V FINANCIAL MARKET INTEGRATION

5.1   Integration is a process by which markets become open and unified so that participants in one market have an unimpeded access to other markets. Integrated financial markets would imply that, in the absence of administrative and informational barriers, risk-adjusted returns on assets of the same tenor in each segment of the market should be comparable to one another. Return differentials across markets could cause arbitraged shifts in portfolios of investors, ultimately bringing about an overall equality of returns across markets. When this argument is applied to cross-border unrestricted movement of capital, risk-adjusted returns on financial instruments of different countries should be equal when the returns are expressed in any single currency. Administrative restrictions on cross-market and cross-border transactions are often viewed as the key factor contributing to market segmentation. While such restrictions exist in regulated state controlled regimes, growing market orientation of the economy warrants greater integration of markets for enhancing the effectiveness of policies and for facilitating better functioning of markets.

5.2   The Indian financial system, till the early 'nineties, was characterised by an administered structure of interest rates, restrictions on various market participants - including banks, financial institutions and corporates - in terms of the nature and volume of transactions they could undertake in the money, forex and capital markets and administrative limits on the transactions between the residents and the non-residents. As a result, the markets remained segmented. The process of economic reform that started in the early 'nineties has created the enabling conditions for better integration of the markets. Quick implementation of wide-ranging reforms, the 'big bang' approach, could help to eliminate market segmentation, though faulty timing, speed and sequencing of reforms could expose the economy to several vulnerabilities. The gradual approach to reforms in India, therefore, strives to attain a balance between the goals of "financial stability" and "integrated and efficient markets".

Reforms to Strengthen Market Integration

5.3   Since the mid-1991, the Reserve Bank has taken several steps to develop various segments of the financial markets, strengthen their integration and enhance their efficiency. These steps essentially covered the money market, the government securities market and the foreign exchange market. Steps were also undertaken by other regulators to develop other markets, specially the equity and the debt segments of the capital market. Policy initiatives in these areas related to introduction of new instruments, institutions and practices. Efforts have been made to widen the participant base, improve information base for all participants, create greater transparency and encourage good market practices, introduce efficient settlement mechanisms, rationalise tax structures, create better infrastructure to facilitate faster transactions and lower their costs.[1]

Money Market

5.4   Reforms in the money market included permission for entry of additional participants in the inter-bank call money market, and steps to develop a term-money market – particularly exemption of inter-bank liabilities from Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) stipulations and introduction of new instruments. The Reserve Bank started repos, both on auction and fixed interest rate basis for liquidity management. Since June 5, 2000, the newly introduced Liquidity Adjustment Facility (LAF) has been effectively used to influence short-term rates by modulating day-to-day liquidity conditions. The transition to LAF was facilitated by the experiment with the Interim Liquidity Adjustment Facility (ILAF) from April 1999 that provided a mechanism for liquidity management through a combination of repos, export credit refinance and collaterised lending facilities. In the long-run, the call money market is being seen to

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[1]   For a comprehensive assessment of the Financial Sector reforms in India, see Reddy, Y.V. (1999), "Financial Sector Reform: Review and Prospects", *Reserve Bank of India Bulletin*, January.

be emerging as purely an inter-bank market. In an environment where banks are undertaking non-bank activities and DFIs are planning to undertake banking functions, a more homogenous set of players is expected to emerge in the call money market. This is expected to facilitate introduction of longer and variable term repos. A well developed repo market is also essential to make the call money market purely inter-bank.

Government Securities Market

5.5   With the abolition of the system of automatic monetisation of deficits and the switchover to market related interest rates for market borrowings, it became possible to develop a genuine market for government securities. Introduction of new instruments, such as, zero coupon bonds, floating rate bonds and capital index bonds, establishment of Securities Trading Corporation, the system of Primary Dealers and Satellite Dealers, and the Delivery *versus* Payments (D*v*P) system constituted the other areas of reforms in the government securities market. The Reserve Bank is exploring the possibility of an early establishment of Electronic Dealing System which would facilitate both electronic bidding in auctions and dealing in Government securities and money market instruments. It will facilitate a shift from largely telephone-based trading to a completely screen-based on-line trading. Such electronic trading is expected to reduce information asymmetry in the markets and prevent the possibility of collusive trading that provides excess returns to some investors. To facilitate settlement in Government securities transactions, the dealing system will be linked to securities settlement system in Public Debt Office (PDO). A core group has been set up to prepare the project report indicating a road map and modalities for setting up a Clearing Corporation for debt securities. The setting up of Real Time Gross Settlement System (RTGS) is also expected to lower transaction costs by speedier settlement. In order to deepen and widen the Government securities market, it was essential to diversify the investor base. In this context, retailing of Government securities becomes critical. By establishing a system of Primary Dealers (PDs) and Satellite Dealers (SDs) with provision for liquidity support from the Reserve Bank, it is expected that the dealers will take on a larger role in the primary as well as secondary markets in Government securities. The liquidity support arrangements – based on bidding commitments and performance in both primary and secondary markets – would help the dealers to make markets and to minimise volatility in security prices. Dedicated gilt funds have also been provided liquidity support from the Reserve Bank. Banks have been allowed to freely buy and sell Government securities on an outright basis and retail Government securities to non-bank clients without any restriction on the period between the sale and purchase. With a view to enabling dematerialisation of securities of retail holders, National Securities Depository Ltd. (NSDL), Stock Holding Corporation of India Ltd. (SHCIL) and National Securities Clearing Corporation Ltd. (NSCCL) have been allowed to open SGL accounts with the Reserve Bank.

Capital Market

5.6 Setting up of depositories, clearing corporations/houses on the stock exchanges, *etc.,* and introduction of on-line trading in all stock exchanges have helped improve the efficiency of the capital market. Delisting norms have been tightened following the recommendations of the Chandratre Committee that were accepted by SEBI. All publicly issued debt instruments, regardless of the period of maturity, are presently required to be rated by credit rating agencies. All listed companies are also required to publish unaudited financial results on a quarterly basis. With a view to enhancing transparency in corporate affairs, SEBI accepted the recommendations of the Committee on Corporate Governance (Chairman: Shri K.M. Birla) and the listing norms have been modified to reflect a code of corporate governance. With a view to detecting market manipulations, SEBI regularly monitors market movements and oversees the activities of the stock exchanges. These measures in the capital market have helped in improving information flows and in reducing the transaction costs in the stock markets.

Forex Market

5.7   Measures to integrate Indian markets with those abroad were largely guided by the recommendations of the Report of the High Level Committee on Balance of Payments (Chairman: Dr. C. Rangarajan) and the Report of the Expert Group on Foreign Exchange Markets in India (Chairman: Shri O.P. Sodhani). The former report recommended, *inter alia*, liberalisation of current account transactions, compositional shifts in capital flows - away from debt in favour of non-

debt, strict regulation of external commercial borrowings (ECBs) - particularly of shorter maturities, and measures to discourage volatile elements in the inflows from NRIs. Against the background of the gradual liberalisation of current transactions, a transition to the market determined exchange rate on March 1, 1993 was achieved through a successful experimentation with a dual exchange rate system under the Liberalised Exchange Rate Management System (LERMS) for one year beginning with March 1992. In October 1993, banks were permitted to rediscount export bills abroad at rates linked to international rates. Introduction of "Post Shipment Export Credit in Foreign Currency (PCFC)" in November 1993 enabled Indian merchants to access funds at internationally competitive rates. In October 1996, ADs were permitted to use FCNR (B) funds to lend to their resident constituents for meeting their foreign exchange as well as rupee needs. Based on the recommendations of the Sodhani Committee, several measures were instituted to deepen and widen the forex market. ADs were permitted in April 1997 to borrow from their overseas offices/correspondents as well as to invest funds in overseas money market instruments up to US $ 10 million. In October 1997, this limit was raised to 15 per cent of Tier I capital of the banks. The uniform limit of Rs. 15 crore on the overnight positions of the ADs was removed with effect from January 4, 1996 and banks were allowed to operate on the limits fixed by their management and vetted by the Reserve Bank. The Aggregate Gap Limit (AGL), which was previously not to exceed US $ 100 million or six times the net owned funds of a bank, was left to be fixed by the individual banks since April 1996, depending upon their foreign exchange operations, risk taking capacity, balance sheet size and other relevant parameters subject to approval by the Reserve Bank.

5.8 Liberalisation of capital account should be viewed as a process and not as a single event. In the approach to capital account convertibility (CAC), the initial reform measures were directed at current account convertibility leading to the acceptance of Article VIII of the Articles of Agreement of the IMF in August 1994. For operationalising CAC in India, a clear distinction is made between inflows and outflows with asymmetrical treatment between inflows (less restricted), outflows associated with inflows (free) and other outflows (more restricted). Differential restrictions are also applied to residents *versus* non-residents and to individuals *versus* corporate entities and financial institutions. A combination of direct and market based instruments of control is used for meeting the requirements of a prudent approach to the management of the capital account. The policy of ensuring a well diversified capital account with rising share of non-debt liabilities and low percentage of short-term debt in total debt liabilities is reflected in India's policies of foreign direct investment, portfolio investment and external commercial borrowings. Quantitative annual ceilings on ECB along with maturity and end-use restrictions broadly shape the ECB policy. FDI is encouraged through a liberal but dual route - a progressively expanding automatic route and a case-by-case route. Portfolio investments are restricted to select players, particularly approved institutional investors and the NRIs. Short-term capital gains are taxed at a higher rate than longer term capital gains. Indian companies are also permitted to access international markets through GDRs/ADRs, subject to the prescribed guidelines. Foreign investment in the form of Indian joint ventures abroad is also permitted through both automatic and case-by-case routes.

5.9 The Committee on Capital Account Convertibility (Chairman: Shri. S.S. Tarapore) which submitted its Report in 1997 highlighted the benefits of a more open capital account but at the same time cautioned that CAC could pose tremendous pressures on the financial system. To ensure a more stable transition to CAC, the Report recommended certain signposts and pre-conditions of which the three crucial ones relate to fiscal consolidation, mandated inflation rate and strengthened financial system. Keeping in view the recommendations of the Report, India has over the years liberalised certain transactions in its capital account. Vastly altered and liberal policy environment for the external sector is reflected in the Foreign Exchange Management Act, 1999 (FEMA), which replaced the earlier Foreign Exchange Regulation Act, 1973 (FERA). The new Act sets out its objective as "facilitating external trade and payment" and "promoting the orderly development and maintenance of foreign exchange market in India".

5.10 The above referred important measures in each of the critical segments of the Indian financial market have enhanced the information sensitivity of the markets and fostered competitive efficiency.

Notwithstanding the restrictions that still exist on specific cross-market transactions and the general policy of discouraging destabilising speculation, markets have shown signs of increasing integration with market participants often recognising the expected return differentials in different markets and triggering cross-market transactions to reduce the return differentials across the markets. Absence of complete integration, stemming to some extent from the lack of complete freedom of individual agents in choosing their preferred portfolios as well as the restrictions on destabilising speculation, are in the interest of developing orderly, and resilient financial markets in India.

Integration of Domestic Markets

5.11 The money market, the government securities market, the capital market and the forex market constitute the important segments of the financial system, besides the market for credit involving banks, non-banks and all India financial institutions. Integration of these markets is reflected in the movements in the term structure of interest rates, the term structure of forward premia, the behaviour of asset prices and their returns in relation to the range of interest rates, despite the limited degree of openness in the capital account and imperfect asset substitutability in India. The extent of integration between the domestic and foreign markets can be evaluated more directly through the interest parity conditions.

5.12 The gradual integration of domestic financial markets, both within themselves and with the foreign exchange market, could be studied by analysing the trends in the turnover and prices of domestic financial markets and the foreign exchange market. Analyses of volatility spillovers – *i.e.,* whether disturbances in one market get transmitted to other markets – could also be useful in assessing the integration of markets.

5.13 The Indian money and foreign exchange markets have become intrinsically linked to each other, especially in view of the commercial banks having a dominant presence in both the markets. The linkage between the call money market and the foreign exchange market, which existed in the past as banks were permitted to maintain nostro account surpluses or overdrafts to some extent, has strengthened in the recent years, particularly after the permission to borrow or lend up to 15 per cent of Tier-I capital overseas. The linkage

between the call market and the forex market is found to be more pronounced during episodes of volatile exchange market conditions (Table 5.1). This fact is clearly discernible in the second half of the 'nineties (Chart V.1). A detailed account of yearly developments of integration of markets – especially money and foreign exchange markets – is provided subsequently in this Chapter. It would be, however, necessary to note at this juncture that while the hike in call rates during volatile forex market conditions partly resulted from the introduction of monetary measures to tighten the liquidity conditions in the face of disorderly developments in the market, to some extent it also reflected the short positions taken by market agents in domestic currency against long positions

Table 5.1: Co-efficient of Variation in the Money and Foreign Exchange Markets

(Per cent)

Year	Call Rates	Exchange Rates
1	2	3
1994-95	42.1	0.3
1995-96	44.6	5.8
1996-97	37.3	1.4
1997-98	85.7	4.3
1998-99	15.0	2.3
1999-2000	12.3	0.7

in the US dollars in anticipation of higher profits through depreciation of the rupee. Furthermore, volatility in the call money market, as may be seen from Table 5.1, reflects the significant adjustment that occurs in the money market in response to

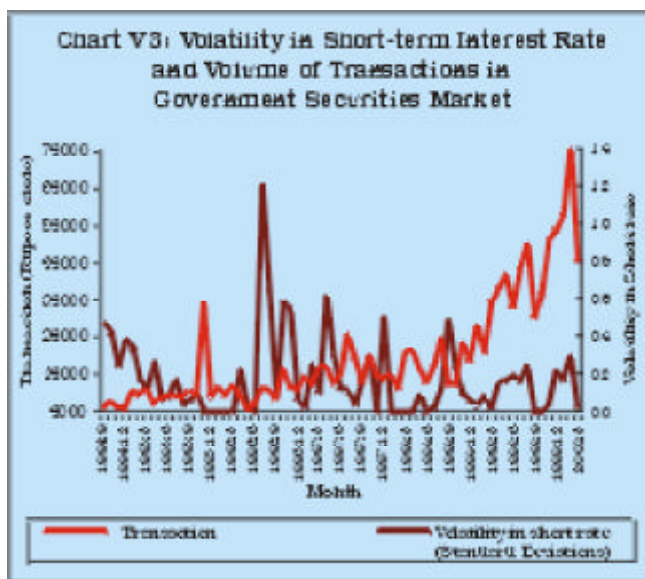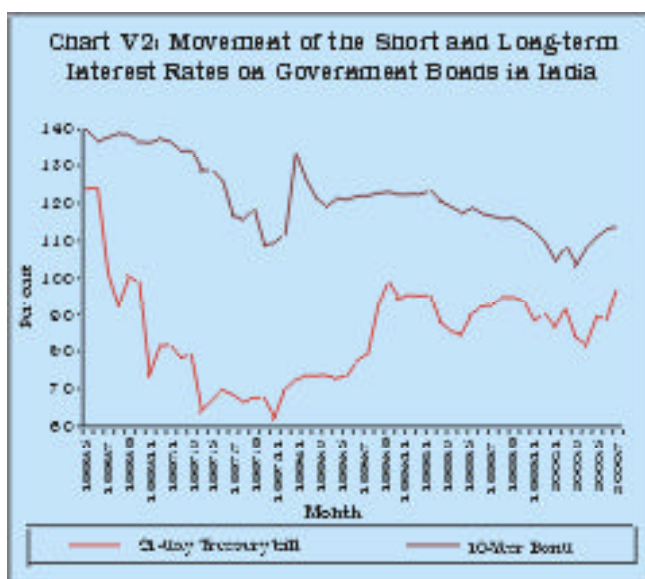Chart V 1: Monthly Average of Call Rates and Exchange Rates
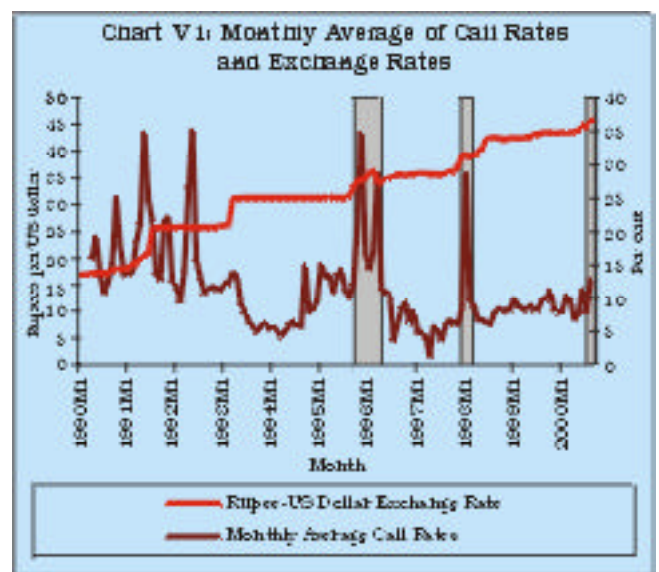
liquidity changes and gaps in the foreign exchange market. Excess demand conditions in the foreign exchange market and the attendant depreciation of the domestic currency affect bank liquidity. Unsure of the extent of depreciation, exporters often delay repatriation of proceeds, while importers rush for cover. So long as money market rates are lower than the rates implied by the forward premia, arbitrage opportunities exist between the money and foreign exchange markets. Banks could fund foreign currency positions by withdrawing from the inter-bank call money market and liquidating excess investments in government securities over and above the statutory liquidity ratio, thereby hiking interest rates in the call and the government securities markets. Banks without a retail base, which fund their assets largely through the inter-bank call money market, are especially squeezed as they face higher borrowing costs along with a sharp increase in the demand for foreign currency. During prolonged volatile conditions, banks begin to liquidate investments in commercial paper (CP), typically issued at sub-PLR levels. As the credit is often a first charge for retail banks, the need for mobilisation of funds, initially through high cost certificates of deposit (CDs) and thereafter through high cost retail deposits, contributes to upward pressures on interest rates, initially at the short end and thereafter across the spectrum.

5.14   The yield and volume in the Government securities market have also witnessed increased volatility as measured by the standard deviation (SD), which has generally tended to fluctuate over time at both long and short-ends of the market (Table 5.2). In the Indian context, it is observed that policy induced effects are readily transmitted across different markets in the short run; for instance, relaxation of the monetary policy stance have been quick to find its way into the yields on Treasury bills. However, a similar correspondence between the yield on dated securities and money market conditions became visible only after the first half of 1996, the period which coincides with institutional development in the money and the government securities markets. At the shorter end of the market, the movement of monthly average short-term interest rate[2] for the period from May 1996 to September 2000 reveals that they are

generally more volatile as compared to the long-term interest rates[3] (Chart V.2). The relative rigidity of the long term interest rates and the falling trend in the spread between the 10-year yield and the 91-day Treasury bill rate indicate that the long-term inflation expectations and real interest rate in the economy may be stable. Besides, the higher volatility at the short end of the Government securities market has also been generally associated with relatively lower trading volumes (Chart V.3).

5.15   The Reserve Bank's monetary strategy of maintaining orderly conditions in the foreign

Chart V.2: Movement of the Short and Long-term Interest Rates on Government Bonds in India

Chart V.3: Volatility in Short-term Interest Rate and Volume of Transactions in Government Securities Market

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[2]   The short-term interest rate considered here is yield on 91-day Government of India Treasury bills. This is widely considered as representative of the risk-free short-term interest rate in the Indian financial system.

[3]   The observed long-term interest rate series is for the 10-year maturity Government of India bonds.

Table 5.2: Volatility in Government Securities Market Measured by Standard Deviation

Year	91-day Treasury bills		364-day Treasury bills		10-year Bond	
	Mean	SD	Mean	SD	Mean	SD
1	2	3	4	5	6	7
1993-94	8.8979	0.3885	11.0237	0.9151	-	
1994-95	9.1136	0.8260	10.1474	1.4076	-	
1995-96	12.6521	0.2964	12.8705	0.3872	-	
1996-97	9.6654	1.2953	11.6710	1.9126	13.6821	0.1905
1997-98	6.8325	0.4520	8.4551	0.4176	12.0432	0.8207
1998-99	8.6194	1.1027	9.5144	1.0145	12.1821	0.1173
1999-2000	9.0242	0.2870	10.0881	0.3746	11.4108	0.4489
2000-01*	9.0616	0.7815	9.7950	0.8546	10.9914	0.4100

* Up to October 2000   SD   Standard Deviation

exchange market involves pre-emptive as well as remedial responses. Pre-emptive measures attempt to augment supply in the foreign exchange market by depleting reserves, encouraging non-resident deposit mobilisation by reducing reserve requirements on such deposits and discouraging exporters from withholding proceeds by raising costs of export credit. Demand is attended to be contained by raising domestic interest rates, especially short-term, above the interest rates implied by the forward premia by substituting low cost discretionary liquidity with high cost discretionary liquidity, usually by raising reserve requirements on domestic deposits and/or cutting refinance facilities available to banks and funding the resultant liquidity gap through refinance at a higher Bank Rate or through high cost reverse repos, backed by increases in the repo rate to discourage speculative positions in the foreign exchange market. This could be buttressed by raising the cost of import finance. The remedial measures attempt to limit the impact of foreign exchange market volatility on the economic activity. Accepting private placements/devolvement of government debt at times of tight liquidity in order to offload them at times of easy liquidity and reversing monetary tightening measures to reduce the cost of discretionary liquidity and thereby reducing interest rates are an integral part of this strategy.

5.16   The Indian stock market has undergone a significant transformation in the 'nineties as described in Chapter IV. Apart from changes in the fundamental factors, information asymmetries and the associated constraints to efficient price discovery remain at the heart of the volatile movements in stock prices. The extent of stock price volatility is also influenced by the extent of integration between the domestic and international capital markets as well as the regulatory framework governing the stock market. In India, two most important factors which had a significant bearing on the behaviour of stock prices during the 'nineties were net investments by FIIs and trends in the international stock exchanges, especially NASDAQ. Stock market volatility has tended to decline in recent years, with the co-efficient of variation (CV) in the BSE Sensex working out to 17.51 per cent during 1995-96 to 1999-2000 (Table 5.3). Asset price bubbles entail significant risks in the form of higher inflation when the bubble grows in size and in the form of financial instability and lost output when the bubble bursts. Monetary and fiscal authorities, therefore, closely watch the asset market developments. The positive wealth effect resulting from bull runs could impart a first round of risk to inflation. If the bull run is prolonged, a second round of pressure on prices may result from subsequent upward wage revisions. Since financial assets are used as collaterals, asset booms may also give rise to large credit expansion. When domestic supply fails to respond to the rising demand, it could give rise to higher external current account deficit. The asset price cycles may follow. When the asset prices collapse, firms may face severe financing constraints as a result of declining value of their collaterals, making lenders reluctant to lend at a scale they do when asset prices are rising. Recognising these alternative complexities emanating from asset market bubbles, information on asset prices is being increasingly used as a critical input for the conduct of public policies.

Table 5.3 : Co-efficient of Variation (CV) and Dispersion of BSE Sensex

Year	CV (Per cent)	Range
1	2	3
1991-92	32.19	3091.39
1992-93	15.39	2242.24
1993-94	23.58	2201.78
1994-95	9.06	1414.40
1995-96	5.51	791.30
1996-97	8.59	1418.08
1997-98	7.88	1440.75
1998-99	11.78	1580.78
1999-2000	13.13	2967.22
1985-86 to 1990-91	33.43	
1990-91 to 1999-00	25.93	
1995-96 to 1999-00	17.51	

The Indian Experience

Early Transition

5.17   The exchange rate remained stable in the period that followed the institution of a market-based exchange rate mechanism in March 1993, even though liberalisation of transactions during this period helped in a quick transition to current account convertibility. During 1992-93 to 1994-95, stability in the currency market was supported by the Reserve Bank's policy of absorbing the excess supply resulting from strong capital inflows. As a result, all segments of financial market witnessed easy liquidity conditions as a result. The Reserve Bank divested net domestic assets (essentially through open market, including repo operations) to maintain monetary stability, while modulating interest rates in the money market. The domestic currency came under minor pressure during November 1994 and in mid-March 1995, but stability was quickly restored. The latter half of the 'nineties, however, witnessed some episodes of volatility in the money and the foreign exchange market which underscored the gradual integration of the domestic money market and the foreign exchange market. Asset prices responded to deregulation of interest rates, two-way capital movements, changes in macroeconomic conditions and general sentiments that were impacted by economic and non-economic factors.

5.18   Fiscal 1995-96 saw return of tight liquidity conditions on account of strong demand for credit and the decline in capital flows. The first serious pressure on the rupee-dollar exchange rate began in the last week of August 1995, with increased import demand, slowdown in capital inflows and strengthening of the US dollar against other major world currencies, which was aggravated by large-scale cancellation of forward contracts by exporters and short-covering by importers. The Reserve Bank intervened by selling US dollars, especially in the forward market, in an attempt to bring forward premia in alignment with the interest differentials. This was supplemented by a withdrawal of money market support, which pushed up call rates towards end-October and early November (touching the peak of 85.0 per cent on November 3, 1995). With the return of stability in the spot foreign exchange market, the Reserve Bank injected liquidity through reverse repos with DFHI and STCI (which peaked at Rs.5,555 crore as on November 8, 1995), enhancement of banks' refinance facilities against Government securities and CRR cuts to stabilise the inter-bank market. Volatility returned to the forex market in February 1996, pushing up call rates but stability returned with the revival of capital flows coupled with measures to accelerate repatriation of export proceeds and prevent acceleration of import payments. The stringent money market conditions during the second half of the year induced banks to mobilise resources through CDs which jumped from Rs.8,017 crore (at an interest rate range of 10.0-15.0 per cent) as at end-March 1995 to Rs.16,316 crore (at an interest rate range of 12.0-22.3 per cent) as on March 29, 1996, while CP issues dwindled to Rs.76 crore (at an interest rate of 20.2 per cent). The equity market was generally subdued during 1995-96, mainly on account of general factors that included lack of buying support from institutions, both foreign and domestic, uncertainties regarding the introduction of the carry-forward system and market disturbances, such as, the switching of shares in respect of a major company. The secondary market showed signs of revival mainly on account of the return of FII interest at the year-end.

5.19   There was an accretion of US $ 5,323 million to the Reserve Bank's foreign currency assets in 1996-97 on account of a contraction in the current account deficit on the one hand and an increase in capital in flows on the other. The exchange rate, as a result, traded in the narrow band of Rs.35-36 per US dollar while the three-

month forward premia eased from 15.6 per cent in April 1996 to 6.7 per cent in March 1997. With the return of exchange rate stability, the Reserve Bank was able to ease liquidity conditions further by cutting the CRR by as much as 4.0 percentage points (thereby releasing Rs.17,850 crore of lendable resources to banks during April 1996-January 1997) with a view to moderating interest rates and facilitating credit off-take. Reflective of this, there was a significant softening of interest rates across the spectrum. As call money rate eased to single digit by the second quarter of the year, the Reserve Bank resumed repo operations in November 1996 in order to divest net domestic assets in the face of accretion to reserves and provide a reasonable floor to the inter-bank market. In tandem with easy money market conditions, CDs declined to Rs.12,134 crore (at an interest rate range of 7.0-14.25 per cent), while the CP market recorded a mild revival.

5.20   The movements in share prices during 1996-97 exhibited three phases. During the first quarter, the market was relatively strong, buoyed by FII support and in anticipation of a favourable budget. The second phase, July to mid-December 1996, saw a reversal of sentiment, on account of the introduction of minimum alternate tax (MAT) and lower net FII investments. The stock market recovered thereafter.

Containing Contagion in 1997-98

5.21   The first half of 1997-98 witnessed easy liquidity conditions, driven by sustained capital inflows that resulted in an accretion of a whopping Rs.11,546 crore (adjusted for revaluation) to the Reserve Bank's NFA. Net purchases of foreign currency exceeded US $ 1.0 billion in May, June and July 1997 (Table 5.4). The concomitant liquidity generation facilitated the completion of the bulk of the Government's borrowing programme at relatively low interest rates as banks sought to park their surplus funds in government paper. The net RBI credit to the Central Government declined by Rs.7,731 crore as scheduled commercial banks' incremental investments in dated securities increased by Rs.22,765 crore. The stability in the foreign exchange market enabled the Reserve Bank to announce reductions in reserve requirements by 2.0 percentage points in equal eight phases beginning with the reporting fortnight of October 25, 1997. Measures were also undertaken to further liberalise the capital account.

5.22   The easy liquidity conditions fostered by large-scale capital inflows were mirrored in an all-round softening of interest rates, particularly at the lower end of the maturity spectrum. The Reserve Bank attempted to modulate liquidity through repo operations at rates of 2.9–4.5 per

Table 5.4: Developments in the Money and Foreign Exchange Markets, 1997-98

(Rupees Crore)

Month	FEDAI Indicative Rate (Rupees per US $)	Net foreign currency Sale (-)/ Purchase (+) (US $ million)	Net OMO Sale (-)/ Purchase (+)	Average Repos outstanding	Average Reverse Repos outstanding	Average Daily Call / Notice Turnover	Average Call Rates (per cent)	Forward premia 1-month (Per cent)
1	2	3	4	5	6	7	8	9
1997								
April	35.8139	641	-1,822	3,528	0	19,951	1.04	3.17
May	35.8145	-1,393	-65	916	0	23,193	6.95	3.11
June	35.8095	1,335	-68	3,145	0	19,536	4.95	2.57
July	35.7372	1,185	-103	4,830	0	23,894	4.09	2.70
August	35.9200	872	-3	2,156	14	25,476	5.73	5.07
September	36.4318	-978	-2	567	178	23,232	6.84	6.90
October	36.2260	189	-980	1,493	12	24,162	5.84	4.23
November	37.2358	-1,590	-507	1,869	18	23,399	5.88	6.51
December	39.2168	-407	423	1,081	468	23,343	8.57	9.42
1998								
January	39.3843	422	-25	155	1,399	21,929	26.34	21.05
February	38.8871	-642	-3	2,662	582	20,776	9.12	12.70
March	39.5007	1,449	-4,460	2,122	88	23,613	8.96	8.81

cent and auction of 14-day Treasury bills, introduced effective June 6, 1997, with a cut-off yield of 4.95 per cent. Call money rates, which dwindled to 1.04 per cent in April 1997, firmed up to 4.95 per cent in June 1997 and 6.84 per cent in September 1997. The implicit cut-off yield on 91-day Treasury bills, after decline from 7.96 per cent in end-March 1997 to a low of 5.72 per cent in mid-April 1997, also increased to 6.22 per cent in October 1997. The long-term nominal interest rates also fell in harmony with short-term interest rates. The PLRs of major scheduled commercial banks also declined by 200 basis points from 14.5-15.0 per cent in end-March 1997 to 12.5-13.0 per cent in end-November 1997.

5.23 The initial impulses of contagion from financial crises in parts of South-East Asia were felt from mid-August to mid-September, 1997 as in a forward-looking reaction, markets anticipated the need for competitive downward adjustment of the rupee to counter the implications of falling South-East Asian currencies. However, normalcy returned to markets after the Reserve Bank intervened effectively, first by selling dollars and then buying them in October. Continuing FII inflows also encouraged the sentiment. Pressures from contagion re-emerged in mid-November, following the weakening of the sentiment in response to financial crisis spreading to hit South Korea and far-off Latin American markets. This exerted fresh pressure on currencies in the region. Cancellation of planned issues of Global Depository Receipts (GDRs) by some Indian companies, reversal in portfolio investment flows and political uncertainty added to the pressures. The volatility in the exchange market led to a significant rise in inter-bank as well as merchant turnover. Demand (as reflected in forward sales) exceeded supply (as reflected in forward purchases) by a large margin and the average 1-month premia more than doubled to 9.4 per cent by December 1997. The rupee exchange rate crossed Rs.40 per US dollar on January 14, 1998, ending up at Rs.40.27 per US dollar on January 15, 1998.

5.24 The South-East Asian crises necessitated twin-pronged policy action. The Reserve Bank attempted to mitigate excess demand conditions in the foreign exchange market. It also moved to siphon off excess liquidity from the system in order to reduce the scope for arbitrage between the easy money market and the volatile foreign exchange market. This helped contain the impact of contagion. Foreign currency sales in the third quarter of 1997-98 (which resulted in a decline of Rs.7,150 crore in the RBI's NFA - adjusted for revaluation) were undertaken to curb the volatility in the exchange rate. This supported domestic currency, but resulted in reduced money market support to the Government borrowing, leading to an increase in the Centre's monetised deficit. The Reserve Bank tightened its monetary policy stance by raising CRR and the Bank Rate, thus substituting cheap discretionary liquidity with expensive discretionary liquidity. Monetary measures that tightened liquidity were taken on November 28, 1997, December 2, 1997 and January 16, 1998. These included: (i) initial deferment of pre-announced CRR cuts as well as subsequent hiking of reserve requirements in two phases of 0.5 percentage point each to 10.5 per cent, (ii) reduction of refinance limits available to scheduled commercial banks, (iii) introduction of fixed rate repo auctions and all-round increase in interest rates with the repo rates progressively raised from 4.5 per cent to 9.0 per cent, and (iv) the increase in the Bank Rate from 9.0 per cent to 11.0 per cent. Measures, such as removal of incremental CRR of 10.0 per cent on NRER and NR(NR) deposits, effective December 6, 1997, were also undertaken to augment supply of foreign currency. With a view to containing demand, the interest rate on post-shipment export credit in rupees beyond 90 days and up to six months was raised from 13.0 per cent to 15.0 per cent and an interest rate surcharge was introduced on import finance as leads and lags in import payments and export realisations widened.

5.25 Interest rates, in fact, hardened from September 1997 onwards, especially at the short end of the market. The Reserve Bank's monetary tightening measures on January 16, 1998 pushed the DFHI's fortnightly average call money lending rates to the historic high of 50.0 per cent during the fortnight ended January 30, 1998 (surpassing the previous high of 42.9 per cent during the fortnight ended May 17, 1991). The market stabilised thereafter as the Reserve Bank's foreign exchange and money market operations and banks' refinance drawals eased liquidity pressures. The 91-day Treasury bill rate increased to 7.33 per cent by January 1998 and the five-year bond yield to 12.85 per cent. The tightening of liquidity conditions gradually transmitted to other markets. Banks' issuance of CDs climbed up from Rs.8,491 crore (at an interest rate range of 7.0-14.0 per cent) as at end-August 1997 to Rs.14,296 crore (at 7.2-26.0 per cent), while interest rates on term deposits

of up to one year maturity firmed up from a range of 5.0-8.0 per cent as on October 21, 1997 to 5.0-12.5 per cent as on March 18, 1998. Interest rates on CPs increased from an effective discount rate of 8.3-9.3 per cent as at end-August 1997 to 10.9-15.5 per cent as at end-February, while banks' prime lending rates also hardened to 14.0-14.5 per cent as on March 18, 1998. An analysis of the yield curve movement in the Government securities market during 1998-99 showed that while the short-term rates respond quickly and pronouncedly to the changes in monetary policy rates, long-term rates exhibit somewhat sticky behaviour.

5.26   The BSE Sensex (Base: 1978-79 = 100) climbed to 4,548 by August 5, 1997 from 3,361 as on March 31, 1997, driven by higher investments by FIIs and favourable proposals in the Union Budget, 1997-98. The equity market, however, turned depressed in the wake of the slowdown in industrial production and the net outflow of funds by FIIs during certain months in the wake of the South-East Asian crises. The BSE Sensex consequently fell to 3,210 by January 28, 1998. The market recovered with FII investments turning positive from February 1998. This coupled with favourable budgetary expectations pushed the BSE Sensex to 3,893 by March 31, 1998.

5.27   The restoration of stability in the Indian currency market was primarily the result of a credible stance to arrest volatility caused by speculation and keep rupee stable and the gradual moderation of pressures in the East Asian currency markets in end-January 1998. As the rupee adjusted downwards smoothly in the months that followed aided by a turnaround in capital inflows, the Reserve Bank eased some of the monetary measures clamped earlier in the face of volatility. The Bank Rate was reduced by 50 basis points each time effective March 19 and April 3, 1998, respectively, and further by 100 basis points to 9.0 per cent effective April 29, 1998. The fixed rate for repo auctions was reduced to 8.0 per cent effective March 18, 1998 and thereafter gradually to 5.0 per cent effective June 15, 1998. The CRR was scaled down by 25 basis points each in two phases effective March 28 and April 11, 1998, respectively. Export credit refinance limits were restored in April 1998. Reflecting the return of easy liquidity conditions, the interest rate structure also softened, with average call rates easing to 6.85 per cent and five-year bond yields softening to 11.06 per cent in April 1998. A majority of banks reduced their lending and deposit rates in response to the Bank Rate cut as also in line with seasonal trends.

The Markets in 1998-99

5.28   The foreign exchange market saw the return of excess demand conditions in mid-May 1998, in reaction to the impending sanctions, resulting in the exchange rate weakening from Rs.39.73 per US dollar at the beginning of May to Rs.42.38 by June 11, 1998. The Reserve Bank sold foreign currency in response to excess demand in the foreign exchange market, depleting its NFA by Rs.6,597 crore (adjusted for revaluation). Net merchant forward sales jumped to US $ 5,498 million, resulting in a sharp increase in the one-month forward premia to 9.59 per cent in June 1998 from 3.67 per cent in April 1998 (Table 5.5). The Reserve Bank announced a package of policy measures on June 11, 1998 to contain volatility in the foreign exchange market. These included: (i) announcement of the Reserve Bank's readiness to sell foreign exchange to meet demand-supply mismatches, (ii) advising importers as well as banks to monitor their credit utilisation so as to meet only genuine foreign exchange demand and discourage any undue build-up of inventory, (iii) allowing banks/ADs acting on behalf of FIIs to approach the Reserve Bank for direct purchase of foreign exchange, and (iv) advising banks to charge a spread of not more than 1.5 percentage points above the LIBOR on export credit in foreign currency as against the earlier norm of 2.0-2.5 percentage points. Stability returned briefly but pressures renewed by the end of the month. The rupee touched Rs.42.92 per US dollar on June 23, 1998 but firmed up at end-June 1998 to Rs.42.47 per US dollar as stability was restored with the sentiment improving in response to the Reserve Bank's policy response and favourable political developments.

5.29   The foreign exchange market again came under pressure in August 1998, reflecting the adverse sentiment on account of the deepening of financial crisis in Russia and the fears of the Chinese renminbi devaluation, resulting in a depreciation of the rupee to Rs.43.42 on August 19, 1998. This was reflected in net spot and forward merchant sales in the foreign exchange market of US $ 1,255 million and US $ 2,225 million. The one-month forward premia, which had softened to 5.84 per cent in July firmed back to 9.58 per cent in August 1998. The Reserve Bank announced a second package of measures in order to prevent

Table 5.5: Developments in the Money and Foreign Exchange Markets, 1998-99

(Rupees Crore)

Month	Com-mercial Bank Borro-wings from the Reserve Bank	Average Daily Turnover in the Inter-bank and Forex Market (US $ Million)	Fixed Repo Rate (Per cent)	FEDAI Indi-cative Rate (Rupees per US $)	Net foreign currency Sale (-)/ Purchase (+) (US $ million)	Net OMO Sale (-)/ Pur-chase (+)	Average Repos out-standing	Average Reverse Repos out-standing	Average Daily Turnover in the Call/ Notice Money Markets	Average Call Rates (per cent)	Forward premia 1-month (Per cent per annum)
1	2	3	4	5	6	7	8	9	10	11	12
1998											
April	166	3,377	6-8	39.6572	201	-215	9,133	80	21,471	6.85	3.67
May	519	4,774	6	40.4708	-754	-34	4,412	82	24,945	6.97	6.49
June	755	5,459	5-6	42.2423	-1,627	-13	6,872	0	25,393	6.63	9.59
July	643	4,597	5	42.5102	-121	-1,442	4,545	67	27,639	6.38	5.84
August	1,075	5,072	5-8	42.7563	542	-6,902	3,689	834	26,022	8.86	9.58
September	3,306	4,978	8	42.5217	760	-689	6,322	1,263	23,967	8.52	7.42
October	3,675	4,899	8	42.3338	95	-880	2,769	941	26,011	8.71	5.55
November	4,084	3,697	8	42.3810	75	-6,707	3,504	250	26,112	8.07	4.33
December	3,150	2,926	8	42.5530	-84	-1,493	1,567	353	26,454	8.74	4.96
1999											
January	5,330	3,681	8	42.5061	477	-5,902	694	407	28,884	10.66	5.08
February	6,109	3,756	8	42.4656	858	-2,780	845	0	29,726	8.95	5.57
March	2,894	4,279	6	42.4487	1,420	-3,422	206	0	31,371	8.46	6.98

speculative pressures on the foreign exchange market, which, *inter alia*, included : (i) a hike in the CRR from 10.0 per cent to 11.0 per cent, (ii) increase in repo rate from 5.0 per cent to 8.0 per cent, and (iii) withdrawal of the facility of rebooking of the cancelled contracts for imports and splitting forward and spot legs for a commitment. A significant contribution towards maintaining orderly exchange market conditions in this phase was made by the mobilisation of US $ 4.2 billion through Resurgent India Bonds (RIBs) that helped in an accretion of US $ 3.7 billion to the foreign exchange reserves. The rupee strengthened to Rs.42.55 per US dollar by end-August and further to Rs.42.49 per US dollar by end-September. The one-month forward premia declined to 7.42 per cent in September and to 4.96 per cent by December 1998.

5.30 Liquidity conditions tightened with the return of excess demand conditions in the foreign exchange market during May-June 1998, but eased after the Reserve Bank announced its intention to limit the impact of the large Government borrowing programme by accepting private placements of Government securities when bids were unreasonably high and releasing them to the foreign exchange market as and when liquidity conditions improved. RIBs also helped in reviving the market interest in the Government paper. Reflecting the changes in liquidity conditions, the Centre's monetised deficit followed an inverted U-curve, climbing from a surplus of Rs.4,740 crore as on April 24, 1998 to a peak of Rs.21,789 crore on July 10, 1998 and slipping thereafter to Rs.1,857 crore by end-September 1998. Five-year bond yield, which jumped by 60 basis points in May 1998, thereafter ruled steady in the band of 11.65 per cent to 11.86 per cent till September and 11.88 per cent to 11.94 per cent during October 1998 to February 1999 as the Reserve Bank continued to strategically subscribe to fresh Government securities (Rs.20,000 crore at face value) and later offloaded them through open market sales (Rs.11,437 crore, of which Rs.6,726 crore to commercial banks) in the last quarter of the year to modulate liquidity conditions. The measures announced on August 21, 1998, however, pushed up the call rates to above 8.0 per cent (the repo rate) from an average of 6.7 per cent during the first four months of the fiscal year.

5.31 March 1999 saw the revival in capital inflows with the Reserve Bank's NFA recording an accretion of Rs.8,008 crore (adjusted for revaluation). With the return of orderly conditions in the foreign exchange market, the Reserve Bank announced the reduction in the Bank Rate (by one percentage point to 8.0 per cent) and the repo rate (by 2 percentage points to 6.0 per cent) effective March 2, 1999 and lowered the reserve requirements (by 50 basis points each effective March 13, 1999 and May 8, 1999). The strategy of combining private placements/ devolvements of the Central Government securities and open market sales limited the interest rate impact of the large sized Government borrowing programme. The average inter-bank call rates ruled steady around the Bank Rate in April 1999 and May 1999.

5.32 The stock market, which began in 1998-99 on a promising note, turned bearish as a result of reversal of market optimism regarding the Budget, the imposition of economic sanctions, downgrading by international rating agencies, the difficulties faced by the UTI's US-64 Scheme and the crises surrounding the South-East Asian markets, Russia and Brazil. Cumulative investments by FIIs, which hit the peak of Rs.30,664 crore as at end-April 1998, declined by Rs.2,234 crore during May-October 1998. The BSE Sensex declined from the intra-year peak of 4,280 on April 21, 1998 to 2,764 as on October 16, 1998. The BSE Sensex recovered in the latter half of the 1998-99 to close the year at 3,739, driven by the US decision to ease sanctions, issuance of SEBI guidelines relating to buyback of shares, revival of FII buying interest and the positive reaction to the market-friendly Union Budget. FII investments recovered to Rs.29,689 crore as at end-March 1999.

Return to Stability in 1999-2000

5.33 The foreign exchange market witnessed a degree of volatility during end-May-June 1999 and August 1999. Effects of policy pronouncements backed by sale of foreign exchange of Rs.2,242 crore (adjusted for revaluation) were able to restore stability in the foreign exchange market. The Reserve Bank reiterated its policy of meeting temporary mismatches in the foreign exchange market, after the rupee depreciated to Rs.43.39 per US dollar by June 25, 1999, in order to restore orderly conditions in the foreign exchange market. As the demand supply gap widened in end-August 1999, the Reserve Bank indicated its readiness to meet fully/partly foreign exchange requirements on account of crude oil imports and the Government debt service payments. The Reserve Bank provided credit to commercial banks and PDs in order to pre-empt tightening of liquidity conditions, in the face of exchange rate volatility, with a view to boosting commercial credit off-take. The policy of combining incremental subscriptions to fresh Government securities (Rs.11,000 crore) with open market sales (Rs.11,683 crore) modulated monetary conditions. The average inter-bank call rates, however, firmed up to 10.3 per cent during August–October 1999. The turnover in the inter-bank and foreign exchange markets also declined substantially in September (Table 5.6). Capital flows revived after November 1999, resulting in excess supply conditions in the foreign exchange market, limiting the rupee to a narrow band around Rs.43.50 per US dollar while the one-month forward premia declined from 5.76 per cent in October 1999 to 3.31 per cent in February 2000. The Reserve Bank was, thus, able to build up reserves through net purchases from authorised dealers (Rs.8,365 crore) and simultaneously divest its net domestic assets through net open market sales amounting to Rs.8,088 crore between November-February 1999. The return of stability in the foreign exchange market allowed the Reserve Bank to further ease monetary conditions by releasing lendable resources of about Rs.10,000 crore through a one percentage point cut in the cash reserve ratio (as well as phasing of incremental CRR on FCNRB deposits *etc.*) during the fortnights ended November 19 and December 3, 1999. Monetary conditions improved further with the Reserve Bank announcing that scheduled commercial banks' cash in hand (Rs. 4,500 crore) would be eligible for CRR compliance in order to mitigate any possible difficulties that could have arisen on account of the Year 2000 transition. Further, with the return of orderly conditions in the foreign exchange market, the Reserve Bank withdrew the stipulation of a minimum interest rate of 20.0 per cent per annum on overdue export bills and the interest rate surcharge of 30.0 per cent on import finance imposed in January 1998. Money market conditions firmed up in February with the seasonal pickup in the demand for non-food credit.

Table 5.6 : Developments in the Money and Foreign Exchange Markets, 1999-2000

(Rupees Crore)

Month	Com-mercial Bank Borro-wings from the Reserve Bank	Average Daily Inter-bank Foreign Exchange Turnover (US $ Million)	Turn-over in Central Govt. Dated Secu-rities mar-kets	FEDAI Indi-cative Rate (Rupees per US $)	Net foreign currency Sale (-)/ Purchase (+) (US $ million)	OMO Sale (-)/ Pur-chase (+)	Average Repos	Liquidity Support to PDs	Average Daily Call/ Notice Turn-over	Average Call Rates (per cent)	Forward premia 1-month (Per cent per annum)
1	2	3	4	5	6	7	8	9	10	11	12
1999											
April	5,221	3,974	57,949	42.7250	38	-7,021	1,629	1,882	31,699	8.27	5.67
May	4,960	3,561	64,699	42.7712	975	-7,832	13	4,688	29,915	8.94	4.70
June	3,863	3,429	50,079	43.1355	-157	-3,785	0	4,633	29,445	8.27	4.54
July	2,761	3,666	63,928	43.2850	-363	-8	0	3,650	34,394	8.37	3.99
August	2,771	3,753	78,500	43.4594	-242	-4,841	5	5,394	31,586	9.67	4.68
September	4,204	3,103	41,635	43.5349	-526	-1,187	0	5,498	31,386	9.90	5.33
October	7,342	3,546	51,313	43.4493	-10	-56	25	3,793	33,399	11.26	5.76
November	3,795	3,345	79,810	43.3968	621	-3,500	0	2,009	36,377	8.20	3.89
December	2,553	2,765	72,552	43.4850	351	0	672	1,050	37,482	7.89	3.39
2000											
January	4,448	3,673	85,615	43.5500	170	-70	502	1,824	35,939	8.03	3.11
February	7,451	4,460	1,18,636	43.6136	744	-7,136	0	5,352	36,232	10.63	3.31
March	6,491	4,280	45,857	43.5862	1,648	-9	0	1,877	42,244	9.68	4.56

5.34   In March 2000, large-scale capital inflows continued, resulting in an accretion of Rs.10,926 crore (adjusted for revaluation) to the Reserve Bank's foreign currency assets. This, in turn, helped to mitigate the pressure on money market created by seasonal credit demand. The Reserve Bank's incremental credit to commercial banks and PDs (Rs.4,034 crore) offset the decline in the Centre's monetised deficit arising essentially on account of advance tax payments. This enabled the Reserve Bank to further ease monetary conditions in April 2000.

5.35   The yield curve witnessed a higher volatility. It shifted downwards with relative steepness at the lower end of the maturity spectrum, reversed and moved northward in subsequent months up to the mid-financial year on account of the monetary policy measures initiated to overcome excess volatility in the foreign exchange market.

5.36   The stock market began 1999-2000 on a subdued note on account of domestic uncertainties but firmed up after September 1999, driven mainly by FII inflows and signs of industrial recovery, the formation of a new government at the Centre, upgrading of India's

international ratings from stable to positive by international credit rating agencies and favourable expectations from information technology stocks. The BSE Sensex crossed the 5,000 mark on October 8, 1999 and the 6,000 mark in the intra-day trading on February 11, 2000. FII investments increased by Rs.2,835 crore in February 2000.

5.37   A disconcerting feature of trading on the Indian stock exchanges in the recent times has been the emergence of intra-day volatility measured as the difference between high and low during the day. During 1999-2000, on 23 occasions, intra-day variation ranged between 200-300 points and exceeded 300 points on 8 occasions (Table 5.7). This level of intra-day volatility is quite high when compared with the previous years. In 1999-2000, stock market volatility could also be attributed to international capital market trends, especially the NASDAQ. This is evident from the fact that the co-efficient of correlation between the BSE Sensex and the NASDAQ Composite Index worked out to as high as 0.79 during 1999-2000, while for earlier years, the correlation co-efficient ranged between 0.21 and - 0.26.

Table 5.7: Intra-day Volatility in BSE Sensex

Year	Less than 100 points	100-200 points	200-300 points	Over 300 Points	Trading Days
1	2	3	4	5	6
1994-95	304	1	-	-	305
1995-96	291	5	-	-	296
1996-97	256	37	3	1	297
1997-98	269	25	2-5	-	294
1998-99	201	39	2	-	242
1999-2000	139	84	23	8	254

Table 5.8: Correlation Coefficients Among Major Financial Market Rates (March 1993 to March 2000)

	SENSEX	CALL	CD	TB91	3MFP	6MFP
1	2	3	4	5	6	7
SENSEX	1.000					
CALL	-0.113	1.000				
CD	-0.418	0.367	1.000			
TB91	0.011	0.239	0.007	1.000		
3MFP	-0.320	0.675	0.682	0.038	1.000	
6MFP	-0.348	0.606	0.733	0.017	0.984	1.000

5.38   Domestic market integration is an important aspect of overall financial integration. The macroeconomic impact of international financial integration depends on the extent to which domestic financial markets are integrated. Integration of domestic financial markets has many aspects. On the one hand, there is an issue of integration within the markets. There is also a question as to how well the deposit and lending rates are integrated with the money market. Besides, there is also an issue as to how the transmission takes place from capital markets to money markets and *vice versa*. An empirical exercise made in this regard for the period March 1993 through March 2000 (monthly series) shows that while call rates, CD rates and forward premia were found to be highly correlated, the co-movements in respect of other interest rates and returns were weak (Table 5.8).

5.39   To a large extent, domestic financial integration can be gauged by the integration of the term structure of interest rates (Box V.1). The application of term structure in the conduct of monetary policy in India is, however, constrained by the absence of a well defined yield curve. An assessment of the transmission link from the policy interest rates to other interest rates in the financial system is critical for the effective conduct of monetary policy in a market economy. While studying the dynamics of monetary policy shocks and their impact on the financial markets in India, Joshi and Bhattacharya (2000)[4] found evidence supporting integration of the financial markets.

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[4]   Joshi, Himanshu and Kaushik Bhattacharya (2000), "Liquidity, Monetary Policy Shocks and Financial Markets in India: A VAR Model"; Paper presented on December 31, 2000 at the Joint Statistical Meeting of International Indian Statistical Association and other Statistical Associations at New Delhi.

Their results showed that the Bank Rate has emerged as a more effective instrument of policy in terms of its impact on the financial markets in relation to other instruments, such as, the CRR or the balance sheet operations of the Reserve Bank involving changes in reserve money.

International Trade and International Financial Integration

Parity Conditions

5.40   Merchandise trade liberalisation in India which began in the 'eighties, gathered further momentum in the 'nineties. It has been reflected in the lowering of tariff and non-tariff barriers and in removal of restrictions on current account transactions. Cross-border trade in financial instruments has also increased over the last decade, due largely to phased liberalisation of capital account transactions. The growing cross-border trade and financial integration is commonly studied through the parity conditions (Box V.2).

5.41   Based on the behaviour of Real Effective Exchange Rate (REER) alone, it may be difficult to assess whether a country's exchange rate is misaligned. REER, nonetheless, is an important parameter, especially when considered along with a set of fundamental determinants. In the absence of any widely acceptable leading indicator of misalignment, REER has generally been used by policy makers and the market participants, despite its known limitations. Given the difficult choice of an equilibrium base, if one considers the average of REER (36-country, trade based) for the 'nineties for evaluating its temporal behaviour, it appears that the REER series is mean reverting (Chart V. 4). Both Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) test statistics suggest the series to be stationary [ADF

Box V.1
The Term Structure of Interest Rates

The term structure of interest rates is the relationship between interest rates and term to maturity. However, financial instruments differ not only in terms of their maturity characteristic, but also other characteristics, most notably the risk. Therefore, the term structure is best estimated through yields on the default risk free government securities. A yield curve that charts yield-to-maturity (YTM) for Treasury securities (on the vertical axis) of various maturities (on the horizontal axis) as of a particular date captures the term structure. The yield curve changes from day to day as the YTM changes. While yields on other money market instruments, such as those on commercial papers of varying maturity could also be considered for the term structure, the risk element in these instruments would need to be considered. Yield curves, today, are popularly estimated in parametric forms using the methodology of Nelson and Siegel (1987) or its extension by Svensson (1994).

Three alternative paradigms are usually used to explain the term structure of interest rates. The unbiased expectations theory (or the pure expectations theory) suggests that the expected future spot rate equals the forward rate. If, say, current economic conditions (say rise in current inflation or a speculative pressure on domestic currency) make short-term spot rates high, then the term structure represented by the yield curve should turn downward sloping in accordance with the expectations theory.

The liquidity preference theory is based on the premise that investors prefer short-term securities because of the interest rate risk or because the investors fear that if needed, they may not be able to realise their funds earlier than anticipated because of liquidity problems. Investors, therefore, prefer short-term securities and try to roll over these securities. Rollovers, however, involve transaction costs. The investors, therefore, evaluate the expected returns from holding long-term bonds and compare them with those on the short-term bonds. They generally tend to charge a liquidity premium for holding long-term bonds, which is the difference between the forward rate and the expected future spot rate. In this case downward sloping yield curves would occur only when the market expectations are that interest rates would decline substantially. A flat term structure in itself indicates that interest rates are expected to decline somewhat. The upward sloping yield curve would indicate an expected rise or fall in interest rates depending upon the steepness of the slope. Steeper the slope, more likely is that market expects interest rates to rise in future.

Another alternative explanation for observed term structure is provided by the market segmentation theory. It points to institutional and legal constraints that often exist in markets so that some investors and borrowers are restricted to certain maturities alone. Psychological factors, customs and habits may also restrict them from investing only in certain classes of maturities. For example, pension and insurance funds generally prefer longer maturity debt instruments in relation to banks and other financial institutions. Besides, trading restrictions, lack of instruments and institutional structures may also result in the term structure getting disjointed. It is possible that the short-end, the long-end and the intermediate-term of the markets may be segmented. With spot rates in each of these segments getting determined by respective demand and supply conditions, the yields in each

segment may remain misaligned. The yield curve could be upward or downward sloping depending upon whether the intersection of short-end demand and supply curves are lower or higher than that for the long-end.

The term structure or the yield curves have considerable information content. They could be used to value a wide range of fixed income instruments, including coupon paying bonds, interest rate forwards and swaps and other derivative instruments. The coupon paying bonds, for example, can be stripped into zero coupon instruments corresponding to various cash flows, with the redemption amount getting added to the terminal coupon. The underlying price of this fixed income security can then be calculated as the net present value of the stream of all these cash flows using this zero coupon yield curve. In practice, however, yields of various securities of various maturities are affected by several factors, other than coupon rates and maturity period. The risk factor, marketability and tax rates are important considerations in pricing that a yield curve may not easily capture.

The term structure also has information content on future inflation and future real economic activity. The value of this information content to a large extent depends upon the stability and predictability of the yield curve with respect to non-financial activity. The information content in the yield curve depends largely on the Fisher equation and the expectations theory of the yield curve. Fisher equation decomposes one period nominal interest rate roughly into one period *ex ante* real interest rate and the one period ahead expected inflation. Combining this with expectations theory, the YTM could be explained by the expected real interest rate and the expected inflation. Following liquidity preference theory, a risk premium could be added to the two expected variables determining YTM if investors are believed to charge the same for holding the bond of a certain maturity. Under the expectations theory, however, the risk premium is constant for all maturities. The yield spread or the slope of the yield curve provides information on expected real interest rate spread and on market's inflation expectations. The yield curve provides the best measure of market's expected inflation path if expectations are formed rationally, risk premium is constant over time and the real term structure is flat denoting constant expected real interest rate for all maturities. If prices are fixed, nominal yield spreads capture the expectations regarding the future real economic activity. However, in practice, the information content of the yield spread for the future real economic activity depends on the nature of macroeconomic shocks. If the shocks are largely of a monetary nature, a positive yield spread could indicate expectations of an economic slowdown. If shocks are real and price rigidities exist, a positive yield spread could indicate a future economic upswing.

In India, the predictive power of the yield curve is yet to be established. The term structure was largely segmented and though a great deal of integration has taken place over the last few years, yields of various maturities are still not perfectly correlated with one another or with the movements in expected inflation. As a result, the predictive power of the yield spread is curtailed by the noise in the forecasts. Nag and Ghose (2000) find that the term structure is segmented,

(Contd...)

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with liquidity considerations affecting the short-end and expectations dominating the long-end of the market and interpret that the yield curve movements during 1996-99 were subject to the segmentation. The growing integration of the term structure is, however, reflected in the co movement of interest rates. The correlation coefficients among the set of interest rates is positive (Report on Currency and Finance, 1998-99). For the banking sector, the short-term deposit rates, long-term deposit rates and the prime lending rates have shown strong co-movement with the Bank Rate in the recent years (Chart.III.4, RBI Annual Report, 1998-99). More importantly, the inter-linkages across the term structure for gilts in India is reflected in cointegration between call money rates and cut off yield on short term 91 day T-bills, medium term 364 days T-bills and redemption yield on long-term Government of India securities (Joshi, 1998). However, as unique common stochastic trend is not observed in this set, the complete integration of the term structure or the efficiency of trading across maturities is still to evolve. As such, it is difficult to identify a reference rate that could be used as a policy instrument to guide the course of the entire term structure. Bhoi and Dhal (1998), on the other hand, observe that the cut off yield on 91 day T-bills could qualify as a reference rate for India among the set of other available rate variables. They find that excluding call money rates and return on equity, all other interest rates exhibited co-movement with the 91 days Treasury bills. It is possible that with further widening and deepening of the gilt market, a smooth yield curve may emerge in the years ahead. The term structure ranging from the overnight call rate to the long-end may get aligned, so that the central bank can more effectively operate at the short-end for its monetary policy objectives. The yield curve could then have a considerable predictive power.

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(with 4 lags) = -3.15 and PP of REER (with 4 lags) = - 3.09]. The mean reverting pattern of the REER in India – symbolic of the validation of PPP – suggests that institutional and behavioural factors may be helping in the correction of the exchange rate. However, deviations from the mean could be a poor representation of the equilibrium exchange rate and the authorities consider a wide set of parameters that include the underlying demand-supply conditions and the shifting leads and lags in the forex markets.

5.42　In Chart V.5, the behaviour of REER is plotted against NEER and Effective Relative Prices (ERP) - with ERP representing REER/NEER (scaled to January 1990=100). It shows that the continuous positive inflation differentials as reflected in the behaviour of ERP have been corrected through periodic depreciation of the NEER and, as a result, significant misalignment of the exchange rate in terms of deviation of REER from PPP has been avoided.

5.43　In the context of empirical tests of interest parity conditions, it is important to note the constraint posed by the underlying assumptions of rational expectations and risk neutrality. When investors are risk averse, expected returns on different instruments would depend not only on the parity conditions but also on the risk premiums. In the presence of time varying risk premia, the complexities relating to identification of the sources of risk and the measurement of risk greatly complicate the empirical testing of parity conditions. In the Indian context, Chart V.6 shows that the 3-month forward premia do not exhibit any strong co-movement with the interest rate differentials (*i.e.*, cut off yield on 3-month Treasury bills in rupees minus the yield on 3-month US Treasury bills). The difference between the two series could be an indication of the time varying

Chart V.4 : Real Effective Exchange Rate (36 Country Trade Weights)
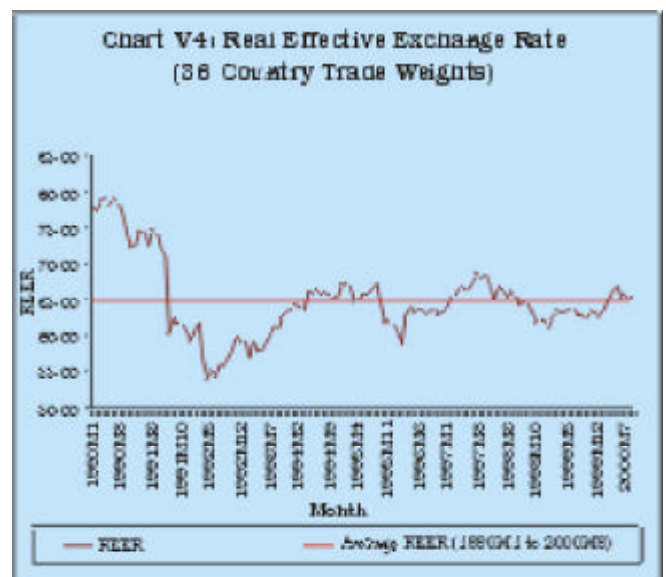
Box V.2

Parity Conditions in International Finance

At the cornerstone of the international finance relations lie the Purchasing Power Parity (PPP) doctrine and the three international interest parity conditions, *viz.*, the Covered Interest Parity (CIP), the Uncovered Interest Parity (UIP) and the Real Interest Parity (RIP). These parity conditions indicate the degree of market integration of the domestic economy with the rest of the world.

Purchasing Power Parity (PPP)

According to the PPP, in the absence of restrictions on cross border movements of goods and services and assuming no transactions costs, commodity prices expressed in any single currency should be the same all over the world. In other words, the path of the nominal exchange rate should be guided by the developments in the domestic prices of goods and services *vis-à-vis* prices of the major trading partners. The behaviour of the Real Effective Exchange Rate (REER) could, therefore, indicate whether the nominal exchange rate moves as per the principle of PPP.

The simplest approach to test PPP is just a test of stationarity of the REER; *i.e.,* to see whether deviations from the PPP are temporary and whether over time the REER reverts to some mean or equilibrium.

The standard alternative framework is to study the existence of a co-integrating relationship between the nominal exchange rate and relative prices.

Covered Interest Parity (CIP)

If markets are efficient, one would expect that rates of return on homogenous financial instruments that are denominated in same currency, but traded domestically or offshore must be equal, provided exchange controls do not exist and country risk premia are the same in the two markets. The CIP implies that yield on foreign investment that is covered in forward markets equal the yield on domestic investment. The interest differential is offset by premium or discount on the forward rate. If closed interest parity holds, CIP will also hold when the difference between the rates of return on instruments which are identical except for their currency of denomination, equal the forward discount on home currency. Therefore, for CIP to hold, the covered interest differential must be zero. If assets denominated in home and foreign currencies are fully comparable in all respects, the absence of covered interest differential indicates that there are some impediments to trade them. This lack of financial integration may be on account of exchange rate and interest rate regulations or several other reasons such as transaction costs, market liquidity conditions, margin requirements, taxation and market entry-exit conditions. A positive covered interest differential typically indicates domestic controls on capital outflows. A negative covered interest differential on the other hand typically indicates domestic controls on capital inflows.

Uncovered Interest Rate Parity (UIP)

The UIP implies that *ex-ante*, expected home currency returns on foreign bonds or deposits in excess of domestic deposits of equal maturity and default risk should be zero. The currency composition of the asset holdings is, therefore, irrelevant in determining relative returns. The prevalence of UIP also implies that the cost of financing for domestic firms in domestic and foreign markets would be the same. Operating through rational expectations, UIP suggests that expected changes in the nominal exchange rates should approximate the interest rate differentials. If CIP holds, UIP will also hold if investors are risk-neutral and form their expectations rationally, so that expected depreciation of home

currency equals the forward discount.

The expected spot rate depreciation is not directly observable unless expectations survey data is available, but may be proxied by some expectation scheme. Biases are introduced whether forward discount is measured by survey data or by some expectation scheme. While measuring UIP, the risk premia need to be modelled more explicitly taking into account the time varying nature of the risk premia.

Real Interest Rate Parity (RIP)

The RIP is a condition for complete financial market integration. It implies real interest rates are equalised at home and abroad. In other words, the firms in home country and the firms abroad, both face same real costs of financing. By assuming cross border equality of real interest rates as the result of perfect asset substitutability and open capital accounts, RIP suggests that nominal interest rate changes reflect essentially revisions in inflation expectations (*i.e.,* prices of goods and services). According to this condition, lower interest rate regime created through easy monetary policy stance can not be sustained because higher inflation expectations, given the constant real interest rate, would eventually give rise to higher nominal interest rates. When commodity prices are highly flexible, easy monetary conditions would be translated into higher prices quickly and as a result, nominal interest rates may actually increase following monetary easing.

Assuming market efficiency and constant real interest rates, Fisher's RIP suggests that nominal exchange rate changes essentially reflect revisions in inflation expectations. In other words, nominal interest rates and expected inflation must exhibit a strong positive co-movement. The existence of two parity conditions, *viz.*, PPP and UIP automatically imply that RIP would hold.

Indian Evidence

Empirical estimates of parity conditions are plagued with theoretical and econometric difficulties that make conclusions difficult even in the case of well developed markets. Differences in estimates arise primarily from the model specifications, choice of techniques and of sample periods over which the models are estimated. Theoretical difficulties arise from existence of trade restrictions, transport and transaction costs, as also from consumption and interest rate smoothing behaviour. In practice, persistent swings in real exchange rate are observed. However, large orders of deviations get corrected over time, whether through market forces or through policy induced adjustments and therefore, PPP is generally believed to hold in the long-run. The speed of convergence, however, is empirically seen to be slow and generally takes several years. For India, Pattanaik (1999) finds that PPP holds in the long run in terms of the presence of a co-integrated relationship between exchange rate and relative prices and the misalignment at any point of time is corrected by 7.7 percent per quarter through nominal exchange rate adjustments. Bhoi and Dhal (1998) tested for the relevance of UIP and CIP and concluded that neither holds.

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Chart V5: REER, NEER and ERP
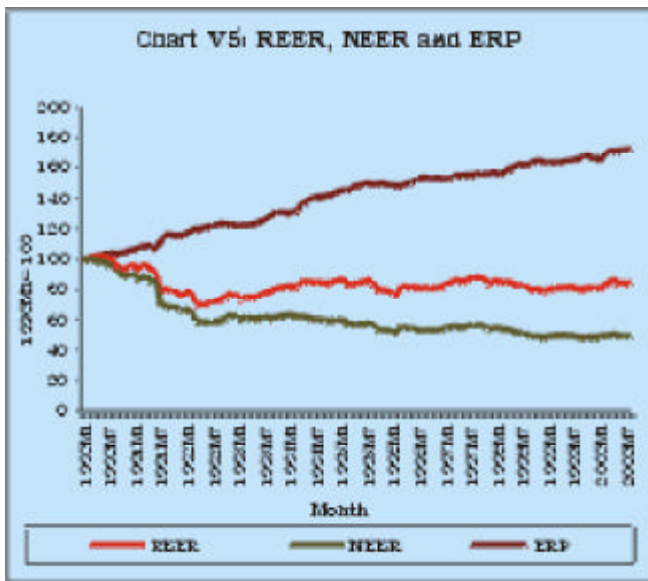
nature of the risk premia. Furthermore, the deviation of the forward premia from the interest parity condition appears to increase during volatile conditions in the spot segment of the foreign exchange market.

5.44 In India, forward premia often get influenced by the demand and supply conditions for forward cover. As could be observed from Chart V.7, the forward segment of the forex market exhibited an excess demand condition in most part of the period between April 1997 to July 2000. Excess demand represents the gap between purchase and sale turnover in the forward segment of the forex market and includes both merchant and inter-bank transactions. In the

Chart V6: Interest Parity
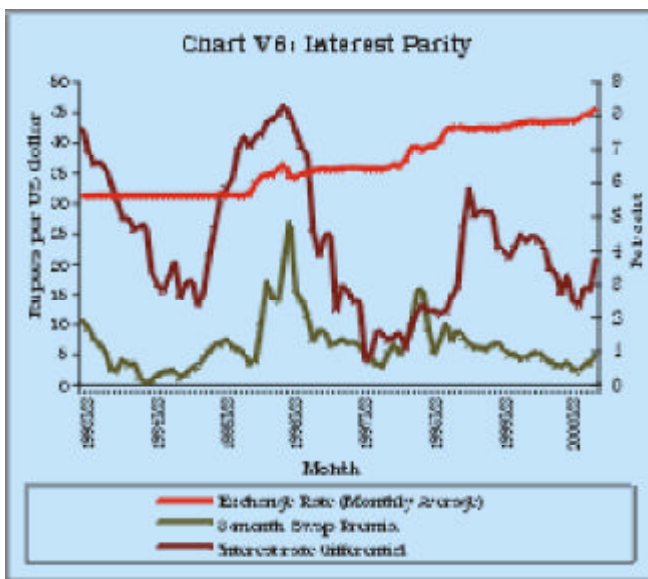
recent period, however, it appears that swap premia follow the interest parity condition more closely than before.

5.45 When the interest rate differentials based on the monthly average call money rates in both Indian and the US markets are considered, 1-month swap premia seem to exhibit a relatively stronger linkage with the interest rate differentials (Chart V.8). The relationship improves further, when the more realistic interest rate scenario in terms of the difference between CP rates in India (both high and low during a month) and the corresponding three months US dollar LIBOR rates is considered for interest parity assessments (Chart V.9).

Chart V7: Demand-Supply Mismatch and Swap Premia
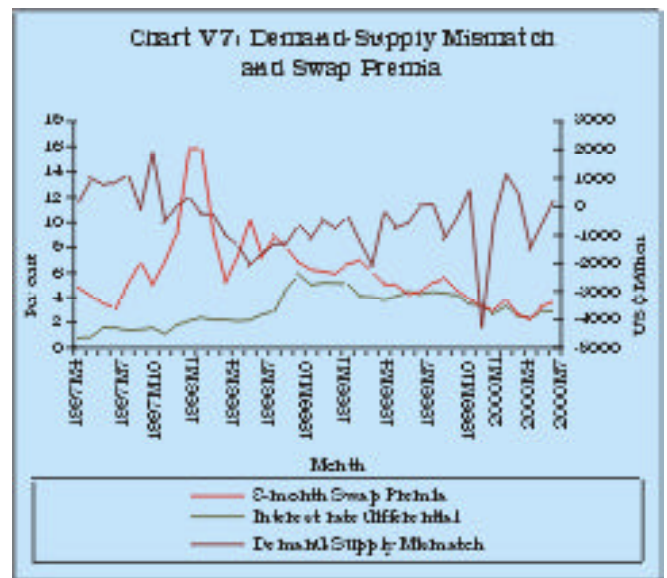
5.46 Deviations from the interest parity in India could be the result of a combination of factors. Changes in interest rates could influence the exchange rate by altering the monetary conditions, capital flows and market expectations. According to the condition of Uncovered Interest Parity (UIP), any increase in interest rate differential in favour of one country should create expectations for the currency of that country to depreciate so that return on assets denominated in different currencies are equalised. In terms of the monetary approach to exchange rate also, an increase in the interest rate in one country in relation to another would give rise to a money stock disequilibrium (with demand for money declining in relation to supply) and as a result of the associated increase in the external overall balance deficit, the currency would depreciate. In flow terms, however, higher

Chart V8: Interest Rate Differentials and 1-month Swap Premia

Chart V9: Covered Interest Parity
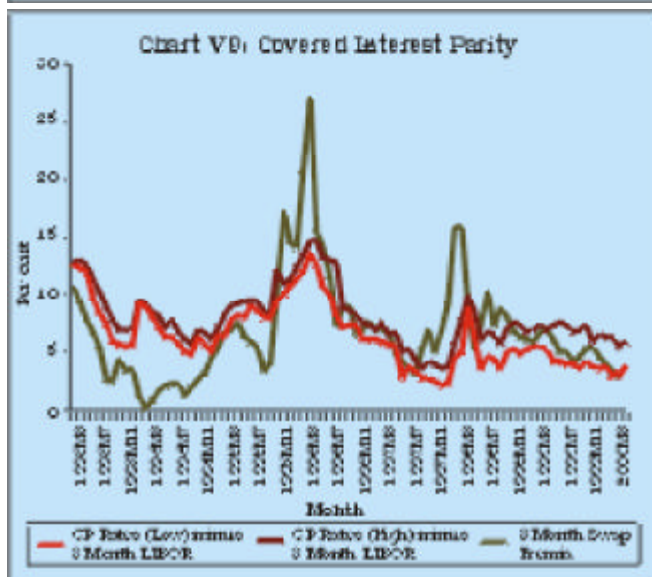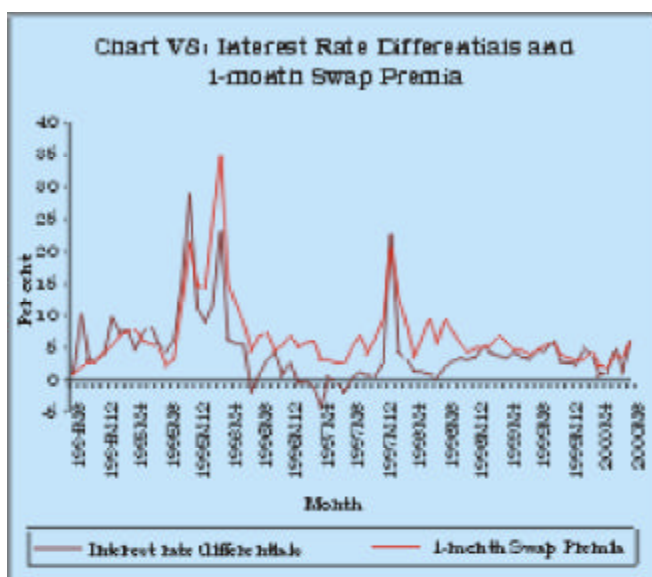
interest rates could attract higher capital inflows, causing thereby the exchange rate to appreciate. An appreciated exchange rate and the resultant deterioration in the current account deficit would eventually result in a downward adjustment of the domestic currency. But if the surges in private capital inflows persist and meet the widening financing gap in the current account, then the eventual depreciation may come with a much longer time lag. It is possible that the depreciation may come with a much higher time lag than what the condition of UIP would suggest. Hence, even though the most conventional reason cited for explaining the deviations from UIP is the presence of time-varying risk premia (*i.e.,* investors are not risk neutral and rational), the pattern of capital flows and the monetary transmission process in

a country could also give rise to deviations from the condition of UIP. There is also a possibility of one-time readjustment of portfolios in response to any change in the interest rate in any country. But this new equilibrium may not eliminate interest rate differentials because the objective of the investors may be to hold a diversified portfolio so as to minimise the unsystematic risks. When risk minimisation through diversification is the objective, deviations from interest parity could persist.

5.47   Market imperfections, particularly the absence of comparable homogenous assets, also have a bearing on the parity conditions. Furthermore, as a conscious policy to avoid excessive short-term debt, India has been cautious in respect of short-term capital flows and has allowed inflows of longer maturity with more readiness. Since shorter-term flows could be more responsive to parity conditions, deviations from parity conditions could be seen as an outcome of the short-horizon for the parity conditions to be realised. For longer term interest rates, detailed analysis of parity conditions is difficult on account of the non-availability of forward rates for longer maturities and reliable estimates of expected inflation beyond the short period.

5.48   In the presence of unlimited supply of arbitrage capital with no restrictions on cross-border movement of capital, however, the parity conditions must hold. Capital controls check the flow of arbitraged capital and as a result deviations from parity stem from (a) the inability of residents to purchase foreign currencies for overseas investments to take advantage of favourable interest rate differentials, whether covered or uncovered, (b) limits on the non-residents to borrow domestic currencies, and (c) inability of the residents to switch between domestic and foreign currency deposits, even with their own domestic banking system. In India, forward market participation is permitted essentially to agents with underlying transactions. For the permitted transactions, therefore, considerable freedom exists for arbitraging. However, the Reserve Bank has been placing considerable emphasis on market regulation to prevent undue speculation as the forex market lacks adequate depth and efficiency. In these circumstances, permission for speculative positions could drive the markets purely by expectations and frequently give rise to rates that do not reflect the underlying fundamentals. Hence,

a cautious approach to exchange market reforms is essential for an emerging market economy like India.
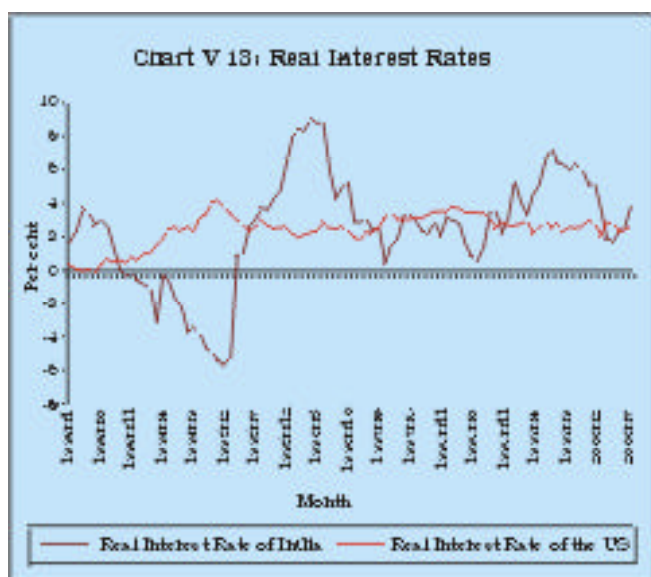
5.49 Unlike the parity conditions which use nominal interest rates, real interest parity requires a deeper integration because over and above the condition of UIP, the expected changes in exchange rates should also equal anticipated inflation differentials. Even in the matured market economies, the conditions of UIP and PPP do not hold and, as a result, one could see persistent and significant differentials in real interest rates the world over. Empirically, the *ex-post* real interest rate represents simply the difference between nominal interest rate and the rate of inflation and *ex ante* real rate is estimated by deducting expected inflation from the nominal interest rate.[5] In India, as could be seen from Chart V.10, the monthly average nominal call rates have been much more volatile than the domestic inflation and the difference between the two series does not point towards any possibility of a constant real rate for India. Instead of average call rates, if one considers the more stable 91-day Treasury bill rates (Chart V.11) or the bank deposit rates of 1 to 3 years maturity (Chart V.12), then the proxy for real interest rate appears to be less volatile. The *ex-post* monthly real interest rates for India and the US (estimated as the difference between inflation and 3-month Treasury bill rate) show that while the real rates in the US were fairly stable for most part of the 'nineties, the variability of the real rates for India was relatively large. During periods of high inflation, real rates were even negative in India (Chart V.13). Absence of real interest parity in India is not an aberration because even in many matured markets this condition may not hold.

Trade Openness

5.50 Openness of an economy relates to its cross-border movements of goods, services and factors of production, particularly capital and labour. While parity conditions reflect the degree of integration between domestic and offshore

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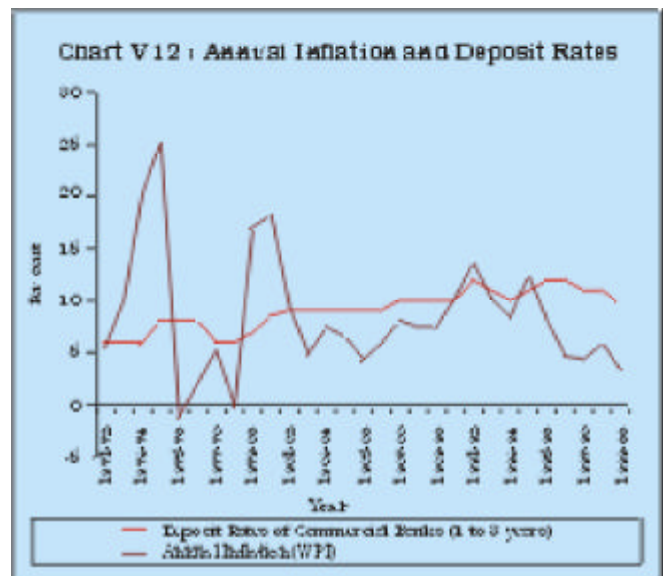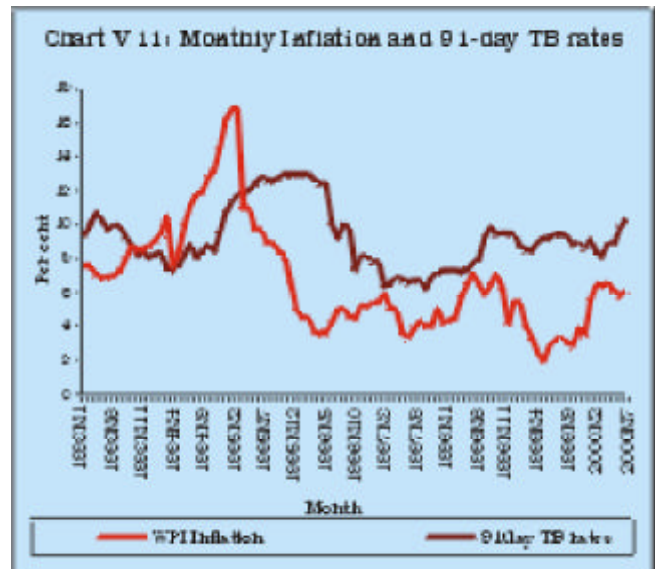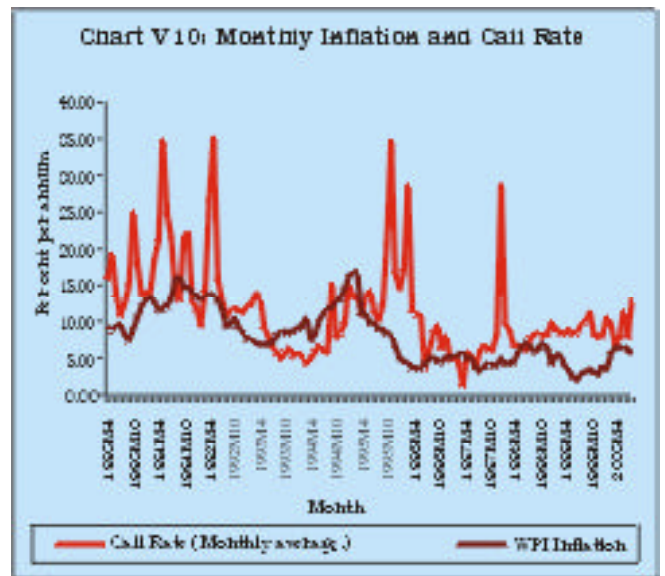
[5] For example, Begum (1988) estimated expected inflation by using ARIMA (4,1) model. The difference between *ex-post* and *ex-ante* inflation is generally the forecast error and under rational expectations, the forecast error should be white noise. See Begum, J. (1998), "Correlations Between Real Interest Rate and Output in a Dynamic International Model: Evidence from G-7 Countries", *IMF Working Paper,* No. 179, December

Chart V.10: Monthly Inflation and Call Rate

Chart V.11: Monthly Inflation and 91-day TB rates

Chart V.12 : Annual Inflation and Deposit Rates

Chart V 13: Real Interest Rates

financial markets, they have some limitations. Alternative measures for openness have also been proposed that focuss more on trade integration (Box V.3). Historically, the approaches of different countries as well as separate regimes within the same country towards openness have varied widely. Trade openness of an economy has two distinct but often interrelated dimensions, *i.e., ex ante* openness and *ex post* openness. *Ex ante* openness of trade of an economy relates to the orientation of its policy frameworks towards exports and imports. The levels of tariff and non-tariff measures applied by the country on cross-border trade flows are the most important indicators of *ex ante* trade openness of the economy. *Ex post* trade openness of an economy, on the other hand, refers to the actual levels of imports and exports in relation to domestic economic activities. At any point of time, high (low) levels of *ex ante* openness may co-exist with low (high) levels of *ex post* trade openness. A major problem in the analysis of trade openness is that openness is neither directly observable nor is strictly defined. The simplest measures of trade orientation, therefore, use the actual trade flows, such as, the share of trade (imports plus exports) in GDP or the growth rates of imports and exports.

5.51   Notwithstanding the limitation that these simple versions could be imperfect proxies, they could still be useful to interpret a country's openness based on such *ex-post* indicators. In doing so, however, it would be useful to consider different variants of such indicators. Although foreign trade relates to both goods and services,

customarily trade in goods alone is used in the calculation of trade-GDP ratio. In the case of India, the trade-GDP ratio showed a decline in India's trade openness in most part of the 'eighties. After showing a rising trend from 1987-88 to1995-96, the ratio exhibited a somewhat declining pattern thereafter (Chart V.14). This could, however, provide somewhat distorted picture of India's trade openness, with the problems emanating from both the denominator and the numerator of the ratio. The 'services' sector, which accounts for bulk of India's GDP, recorded a high rate of growth during the period of trade liberalisation. The share of the 'services' sector in GDP, which was around 40 per cent in 1980-81 rose to nearly 52 per cent in 1998-99. On the numerator side, petroleum crude and products account for a sizable portion of India's foreign trade. International prices and the behaviour of domestic consumption and production shape their trends (especially of the oil imports), and they have little to do with the policies of trade openness.

5.52   Two alternative measures that could take care of the problem of high growth of services sector component of GDP would be: (i) the ratio of total (merchandise plus services) trade to GDP, and (ii) the ratio of merchandise trade to GDP net of services (hereafter referred to as commodity sector GDP). The first measure is provided, based on the Reserve Bank's Balance of Payments data, while the second measure is based on trade data from the DGCI&S.

5.53   The ratio of total trade to GDP shows almost a continuously increasing trend since

Chart V 14: Ratio of Merchandise Trade to GDP
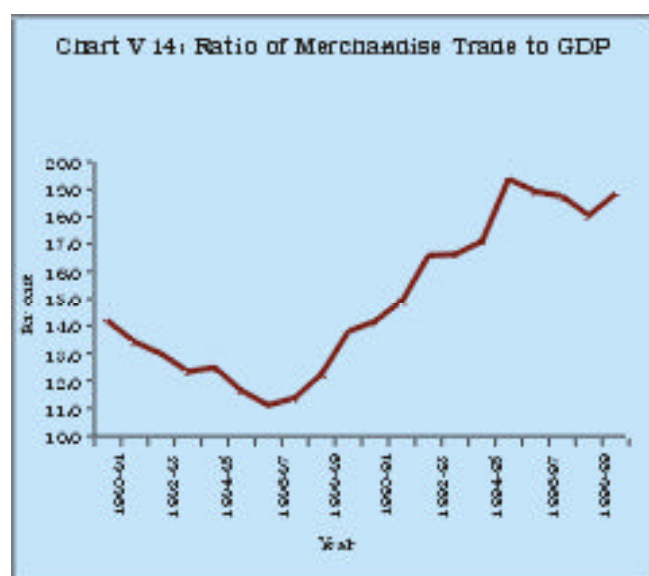
Box V.3
Alternative Indicators of Openness

The condition of Purchasing Power Parity (PPP) is often viewed as an indicator of integration of cross border market for goods and services. Deviations from PPP could result not only due to the presence of tariff and non-tariff barriers but also on account of transportation costs, choice of exchange rate regimes, pricing to market behaviour and productivity differentials. Alternative indicators of a country's integration with the rest of the world would, therefore, be useful. Conventionally, exports or total trade as percentage of GDP is used as a convenient indicator of openness. But this indicator does not reveal the degree and nature of restrictions prevailing in a country that could constrain complete cross-border integration. In the 1990s, alternative indicators of openness have been proposed by Dollar (1992) and Sachs and Warner (1995) and have been used in several empirical analyses, particularly to study whether more open economies converge faster. Dollar constructed two indices of outward orientation, *viz.,* "index of real exchange rate distortion" and "index of real exchange rate variability". Each of these two indicators, however, showed negative correlation with economic growth. Sachs and Warner's approach tries to avoid the measurement problem associated with constructing an index of openness by introducing a dummy variable that captures several possible aspects of trade policy. The dummy is assigned a value of zero (*i.e.,* less open or closed) for any one of the following eventualities : (a) average tariff rates exceeding 40 per cent, (b) non-tariff barriers covered more than 40 per cent of total imports, (c) a socialistic economic system, (d) state monopoly on majority of exports, and (e) black market premium exceeds by 20 per cent in relation to the official exchange rate. In their empirical analysis of the relationship between openness and growth convergence, the openness dummy coefficient was estimated to be 2.44, indicating that countries which were open as per the above five norms experienced on average growth at 2.5 percentage points higher than the rest. The growing international perception that greater trade openness leads to growth convergence has motivated experimentations with alternative plausible indicators of openness. Edwards (1998) considered nine different indicators of openness, five of which showed statistically significant positive association with growth. Given the rising empirical interest in the indirect approach to study the impact of openness, Barro and Sala-i-Martin (1992) propounded the concepts of b and s convergence. According to b convergence, a country could grow faster when it opens up, if its initial income level was low. According to s convergence, the income disparity across open economies would decline over time.

As regards indicators of openness to cross-border capital flows, besides the law of one price which suggests that identical assets should yield same return everywhere, saving-investment correlation, cross-country consumption linkages,

and deviations of actual from optimally diversified portfolios represent the standard measures of integration. Retention of capital controls, particularly on outflows from India and constant monitoring of the current account deficit complicate the assessment of integration using the standard frameworks for India. Even in countries where capital is freely mobile and the authorities do not operate with any current account level as an intermediate policy target, conventional indicators of integration may fail to establish integration. Home bias of investors in many developed countries prevents diversification of portfolios on a global scale and, therefore, comparing actually held portfolio against an optimally diversified portfolio occasionally shows considerable deviations. Similarly, for testing the law of one price one requires identical or homogenous assets denominated in different currencies. In reality, this may be extremely difficult. Return differences, therefore, could actually reflect specific risk features of the assets (like default or liquidity risk) rather than the presence of unexploited arbitrage opportunities due to restrictions on capital transactions. The cross-country consumption linkage assumes that with greater capital integration idiosyncratic risks can be better diversified and managed, inducing smoother consumption behaviour among investors. In other words, in an integrated capital market, the volatility of consumption can be expected to decline whereas the volatility of investment could increase. The impact of any shock is assumed to affect investment demand more than consumption demand. Smoother consumption with more volatile investment may actually be one of the many possible implications of capital mobility and not a test of capital market integration. Despite the empirical limitations, co-movement of international stock prices and increasing convergence of the real interest rates across developed countries indicate that greater capital integration has been an integral element of the ongoing process of globalisation.

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1987-88 (Chart V.15). It is important to note that the ratio increased sharply from 16.5 per cent in 1986-87 to nearly 30.3 per cent in 1996-97 (according to the old series of GDP with base 1980-81). The ratio also showed a similar pattern when computed using the revised GDP series with 1993-94 as the base. It rose from 23.9 per cent in 1993-94 to 29.8 per cent in 1999-2000, while the

conventional (merchandise) trade-GDP ratio increased only marginally from 16.6 per cent to 18.8 per cent during the same period.

5.54 The ratio of merchandise trade to commodity sector GDP rose from 23.1 per cent in 1986-87 to nearly 44 per cent in 1996-97 (1980-81 series of GDP). This ratio (with revised GDP

series) rose from 36.6 per cent in 1993-94 to 44 per cent in 1995-96, before declining to 40.7 per cent in 1996-97 (Chart V.16). Excluding exports and imports of petroleum crude and products, the ratios of total trade to GDP and merchandise trade to commodity sector GDP showed that the trade openness of the Indian economy started increasing from 1984-85 (Charts V.17 and V.18).
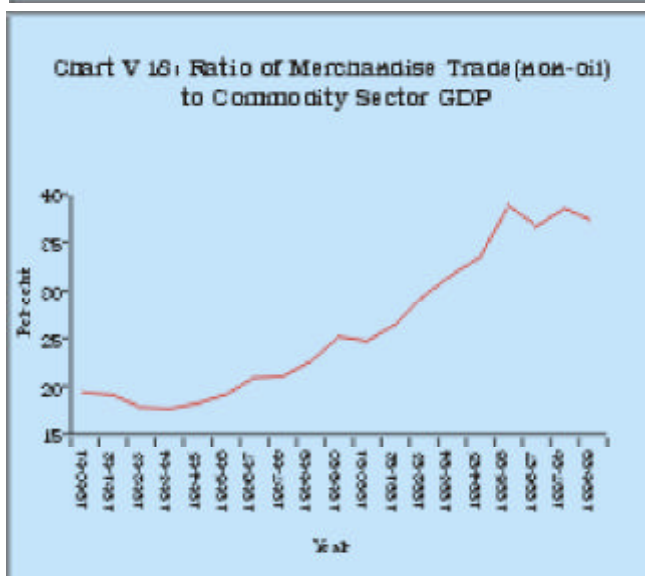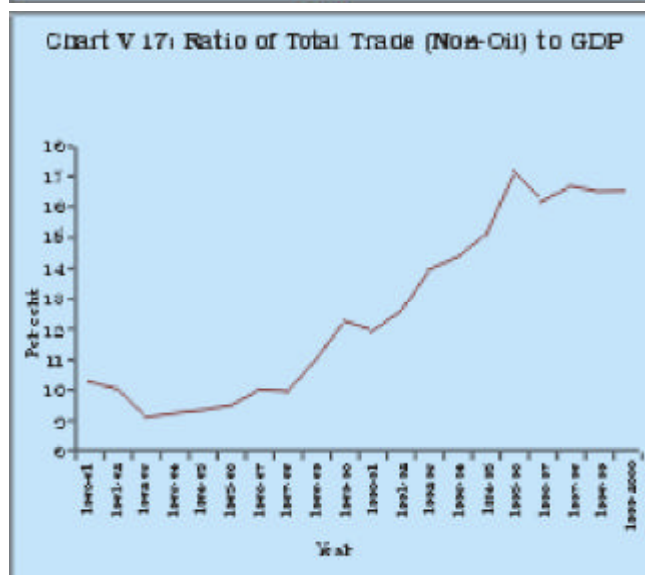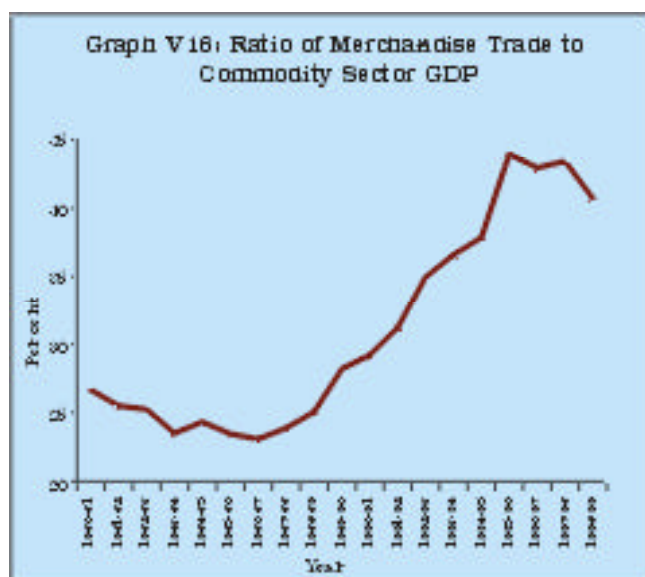
5.55   India's economic growth has exhibited some positive co-movement with both openness and growth in world GDP (Chart V.19). The values of the correlation coefficients between openness and India's GDP at 0.51, between India's openness

Graph V.16: Ratio of Merchandise Trade to Commodity Sector GDP
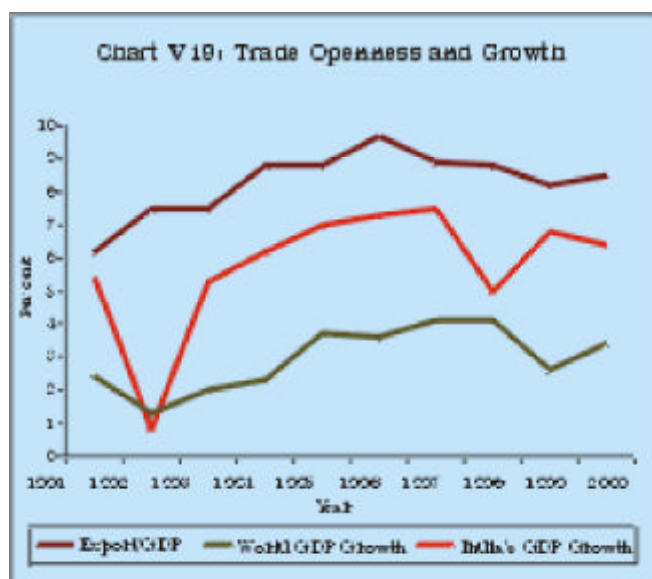

Chart V.15: Ratio of Total Trade to GDP
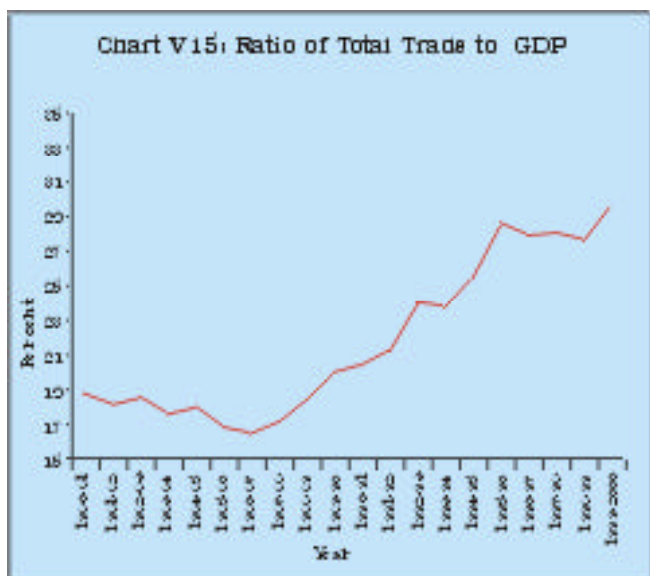
and World GDP at 0.65, and between India's GDP and World GDP at 0.68 also point towards the co-movement seen in the Chart. However, on the basis of correlation coefficients or co-movements in growth alone one cannot conclusively view openness as essential for growth, because openness measure itself could depend on external demand and domestic supply conditions. Furthermore, while India's exports as percentage of its own GDP rose from 6.2 per cent in the early 'nineties to 8.5 per cent in the late 'nineties, India's exports as percentage of World exports registered only a marginal increase from 0.5 per cent to 0.7 per cent during the same period.

Financial Openness

5.56   Sharp increase in the inflows of foreign private capital into India in the 'nineties, has increased the cross-border financial integration. Till 1992-93, foreign investment flows to India were insignificant. Following the opening up of the

Chart V.17: Ratio of Total Trade (Non-Oil) to GDP

Chart V.18: Ratio of Merchandise Trade (Non-Oil) to Commodity Sector GDP

Chart V.19: Trade Openness and Growth

Indian capital markets to portfolio investments, India attracted large foreign investment flows during 1993-94 to 1997-98 averaging US$ 5.1 billion per annum (Table 5.9). Most of these flows were in the form of portfolio investments during 1993-94 and 1994-95. From 1995-96 direct investment flows also picked up and exceeded $2.0 billion in each year. Foreign investment flows dipped in 1998-99, mainly on account of weakening sentiment for emerging markets in the aftermath of the financial crises in East Asia. In 1999-2000, foreign investment flows revived, with direct investment exceeding $2.0 billion and portfolio investment $3.0 billion mark.

5.57   Net foreign direct investment (FDI) flows to India as a percentage of net FDI flows to all developing countries (as published in the *Global Development Finance*, World Bank, 2000) exhibited a sharp increase from about 0.2 per cent in 1991 to more than 2.0 per cent by 1997. Since then India's share has declined. However, in terms of net inflows in all different forms (*i.e.*, private and official) India seems to have attracted a fairly stable percentage of flows, except during 1994-96 when certain fluctuations occurred (Chart V.20).

5.58   Another way to measure degree of financial openness is to see the co-movement in the domestic stock markets and international stock markets. As a result of large capital flows, especially portfolio investments since 1993-94, the sensitivity of the Indian stocks to developments in international stocks has increased. The impact was particularly strong in 1999-2000 as movements in the technology stocks in the NASDAQ had a significant bearing on the Indian stock markets (Chart V.21). An analysis of the prices of the Indian GDRs/ADRs in the international stock markets and the stocks in the domestic markets also reveals that the two prices are highly correlated. The correlation co-efficient between the BSE Sensex and the Skindia GDR Index for the period from April 1996 to August 2000 worked out to 0.64. It, however, may be noted that many Indian GDRs/ADRs listed on the International stock markets during the period from 1993-94 to 2000-2001 (up to August) traded either at discount or at premium (Table 5.10).

5.59   It also needs to be noted that at present all

Table 5.9: Foreign Investment Flows

Year	A. Direct Investment		B. Portfolio Investment		Total (A+B)	
	(Rs. crore)	(US $ million)	(Rs. crore)	(US $ million)	(Rs. crore)	(US $ million)
1	2	3	4	5	6	7
1990-91	174	97	11	6	185	103
1991-92	316	129	10	4	326	133
1992-93	965	315	748	244	1,713	559
1993-94	1,838	586	11,188	3,567	13,026	4,153
1994-95	4,126	1,314	12,007	3,824	16,133	5,138
1995-96*	7,172	2,144	9,192	2,748	16,364	4,892
1996-97*	10,015	2,821	11,758	3,312	21,773	6,133
1997-98*	13,220	3,557	6,696	1,828	19,916	5,385
1998-99*	10,358	2,462	-257	-61	10,101	2,401
1999-00*	9,338	2,155	13,112	3,026	22,450	5,181

* Includes acquisition of shares of Indian companies by non-residents under Section 29 of FERA.

market participants are not able to exploit arbitrage opportunities due to certain restrictions. FIIs have better arbitrage opportunities between these two markets as resident investors are not allowed to invest overseas.[6] However, the arbitrage operations are only one way since domestic shares cannot be converted into GDRs/ADRs. As a result, only when the GDRs/ADRs are at discount, FIIs can reap arbitrage profits. For most part of the 1990s, however, GDRs/ADRs floated at a premium.

5.60 In India, a comparison of the prices of GDRs/ADRs against their underlying shares listed in India shows that the international prices of GDRs/

Chart V20: Financial Openness

FDI : Net FDI flows to India as percentage of net FDI flows to all developing countries.
NCF : Net capital flows to India as percentage of net total flows to all developing countries.

Chart V21: Co-movement of Stock Indices

BSE   S&P500   NASDAQ

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[6] Only recently Indian mutual funds have been allowed to invest in Indian GDRs/ADRs, subject to certain restrictions.

ADRs generally fetched a premium or discount, with the premium at some point touching 170 per cent (for Infosys in 1999-00) and discount rising to more than 35 per cent (for HINDALCO in 1998-99) (Table 5.10).

5.61   In response to the ongoing process of reforms in trade, industry and finance, India's openness to cross-border trade and private capital has increased considerably in the 'nineties, notwithstanding some slow down in the process towards the end of the decade. The trade openness as measured by the trade to GDP ratio improved. However, it needs to be recognised that a high ratio of trade to GDP need not be the ideal indicator of trade openness for several reasons. First, if the share of non-tradeables in GDP continues to be high even after significant trade liberalisation, it reflects the competitive strength of India's non-tradeables. Secondly, benefits of trade openness should essentially emanate from equalisation of cross-border prices of goods and services so that residents no longer pay higher prices for goods produced under protection. Though it is difficult to validate whether liberalisation has actually contributed to the expected price convergence, the behaviour of the exchange rate in India, which does not reflect large and persistent misalignment from PPP, indicates the possibility of such a price convergence. Thirdly, India continues to operate with an intermediate target for the external sector, in the form of a sustainable level of current account deficit as an integral element of its sound strategy for the management of the external sector. As a result, trade openness is essentially linked to export performance. More than 20 per cent growth recorded in India's exports during the first 8 months of 2000-01 would have helped in furthering India's openness to international trade.

5.62   As regards openness to international capital flows, India's share in the total FDI flows to the developing countries increased significantly in the first half of the 'nineties following the far reaching liberalisation of policies on FDI. In the last few years, however, India's share declined somewhat. This is essentially due to several structural constraints. FDI policies of emerging markets have also become fiercely competitive.

5.63   In the domestic financial markets, liberalization has given rise to market orientation and there is evidence of increasing co-movement of risk adjusted returns in different segments of the market. Forward premia in India, though
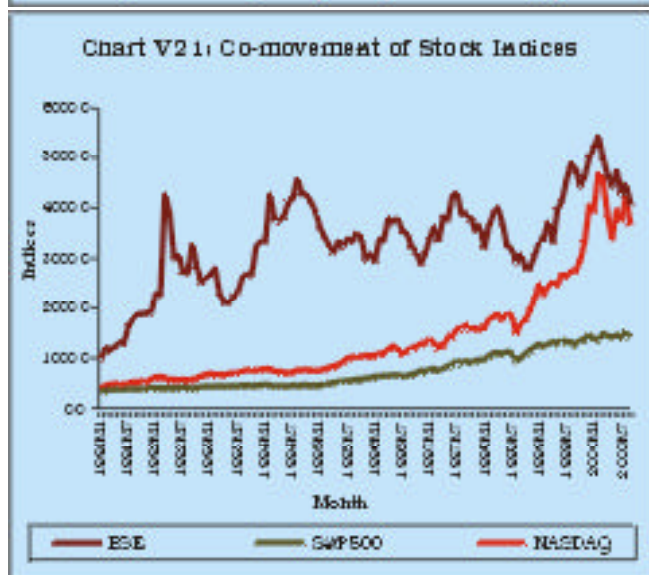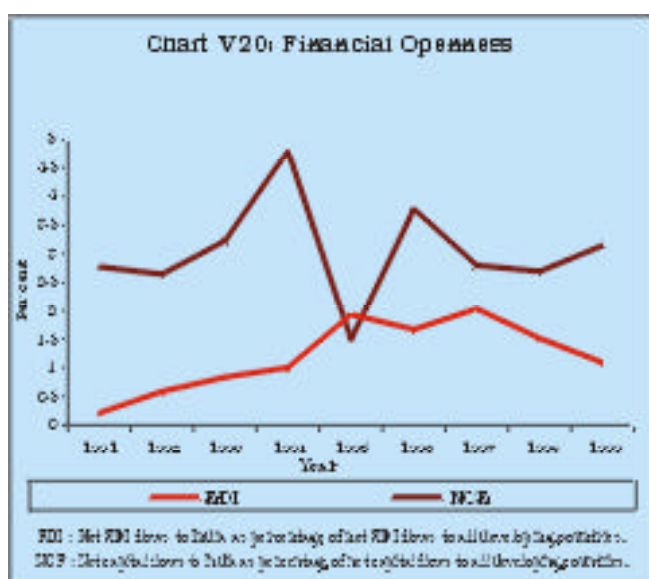
Table 5.10: Range of Premium/ Discounts on GDR/ADR Prices Over Domestic Prices for Select Scrips

(Per cent)

Year	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01 @
1	2	3	4	5	6	7	8	9
Reliance	-11.3 to 47.7	-13.3 to 9.1	1.8 to 26.8	-4.9 to 25.7	-6.8 to 15.9	-9.8 to 2.9	10.4 to 55.4	11.5 to 63.8
HINDALCO	-	-11.6 to 1.1	-6.4 to 36.7	-1.4 to 58.0	-10.1 to 29.1	-35.9 to 12.2	6.5 to 34.2	3.6 to 14.4
VSNL	-	-	-	-	11.5 to 44.6	0.1 to 41.2	5.0 to 71.3	9.2 to 24.7
ITC	-	-20.8 to -7.6	-20.8 to 27.1	4.9 to 31.7	9.8 to 65.8	6.6 to 26.1	6.6 to 34.6	4.8 to 30.6
Grasim	-	1.0 to 10.7	6.9 to 34.1	4.6 to 35.0	-7,0 to 35.6	-32.6 to 25.0	11.6 to 77.0	12.1 to 48.5
MTNL	-	-	-	-	17.8 to 32	3.7 to 41.4	1.7 to 48.3	4.0 to 27.2
SBI	-	-	-	17.2 to 48.3	16.7 to 52.7	-4.1 to 31.3	-7.4 to 48.2	-3.9 to 16.6
M&M	-	-5.2 to 13.4	6.4 to 36.1	7.9 to 27.4	-6.7 to 34.6	-14.8 to 5.3	-8.4 to 22.9	-3.3 to 14.4
Infosys	-	-	-	-	-	25.1	30.9 to 170.8	70.6 to 118.8
ICICI	-	-	-	-	-	-	18.9 to 105.0	16.4 to 59.6

@ : Up to August 2000.

Source : Instanex Capital Consultants Pvt. Ltd. and Bridge On-Line Information System

increasingly becoming sensitive to interest rate developments, continue to be influenced by the demand-supply mismatches in the forward segment of the forex market. Alternating phases of spot market stability and market corrections for perceived misalignments have influenced both the risk premia and the demand-supply positions in the forward market. Furthermore, the requirement of genuine underlying transactions in the forward market and the restrictions on cross-market shifts in positions also hinder the parity conditions to hold in India. Such restrictions, however, form an integral element of the cautious and gradual approach to the reforms in India and are viewed as essential to avoid disorderly market developments. The Indian approach strives to attain a balance between efficiency gains associated with faster reforms and the need to preserve financial stability by pursuing a cautious and gradual approach to reforms.