risk, Investor Concern," *Mint*, Monday, January 19.
- Mohan, R. 2008. "Capital Flows to India," in *Financial Globalisation and Emerging Market Capital Flows*, BIS Papers no. 44.
- Mohan, Rakesh and Muneesh Kapur. 2009. "Managing the Impossible Trinity: Volatile Capital Flows and Indian Monetary Policy," Working Paper no. 401. Stanford: Stanford University, November.
- Patnaik, Ila and Ajay Shah. 2011. "Did the Indian Capital Controls Work as a Tool of Macroeconomic Policy?" NIPFP–DEA Working Paper no. 2011-87, April.
- Reddy, Y.V. 2000. "Capital Account Liberalization: The Developing Country Perspective," Presentation at the seminar at the Overseas Development Institute, London. Available at <http://www.rbi.org.in/speeches/archives>
- Reserve Bank of India. 2010. "Report on Currency and Finance," July.
- Sims, C.A. 1986. "Are Forecasting Models Usable for Policy Analysis," *Federal Reserve Bank of Minneapolis Quarterly Review*, 10 (Winter): 2–16.
- Singh, M. 2007. "Use of Participatory Notes in Indian Equity Markets and Recent Regulatory Changes," IMF Working Paper no. 07/291, December.
- Tarapore, S.S.—Chairman. 2006. *Report of the Committee on Fuller Capital Account Convertibility*, RBI, July.
- Tsuyuguchi, Y. and P. Wooldridge. 2008. "The Evolution of Trading Activity in Asian Foreign Exchange Markets," *Emerging Markets Review*, 9 (December): 231–46.