

5.1 The developments in the global economy during the past three decades indicate that the process of financial development and globalisation is, at times, susceptible to crisis. Nevertheless, it is argued that the recurrence of financial crisis has not changed the positive relation between financial development and growth (Lipsky, 2009). The global crisis of 2008 that originated in the mortgage sector of the US spread to the entire financial system and the real economy across countries. Exchange rates in many economies depreciated, equity prices crashed, volatility heightened, liquidity dried up in financial markets, and the cost of external borrowings moved significantly upward. While in the case of advanced countries the external shocks were largely carried through direct channels with the exposure of banking systems to the sub-prime mortgage assets, the contagion to developing countries was transmitted mainly through trade, finance, and commodity price channels and rapid changes in expectations (Subbarao, 2009). The rising financial linkages resulted in a higher degree of business cycle co-movement and the greater wealth effect of external shocks, while the trade linkages generated both demand-side and supply-side spillovers across countries, resulting in more highly correlated output fluctuations.

5.2 Initially, it appeared that emerging market economies (EMEs) are better positioned to weather the storm created by the global financial meltdown on the back of substantial foreign exchange reserve cushions, improved policy frameworks and generally robust banking sector and corporate balance sheets. However, any hope about EMEs escaping unscathed could not be sustained after the failure of Lehman Brothers in September 2008 and the ensuing rise in global risk aversion; EMEs were also adversely affected by the spillover effects of the macroeconomic turbulences created by the global financial meltdown. Depressed consumer

and investor spending in the advanced economies led to a slump in demand for EME exports, which reinforced the inflow reversal (BIS Annual Report, 2008-09). However, the effect varied across these economies depending on their level of global integration.

5.3 During the initial phase of the crisis, the impact on the Indian financial markets was rather muted; however, since mid-September 2008, the impact on Indian financial markets became amplified. In fact, banks dominated financial system and their negligible engagement in off-balance sheet activities and illiquid securitised assets, which remained at the heart of the recent global financial crisis in advanced economies, protected India from early turmoil in international financial markets. Nonetheless, India could not remain unscathed and the global developments affected its financial and real activities in the second half of 2008-09.

5.4 India's financial markets – equity markets, money markets, forex markets and credit markets – had all come under pressure from a number of directions. First, the substitution of overseas financing by domestic financing brought both the money market and credit market under pressure. Second, the forex market came under pressure because of reversal of capital flows as part of the global deleveraging process and, simultaneously, corporates were converting the funds raised locally into foreign currency to meet their external obligations. Third, the Reserve Bank's intervention in the forex market to manage the volatility in the rupee further added to liquidity tightening. Fourth, Indian banks as well as corporates were finding it difficult to raise funds from external sources as a consequence of the global liquidity squeeze and, as a result, pressure escalated sharply on banks for the credit requirements of corporates. Also, in their frantic search for substitute financing,

corporates withdrew their investments from domestic money market mutual funds, putting redemption pressure on the mutual funds and, down the line, on non-banking financial companies (NBFCs) where the mutual funds had invested a significant portion of their funds. Finally, India also witnessed large capital outflows, exchange rate depreciation, protracted contraction in merchandise exports, and a steep fall in equity prices in the second half of 2008-09. All these factors resulted in a sharp deceleration in the growth of the Indian economy in the second half of 2008-09.

5.5 Against this background, Chapter 5 and Chapter 6 cover the impact of the global financial crisis on the Indian economy and the policy responses of the authorities. Here, in Chapter 5, the impact on India's financial sector is analysed in detail. In Chapter 6, the final impact through the trade and financial channels on saving, investment and growth is discussed.

5.6 In examining the impact of the financial crisis on the financial sector, this chapter first sets out the context by analysing the evolving global integration of the Indian economy through trade and financial channels over the years in Section I. The impact of the crisis on various financial markets and respective policy measures has been delineated in Section II. The spillover effects traversing to the banking sector, mutual funds and non-banking finance companies and policy measures to counter their impact have been examined in Section III. The policy responses to the crisis by the Government of India and the Reserve Bank are discussed in Section IV. Section V contains the conclusions.

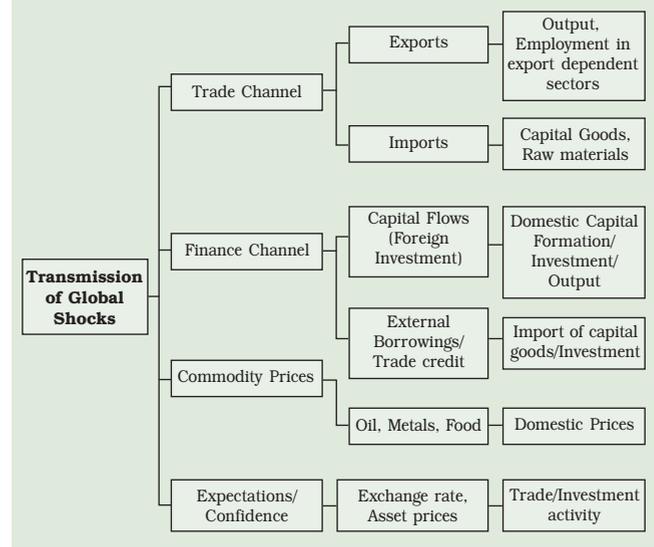
I. CHANNELS OF GLOBAL INTEGRATION

5.7 The literature recognises four principal channels through which global developments could percolate to the domestic economy. These relate to foreign trade, cross-border financial flows, global commodity prices and expectations/confidence.

Although distinguished in various ways, these channels share some features. First, each channel could be associated with some direct and indirect effects. Second, all these channels may be interlinked and work simultaneously to cause an impact that is different from what could be achieved if each channel work independently. Both the trade and finance channels could interact due to the interaction between trade and trade credit and commercial borrowings, and foreign direct investment and exports and imports. Third, the varied impact of trade and financial channels could be associated with their micro characteristics (Chart V.1).

5.8 The relationship between foreign trade and the economic growth of nations has been analysed extensively in the literature. Basically, the foreign trade channel is expected to work through exports and imports of merchandise goods and tradable services. There are a number of reasons within trade theory to support the export-led growth hypothesis (Havrylyshn, 1990; Krugman, 1987). Exports are expected to contribute to growth through, *inter alia*, enhanced demand, economies of scale, better technology and productivity, optimal allocation of resources, and research and development. The transmission of the trade

Chart V.1: Key Transmission Channels of Global Shocks on the Domestic Economy



channel could occur in three ways: the income effect, competitiveness effect, and cheap-import effect (Forbes, 2001). The empirical literature provides a mixed perspective on the causal nexus between exports and economic growth. Eichengreen and Rose (1999) and Glick and Rose (1998) in their study of 20 industrial countries supported trade links rather than macroeconomic similarities as the dominant channel for contagious international transmission of shocks. A number of empirical studies also argue that trade was not important in the propagation of crises. Masson (1998) categorised trade as a spillover effect and showed that it was not important during the Mexican crisis or the Asian crisis. Harrigan (2000) also rejected the trade channel; the impact of the Asian crisis on the US industries was small and localised.

5.9 Similar to the trade channel, the relationship between finance and growth in general and the importance of foreign capital for the economic progress of developing economies has been deliberated at length over the years. In theory, financial globalisation can help developing countries to better manage output and consumption volatility (Prasad *et al.*, 2003). Indeed, a variety of theories imply that the volatility of consumption relative to that of output should go down as the degree of financial integration increases; the essence of global financial diversification is that a country is able to offload some of its income risk in world markets. Since most developing countries are rather specialised in their output and factor endowment structures, they can, in theory, obtain even bigger gains than developed countries through international consumption risk-sharing, that is, by effectively selling off a stake in their domestic output in return for a stake in global output (Box V.1).

5.10 Analytical arguments supporting financial openness revolve around considerations such as the benefits of international risk sharing for consumption smoothing, the positive impact of capital flows on domestic investment and growth, enhanced macroeconomic discipline and increased efficiency as well as greater stability of the domestic financial system associated with financial openness

(Agenor, 2001). In recent years, there appears to be some rethinking about financial globalisation based on the experiences of various crises in the late 1990s and the current global imbalances. Owing to contagion effects, some economists have viewed increasing capital account liberalisation and unfettered capital flows as a serious impediment to global financial stability (Bhagwati, 1998; Rodrik, 1998; Stiglitz, 2002). Others argue that increased capital account openness has largely proven essential for countries aiming to upgrade from lower to middle income status. Thus, it is widely accepted that the beneficial effects of international capital inflows can be harnessed by ensuring sound macroeconomic policies and strong institutions and adopting an appropriate regulatory framework for the stability of financial systems.

5.11 The potential costs associated with financial globalisation include a high degree of concentration of capital flows, misallocation of flows which may hamper their growth effects and exacerbate domestic distortions, the loss of macroeconomic stability, the pro-cyclical nature of short-term capital flows and the risk of abrupt reversals, a high degree of volatility of capital flows in part due to herding and contagion effects and risks associated with foreign bank penetration (Dadush, Dasgupta and Ratha, 2000). Thus, unlike trade integration, where benefits to all countries are demonstrable, in the case of financial integration a threshold in terms of preparedness and resilience of the economy is important for a country to get full benefits (Kose *et al.*, 2006).

5.12 An issue that assumed importance during the present global crisis is the relative strength of various channels of transmission especially against the backdrop of the sharp escalation of India's financial integration with global markets over the past few years. While the crisis was transmitted to India through both the trade and finance channels, the latter was by far more significant in terms of the intensity of the impact (Subbarao, 2009). Thus, how global asset price movements affect the domestic asset market and, in turn, the real economy has assumed critical significance during

Box V.1 Financial Openness and Economic Growth

Traditional development thinking was guided by the notion that the savings gap could be bridged through capital inflows from countries with higher income and savings in order to achieve faster growth. According to this premise, the strategy to reduce global poverty and to allow the catching up of poorer countries is built on two blocks. First, the endowments of less developed countries can be enriched by giving them access to those factors of production that they lack – through the provision of private foreign capital or official aid. Second, as developed countries open up their markets to the products of developing countries that possess natural resources or abundant labour but little capital, the developing countries are able to raise their export earnings and capacity to import more sophisticated equipment. The savings gap theory refers to the standard growth model (Harrod-Domar model), which identifies certain necessary components of growth, but does not explain the functional relationships that determine the interaction of these components. Most approaches based on this growth theory see the rate of capital accumulation determined by the difference between capital deepening (the capital-labour ratio) and capital widening (the amount of saving per capita needed to hold the capital-labour ratio constant as the population grows and the existing capital stock depreciates). Countries with relatively low growth rates are encouraged to increase their savings enough to keep up with the requirements of capital widening.

According to the neoclassical growth model, savings determine capital accumulation (as in the Harrod-Domar model), but savings and investment are not always related to economic growth (in contrast to the Harrod-Domar model). Savings (and investment) drive growth only when the economy is out of equilibrium, but they do not influence growth when the economy is in equilibrium. In the long run, growth is determined solely by technology, which in turn is determined exogenously by non-economic variables. It is conceived that consumers prefer a stable consumption path and any transitory shock to income is, under normal circumstances, compensated by a change in savings in the same direction and *vice versa*. If GDP growth increases permanently, individuals will immediately jump to a higher consumption path and the increase in growth will lead to lower savings. By contrast, if a shock has its origin in the savings rate, for example, if a change

in preferences leads to higher savings, then both investment and growth increase (as in the Harrod-Domar model), at least in the transition to a “new steady state”. Thus, the model predicts different relationships between savings and growth, depending on the nature of the shock and on whether the shock is permanent or temporary. These assumptions are based on a closed economy model, in which *ex post* national savings are always equal to *ex post* investment.

In open economy models with free capital flows – savers can invest in other countries – there should be no correlation between domestic savings and investment decisions. Under the assumption that profits per unit of output are the same in all countries, the marginal product of capital should be higher in countries with a relatively small capital stock, which should record net capital inflows (Lucas, 1990). Accordingly, the observed relatively small capital flows from developed to developing countries – the “Lucas Paradox” – triggered debate that sought to explain the factors limiting the incentives to invest in developing economies. The recent literature seeks to explain the Lucas Paradox by switching the emphasis from factor accumulation to total factor productivity, which is the part of the overall productivity increase that cannot be attributed to either labour or capital. It also argues that countries with faster productivity growth will have a lower savings rate because agents anticipate the potential for future consumption, which increases with rising productivity growth. The neoclassical open economy model predicts that an exogenous increase in national savings will be associated with an improvement in the current account, but that it will have no effect on domestic investment and growth. Similar to the savings-gap model, the neoclassical model predicts a positive correlation between savings and growth for a closed economy.

References

- Lucas R.E. Jr. 1990. “Why Doesn’t Capital Flow from Rich to Poor Countries?” *American Economic Review*, 80(2): 92–96.
- UNCTAD. 2008. “Foreign Capital and Growth.” *Trade and Development Report 2008*. United Nations.

the recent global financial crisis. While the movement in financial flows could have a direct impact on the economy through changes in the

availability of credit and investment, these financial flows also simultaneously affected the price of credit and the return on investment.

Indian Context

5.13 The globalisation process in India was strengthened and reinforced in the 1990s and 2000s due to several important developments. First, trade openness (goods and services trade) increased substantially with the trade-GDP ratio doubling since 1999-2000. Second, services, which were largely considered non-tradable, turned increasingly tradable mainly due to off-shoring led by rapid innovations in information technology, labelled as information technology-enabled services (ITES) and business process outsourcing (BPO). Third, the trade channel of global integration has been, concomitantly, supported by the migration channel with the competitive edge of human resources in knowledge-based services. The rising importance of the human channel, which operates directly through remittances and indirectly through trade in goods and services, in strengthening India's global integration is reflected in the widening gap between exports and imports of goods and services and current account receipts and payments as percentage of GDP, which

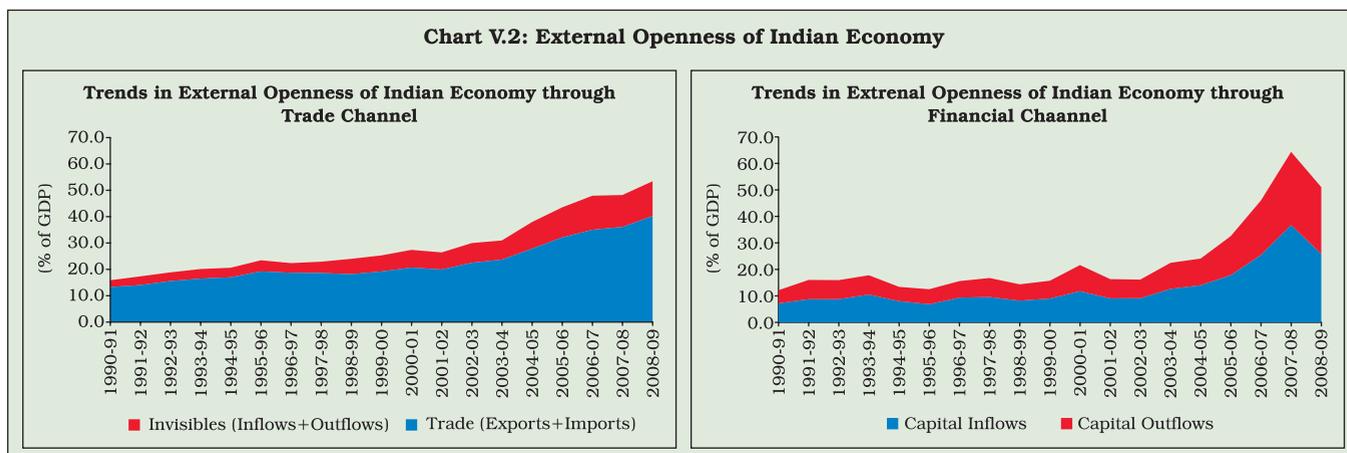
increased from about 2 per cent in 1990-91 to around 7 per cent during 2008-09. Fourth, the economy became more open to external capital flows as the gross capital account-GDP ratio witnessed a more than three-fold increase during the same period. Fifth, higher capital account openness also strengthened the integration of domestic markets with global markets, which was reflected in the stronger correlations of domestic interest rates, equity and commodity prices with their global counterparts; these developments also facilitated the role of expectations in transmitting global shocks to the domestic economy. Sixth, even in commodity-producing sectors, global integration came through prices and not necessarily through physical trade in commodities, as global price movements have an important expectation impact on domestic prices. Finally, greater synchronisation of the domestic business cycles with the global cycles implied that the external shocks could have a greater and more rapid impact on the domestic economy (Table 5.1 and Chart V.2).

Table 5.1: Openness Indicators of Indian Economy

(Per cent)

Year	Exports plus Imports of Goods/ GDP	Exports plus Imports of Goods and Services/ GDP	Current Receipts plus Current Payments/ GDP	Gross Capital Inflows plus Gross Capital Outflows/ GDP	Current Receipts and Gross Capital Inflows plus Current Payments and Gross Capital Outflows/GDP	Net Capital Inflows/ GDP	GDP (US\$ billion)
1	2	3	4	5	6	7	8
1950s	12.5	14.1	15.0	2.3	17.3	0.4	26
1960s	8.8	10.0	10.9	4.6	15.5	1.8	48
1970s	10.0	11.3	12.7	4.2	16.9	0.6	99
1980s	12.7	15.2	17.2	5.4	22.6	1.6	234
1990s	18.8	22.9	26.7	15.1	41.8	2.2	345
2000s	29.3	39.0	45.0	32.7	77.7	3.4	756
1990-91	14.6	17.2	19.4	12.1	31.5	2.2	318
1995-96	21.3	25.5	29.7	12.4	42.1	1.1	356
1996-97	21.4	25.1	29.8	15.5	45.3	3.1	388
1997-98	21.1	25.4	30.0	16.7	46.7	2.4	411
1998-99	19.7	25.5	29.8	14.4	44.2	2.0	416
1999-00	20.6	26.7	31.2	15.7	46.8	2.3	451
2000-01	22.5	29.2	34.4	21.6	56.0	1.9	460
2001-02	21.1	27.6	33.4	16.3	49.7	1.8	478
2002-03	23.3	30.8	36.5	16.1	52.6	2.1	507
2003-04	24.4	31.7	37.6	22.5	60.1	2.8	599
2004-05	29.1	39.3	44.5	24.1	68.6	4.0	701
2005-06	32.4	43.8	49.4	32.6	82.0	3.1	809
2006-07	34.9	47.8	54.2	46.0	100.2	4.9	916
2007-08	36.2	48.4	55.2	64.8	120.0	9.2	1,128
2008-09	40.5	53.7	60.9	51.4	112.3	0.8	1,139

Chart V.2: External Openness of Indian Economy



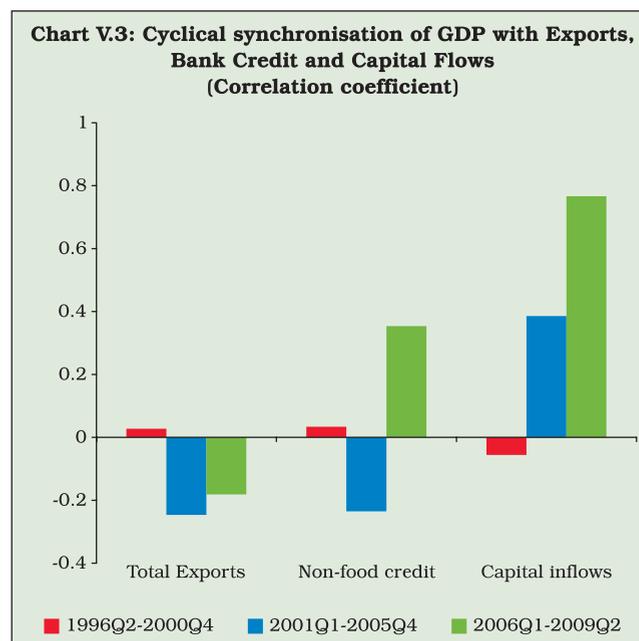
5.14 The increasing liberalisation of capital account enabled the financial channel to foster the global integration of the Indian economy as manifested in the rising share of capital flows to the GDP (Chart V.2). In fact, India's financial integration with the world has been as deep as India's trade globalisation, if not deeper (Subbarao, 2009). The deceleration in the growth of the Indian economy on account of the current global slowdown is also testimony to the increased global integration of the India during recent years.

5.15 In India, it appears that all four channels of transmission (trade, financial, commodity prices and expectation channels) operated and adversely affected real activities during the recent global crisis; however, the strengths of different channels of transmission varied. The analysis of the trend in the cyclical synchronisation shows that the financial channel of transmission was more pronounced during recent periods, reflecting the strengthening of the global integration of the Indian economy through increasing financial flows (Chart V.3). A vector autoregression (VAR) model was estimated with GDP growth, total exports (goods & services), non-food credit (NFC), net capital flows, call money rate, and Bombay Stock Exchange (Sensex) from 1996 to 2009 to ascertain the strength of trade and financial channels. The Cholesky variance decomposition suggests that

about 50 per cent of variation in GDP is explained by financial variables, viz., bank credit, capital inflows, call rate, and the Sensex, while exports of goods and services explains about 9 per cent of the variation. This implies that financial channels have assumed a more dominant role in transmitting the effects of global developments in the Indian economy during recent periods.

5.16 The relative strengths of various channels of transmission through which the crisis was transmitted to India have been highlighted in several fora. It was felt that the financial channel was more pronounced due to increasing

Chart V.3: Cyclical synchronisation of GDP with Exports, Bank Credit and Capital Flows (Correlation coefficient)



globalisation in the recent period. The increase in trade and liberalisation of the capital account have led to higher global integration of the Indian economy which, in turn, also made India vulnerable to global shocks. Empirically also, it has been established that the financial channels have assumed a more dominant role in transmitting the effects of global developments to the Indian economy during the recent periods. In the next section, the transmission of the current global crisis to the financial markets of India is examined.

II. IMPACT OF GLOBAL CRISIS ON FINANCIAL MARKETS

5.17 India's financial markets – equity market, money market, forex market and credit market – experienced the knock-on effects of the global financial crisis. The equity markets and forex markets came under pressure because of the reversal of capital flows as part of the global deleveraging process. With the reversal of capital flows and drying up of external sources of funds, corporates shifted to domestic bank credit. This substitution of overseas financing by domestic financing brought both money markets and credit markets under pressure. The global liquidity spiral increased volatility in the financial markets, and restoring orderly conditions in the financial markets became critical to contain the spread of contagion to other sectors of the economy (Chakrabarty, 2009). In response to the crisis, the Reserve Bank and the Government reacted swiftly and took both conventional and unconventional measures aimed at stabilising various market segments. Broadly, these measures included reduction in liquidity adjustment facility (LAF) interest rates, infusion of large amounts of forex and domestic liquidity, lending to non-bank financial institutions through the banking channel, encouraging the inflow of foreign capital through increasing interest rate ceilings on NRI deposits, and easing norms pertaining to external commercial borrowing (ECBs). In this section, the impact of the crisis on various financial market segments in India and policy responses to contain

the damage and restore normalcy have been analysed.

Foreign Exchange Market

5.18 Prior to the 1990s, the Indian foreign exchange market was highly regulated with restrictions on transactions, participants and use of instruments. The period since the early 1990s has witnessed a wide range of regulatory and institutional reforms resulting in substantial development of the rupee exchange market as it is observed today. Market participants have become sophisticated and acquired reasonable expertise in using various instruments and managing risks. The foreign exchange market in India today is equipped with several derivative instruments. These derivative instruments have been cautiously introduced as part of the reforms process in a phased manner, both for product diversity and, more importantly, as a risk management tool. As a result, trading volumes in the Indian foreign exchange market have grown significantly over the past few years. The daily average turnover has seen an almost ten-fold rise during the 10-year period from 1997-98 to 2007-08, from US\$ 5 billion to US\$ 48 billion. The pick-up has been particularly sharp from 2003-04 onwards, when there was a massive surge in capital inflows. Reflecting these trends, the share of India in global foreign exchange market turnover trebled from 0.3 per cent in April 2004 to 0.9 per cent in April 2007.

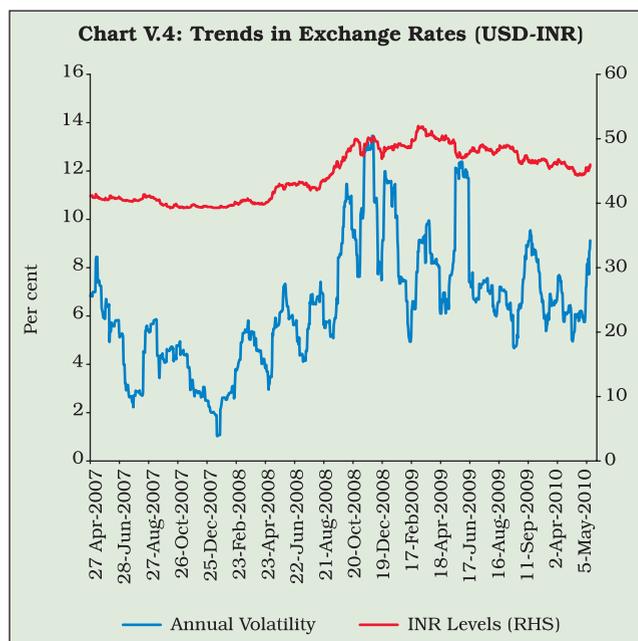
5.19 With the increasing global integration, efficiency in the foreign exchange market has improved as evident from the low bid-ask spreads. It was found that the spread is almost flat and very low. In India, the normal spot market quote has a spread of 0.25 paise to 1 paise while swap quotes are available at a 1 to 2 paise spread. Thus, the foreign exchange market has evolved over time as a deep, liquid and efficient market as against a highly regulated market prior to the 1990s.

5.20 In recent years, external sector developments in India have been marked by strong

capital flows, which had led to an appreciating tendency in the exchange rate of the Indian rupee up to 2007-08. The Indian approach has been guided by the broad principles of careful monitoring and management of exchange rates with flexibility, without a fixed target or a pre-announced target or a band, coupled with the ability to intervene if and when necessary, while allowing the underlying demand and supply conditions to determine the exchange rate movements over a period in an orderly way. Subject to this predominant objective, the exchange rate policy is guided by the need to reduce excess volatility, prevent the emergence of speculative activities, help maintain an adequate level of reserves, and develop an orderly foreign exchange market. This approach has served well in maintaining orderly market conditions.

5.21 There was a sudden change in the external environment following the Lehman Brothers' failure in mid-September 2008. The global financial crisis and deleveraging led to reversal and/ or modulation of capital flows, particularly foreign institutional investor flows, ECBs and trade credit (Gopinath, 2009). Large withdrawals of funds from the equity markets by the foreign institutional investors (FIIs) reflecting the credit squeeze and global deleveraging resulted in large capital outflows during September-October 2008, with concomitant pressures in the foreign exchange market across the globe including India (Chart V.4).

5.22 The cascading effect of the global financial crisis on the domestic foreign exchange market was felt through the dollar liquidity shocks emanating from the lower level of net capital flow and contracting exports. The impact of these factors has resulted in a significant fall in turnover in the foreign exchange market since October 2008. This decline was spread across the merchant and inter bank segments of the forex market. The pressure on the foreign exchange market was also visible in the falling share of the spot market in the total turnover (Table 5.2). At the same time, the share of the forward and swap markets in total turnover increased, possibly reflecting the rising tendency of hedging the



underlying exposure in the foreign exchange market, which could have been driven by high volatility and uncertainty prevailing in the international financial markets.

5.23 After Lehman's bankruptcy, the rupee depreciated sharply, breaching the level of Rs.50 per US dollar on October 27, 2008. The Reserve Bank scaled up its intervention operations during the month of October 2008. Despite significant easing of crude oil prices and inflationary pressures in the second half of the year, declining exports and continued capital outflows led by global deleveraging process and the sustained strength of the US dollar against other major currencies continued to exert downward pressure on the rupee. With the spot exchange rates moving in a wide range, the volatility of the exchange rates increased during this period (Table 5.3). However, with the return of some stability in international financial markets and the relatively better growth performance of the Indian economy, there has been a revival in foreign investment flows, especially FII investments since the beginning of 2009-10. As compared with depreciation of 21.5 per cent during 2008-09, the rupee appreciated by around 13 per cent in 2009-10. During the current year so far upto June 11, 2010, the rupee

Table 5.2: Transactions in Foreign Exchange Market

Period	Average Daily Turnover in Forex Market (US\$ billion)	Average Daily Share of Spot Market in Total Turnover (per cent)	Average Daily Share of Forward & Swap Market in Total Turnover (per cent)	RBI's Net Foreign Currency Sales (-)/ Purchases (+) (US\$ million)	Movements in Average Exchange Rate (Rs. Per US\$) Depreciation (-)/ Appreciation (+)	Average Exchange Rate (Rs. Per US\$) range (Low-High)	Average 3-month Forward Premia (per cent)
1	2	3	4	5	6	7	8
2000-05	7.7	47	53	20,848@	-6.9	5.7	3.3
2005-06	17.5	51	49	8,143	1.5	3.0	1.6
2006-07	25.8	52	48	26,824	2.2	3.8	2.14
2007-08	47.9	50	50	78,203	12.5	3.9	2.16
2008-09	47.6	45	55	-34,922	-12.4	-12.2	3.47
2009-10	40.7	50	40		-3.2	5.6	2.91
April-08	52.9	49	51	4,325	0.8	0.6	2.68
May-08	45.3	48	52	148	-5.0	2.6	2.45
June-08	51.1	46	54	5,229	-1.6	0.7	3.69
Jul-08	50.6	47	53	-6,320	0.0	1.4	6.04
Aug-08	54.2	46	54	1,210	-0.2	2.2	4.71
Sept-08	62.5	46	54	-3,784	-5.8	2.7	2.35
Oct-08	51.0	46	54	-18,666	-6.4	3.2	1.13
Nov-08	42.3	43	57	-3,101	-0.7	3.3	4.20
Dec-08	46.4	40	60	-318	0.8	3.5	4.59
Jan-09	37.0	44	56	-29	-0.4	0.8	3.10
Feb-09	33.8	44	56	230	-0.9	2.1	2.68
Mar-09	43.1	42	58	3,388	-3.8	1.9	3.99
Apr-09	36.4	42	58	-2,487	2.3	1.0	3.34
May-09	46.5	42	58	-1,437	3.2	2.7	3.42
Jun-09	43.1	48	52	1,044	1.6	2.1	3.29
Jul-09	39.8	48	52	-55	-1.5	1.6	2.57
Aug-09	37.1	50	50	181	0.3	1.4	2.80
Sept-09	37.9	53	47	80	-0.2	1.1	2.66
Oct-09	40.0	53	47	75	3.7	2.0	2.93
Nov-09	37.8	54	46	-36	0.3	1.1	2.46
Dec-09	37.4	51	49		-0.1	0.6	2.51
Jan-10	43.5	54	46		1.5	1.3	2.93
Feb-10	45.8	53	47		-0.8	0.8	2.78
Mar-10	43.4	51	49		1.8	1.1	3.28
Apr-10	48.4	53	47		2.2	0.4	3.43

@: Figures pertain to 2004-05.

depreciated by 3.6 per cent against US dollar over end-March 2010. Though there has been some

recovery in the forex turnover during 2009-10, it has not yet picked up to the pre-crisis levels.

Table 5.3: Movement of Indian Rupee

	US Dollar					Euro				
	Average	High	Low	Variation*(%)	Volatility# (%)	Average	High	Low	Variation*(%)	Volatility (%)
1	2	3	4	5	6	7	8	9	10	11
2007:Q2	41.23	40.46	43.15	6.65	0.50	55.60	54.34	57.78	6.34	0.49
2007:Q3	40.53	39.71	41.58	4.18	0.39	55.70	54.95	56.27	2.40	0.39
2007:Q4	39.46	39.26	39.84	1.48	0.26	57.21	55.51	59.19	6.63	0.54
2008:Q1	39.82	39.27	40.77	3.82	0.32	59.73	57.27	64.48	12.59	0.73
2008:Q2	41.66	39.89	43.16	8.20	0.44	65.06	62.24	68.09	9.39	0.71
2008:Q3	43.78	41.90	46.94	12.03	0.67	65.87	62.80	68.87	9.66	0.96
2008:Q4	48.76	46.91	50.53	7.72	1.07	64.30	60.57	69.15	14.16	1.34
2009:Q1	49.77	48.37	52.09	7.69	0.64	65.00	62.11	69.20	11.40	0.95
2009:Q2	48.79	46.84	50.54	7.90	0.73	66.35	64.46	68.51	6.29	0.83
2009:Q3	48.42	47.55	49.42	3.93	0.48	69.23	67.29	71.02	5.54	0.39
2009-10:Q4	46.64	45.90	47.87	4.29	0.50	69.20	66.76	70.03	4.90	0.41
2009-10:Q1	45.93	44.94	46.81	4.16	0.39	63.63	60.48	66.82	10.47	0.50

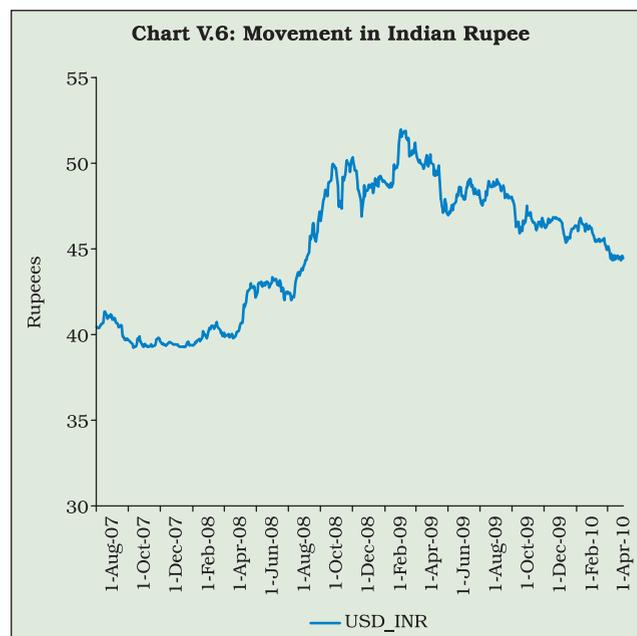
*: Maximum variation calculated as the percentage change between the lowest and highest level of the exchange rates during the quarter.

#: Volatility is calculated taking the standard deviation of the rupee-dollar exchange rate changes.

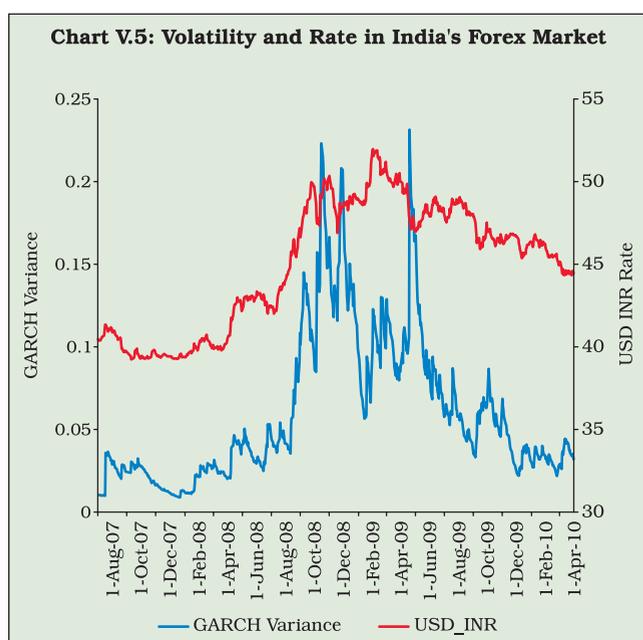
5.24 The volatility in exchange rate, measured in terms of the difference between high and low remained elevated since July 2008 but subsided somewhat from the beginning of 2009-10. Further, the volatility of the rupee-US dollar returns estimated using a GARCH (1,1) process¹ distinctly indicates two different phases in the forex volatility in the Indian market. In the first phase (during August 2007 to September 2008) the volatility was low compared with the volatility witnessed during September 2008 to December 2008 (Chart V.5).

5.25 With a view to maintaining orderly conditions in the foreign exchange market, the Reserve Bank announced in mid-September 2008 that it would continue to sell foreign exchange (US dollar) through agent banks to augment supply in the domestic foreign exchange market or intervene directly to meet any demand-supply gaps. Despite the intervention by the Reserve Bank, the rupee depreciated in October, 2008 (Chart V.6).

5.26 Several measures were undertaken by the Reserve Bank to ease the forex liquidity situation. A rupee-dollar swap facility for Indian banks was



introduced with effect from November 7, 2008 to give the Indian banks comfort in managing their short-term foreign funding requirements. For funding the swaps, banks were also allowed to borrow under the LAF for the corresponding tenor at the prevailing repo rate. The forex swap facility, which was originally available till June 30, 2009, was extended up to March 31, 2010; however, this was discontinued in October 2009. The Reserve Bank also continued with Special Market Operations (SMO) which were instituted in June 2008 to meet the forex requirements of public sector oil marketing companies (OMCs), taking into account the then prevailing extraordinary situation in the money and foreign exchange markets; these operations were largely (Rupee) liquidity neutral. Finally, measures to ease forex liquidity also included those aimed at encouraging capital inflows, such as an upward adjustment of the interest rate ceiling on foreign currency deposits by non-resident Indians, substantially relaxing the ECB regime for corporates, and allowing non-banking financial companies and housing finance companies to access foreign borrowing (Box V.2).



¹ The choice of the GARCH (1,1) model is based on its attribute of parsimony and its capacity to outperform most other models (White, 2000; Hansen, 2001). The details of the dummy variables and the specifications of the dummy variables are reported in the Annex. The coefficient of the dummy variable, introduced to verify the apparent break in the GARCH volatility equation, was found to be positive and statically significant at the 1 per cent level, confirming the validity of such a break.

Box V.2

Policy Measures to Augment Forex Liquidity

- Interest rate ceilings on FCNR (B) and NR(E)RA deposits were increased by 175 basis points each from September 16, 2008 providing more flexibility to Indian banks to mobilise higher foreign exchange resources.
- The constraints on external commercial borrowings were eased through relaxing various conditions, viz., (i) enhancing all-in-cost ceilings for ECBs of average maturity periods of three to five years and over five years to 300 basis points above LIBOR and 500 basis points above LIBOR, respectively; subsequently, the requirement of all-in-cost ceilings under the approval route was dispensed with until December 2009; (ii) permitting ECBs up to US\$ 500 million per borrower per financial year for rupee/foreign currency expenditure for permissible end-uses under the automatic route; (iii) the definition of infrastructure sector for availing ECB was expanded to include the mining, exploration and refinery sectors; (iv) payment for obtaining license/permit for 3G spectrum by telecom companies was classified as eligible end-use for the purpose of ECB; (v) dispensing with the requirement of minimum average maturity period of 7 years for ECB of more than US\$ 100 million for rupee capital expenditure in the infrastructure sector; (vi) permitting borrowers to keep their ECB proceeds offshore or keep it with the overseas branches/subsidiaries of Indian banks abroad or to remit these funds to India for credit to their rupee accounts with AD category-I banks in India, pending utilisation for permissible end-uses; (vii) allowing NBFCs exclusively involved in financing of the infrastructure sector to avail of ECBs under the approval route from multilateral/regional financial institutions and government-owned development financial institutions for on-lending to borrowers in the infrastructure sector, subject to compliance with certain conditions; and enabling housing finance companies registered with the national housing bank (NHB) to access ECBs subject to RBI approval and compliance to regulations laid down by NHB.
- Access to short-term trade credit was facilitated by increasing the all-in-cost ceiling to 6-month LIBOR plus 200 basis points for less than three years' tenor. Furthermore, systemically important NBFCs not allowed hitherto were permitted to raise short-term foreign borrowings.
- Interest rate ceiling on export credit in foreign currency was increased to LIBOR plus 350 basis points subject to banks not levying any other charges.
- Authorised Dealer (AD) category-I banks were allowed to borrow funds from their head office, overseas branches and correspondents and overdrafts in nostro accounts up to a limit of 50 per cent of their unimpaired Tier 1 capital as at the close of the previous quarter or US\$ 10 million, whichever was higher, as against the earlier limit of 25 per cent.
- Indian companies were encouraged to prematurely buy back their FCCBs under the approval or automatic route, at prevailing discounts rates, subject to compliance with certain stipulated conditions. Extension of FCCBs was also permitted at the current all-in-cost for the relative maturity.

5.27 In the Indian context, even though the utilisation of the forex swap facility was limited, the feedback from market participants and anecdotal evidence suggest that the facility had achieved the desired objective in providing comfort and confidence to the banks at a time when international

money markets were frozen. An exercise was undertaken to test the effectiveness of the *forex swap* facility. The results do not indicate any significant relation between the differenced USD-INR series and the forex-swap amounts (low \bar{R}^2 and insignificant coefficients)². However, in the case of

Variable	Differenced USD-INR ²		USD-INR Volatility	
	Coefficient	Prob.	Coefficient	Prob.
C	0.027	0.072	8.49e-05	0.000
DUMMY	-0.005	0.933	-0.00014	0.120
Dependent Var (t-1)	0.145	0.001	0.97202	0.000
Forex Swap (000 cr)	-0.033	0.578	0.00020	0.053
R-squared	0.03		0.95	
Durbin-Watson stat	1.97		1.77	

Dummy variable takes value 1 since November 14, 2008, otherwise zero.

volatility, the *dummy variable* has a negative coefficient and the *forex swap* has a positive sign indicating (a) the decline in volatility after the introduction of forex swap and (b) the use of the swap window by banks during high volatility periods. In due course, the outstanding under the forex swap facility, declined to Rs. 240 crore at end-September 2009 from its peak of Rs.1,820 crore on February 19, 2009, indicating considerable improvement of forex liquidity conditions for Indian banks (Chart V.7). Taking into account the prevailing forex liquidity conditions, the forex swap facility was discontinued by the Reserve Bank from October 27, 2009.

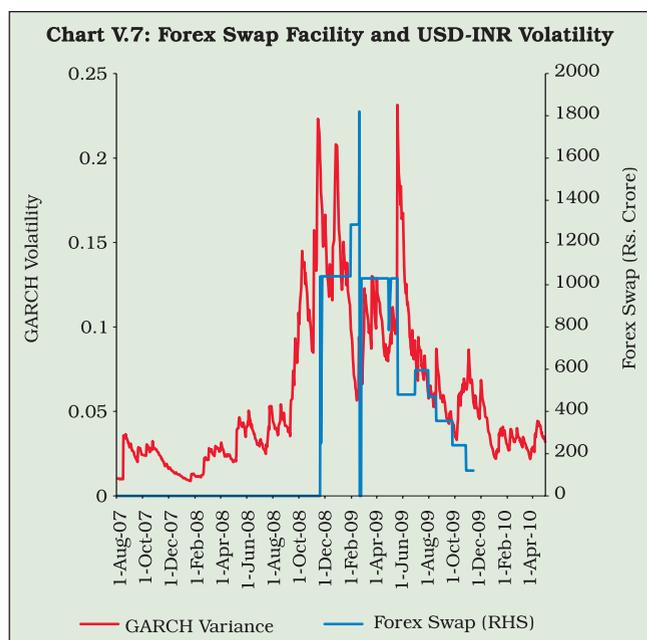
5.28 In sum, with the help of the Reserve Bank's actions in the foreign exchange market, the pressure eased since December 2008 as liquidity conditions in the foreign exchange market returned to normalcy. The rupee generally appreciated against the US dollar during 2009-10 on the back of significant turnaround in FII inflows, continued inflows under FDI and NRI deposits, better-than-expected macroeconomic performance in 2009-10 and weakening of the US dollar in the international markets. The volatility in the foreign exchange market declined after the introduction of the forex swap facility. Additionally, the outcome of the

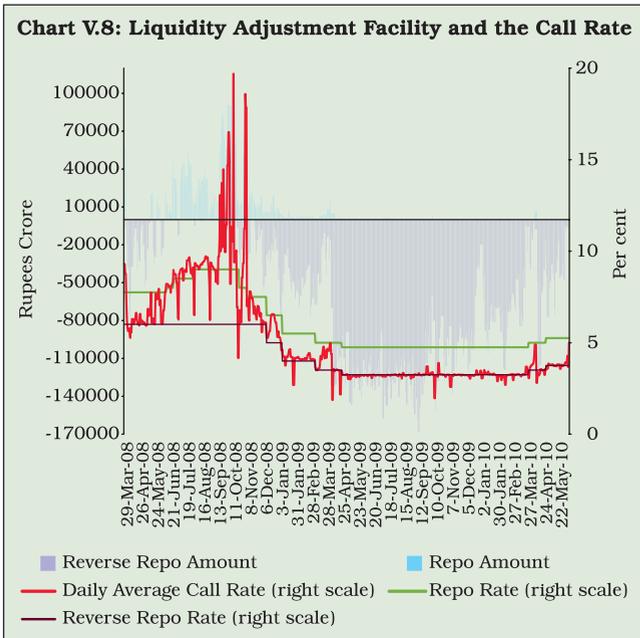
general elections, which generated expectations of political stability, buoyed market sentiment and contributed towards the strengthening of the rupee, especially from the second half of May 2009.

Money Market

5.29 Since the early 1990s, the Indian money market has undergone a significant transformation in terms of instruments, participants and technological infrastructure. Various reform measures have resulted in a relatively deep, liquid and vibrant money market. Along with the shifts in the operating procedures of monetary policy, the liquidity management operations of the Reserve Bank have also been fine-tuned to enhance the effectiveness of monetary policy signalling. Various segments of the money market have been developed in line with shifts in policy emphasis. The call money market was transformed into a pure inter-bank market, while other money market instruments, such as market repo and collateralised borrowing and lending obligation (CBLO), were developed to provide avenues to non-banks for managing their short-term liquidity mismatches. Policy initiatives by the Reserve Bank in terms of widening of market-based instruments and shortening of maturities of various instruments have not only helped in promoting market integration but also enabled better liquidity management and transmission of policy signals by the Reserve Bank. Following the recommendations of the Technical Group on Money Market (2005), the Reserve Bank's focus on the money market has been on encouraging the growth of the collateralised market, developing a rupee yield curve and providing avenues for better risk management by market participants.

5.30 The money market was orderly during the first half of 2008-09, with call rates remaining generally within the informal corridor of reverse repo and repo rates (Chart V.8). The call money rates edged up in tandem with the hikes in LAF repo rates in stages till August 2008, reflecting monetary policy tightening on inflation concerns and hovered around the upper bound of the





corridor during the second quarter (up to mid-September 2008). In mid-September 2008, the failure of Lehman Brothers and a few other global financial institutions led to the freezing of money market activities in major financial centres; and

Indian markets were also indirectly affected. In response to the crisis, the Reserve Bank provided substantial dollar liquidity to curb excessive volatility in the foreign exchange market, which had a tightening impact on rupee liquidity. Such operations by the Reserve Bank in the foreign exchange market along with transient local factors such as build-up in government balances following quarterly advance tax payments adversely impacted domestic liquidity conditions and the call money rate moved above the repo rate till the end of October 2008.

5.31 With the increasing uncertainty in global markets, the volatility in the call market also increased significantly during mid-September 2008. The volatility estimated by the GARCH(1,1) model indicates large increase in volatility in interbank rates during the second half of 2008-09 (Chart V.9). The apparent break in volatility was confirmed by the sign and statistical significance of the dummy variable of the augmented GARCH volatility equation.³ However, it may be mentioned that some

³ The GARCH volatility equation (Equation 2) was augmented to include a dummy variable. The augmented set of information used for estimating GARCH volatility is as follows:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \epsilon_t \dots \dots \dots (1); \text{ where } \epsilon_t / \Phi_{t-1} \sim N(0, h_t)$$

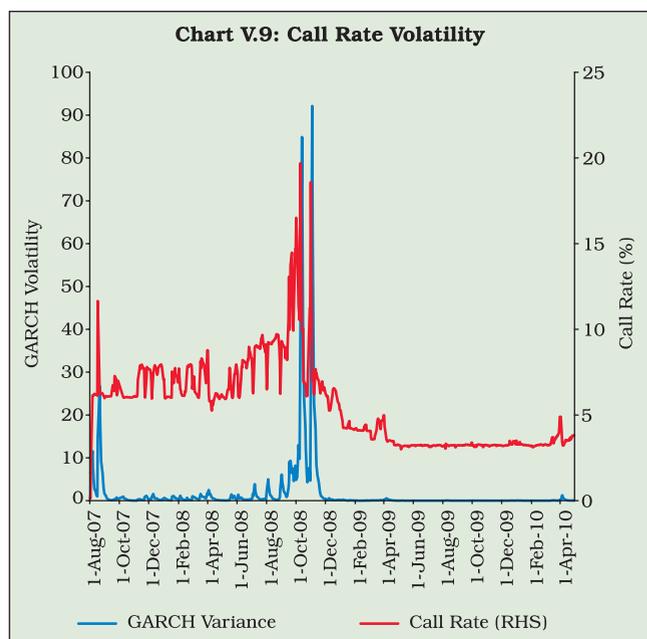
$$h_t = \beta_0 + \beta_1 \epsilon_{t-1}^2 + \beta_2 h_{t-1} + \lambda * D_t \dots \dots \dots (2)$$

where R_t is the dependent variable signifying the financial variable (e.g., weighted average call rate), h_t is the conditional volatility of the weighted average call rate/spread augmented by D_t - a dummy variable which takes the value 1 on a particular regime 0, otherwise. D_t is created to capture the effect of changes in regimes. Three dummies were considered as Prelude (August 07-August 08), Problem (September 08- December 08) and Recovery (January 09 to October 09). The dummy variables, Problem and Recovery, are introduced in the variance equation to evaluate the regime shift. The estimated results using the augmented GARCH model are as under:

Equation	Call Rate		Benchmark G-sec		Difference USD-INR	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	-	-	0.06	0.05	0.01	0.34
Dependent Variable (t-1)	0.98	0.00	0.99	0.00	0.16	0.00
Variance Equation						
C	0.59	0.00	0.00	0.00	0.01	0.00
RESID(-1)^2	0.61	0.00	0.09	0.00	0.21	0.00
GARCH(-1)	0.19	0.00	0.91	0.00	0.30	0.05
PROBLEM	0.39	0.00	0.00063	0.03	0.06	0.01
RECOVERY	-0.58	0.00	0.00003	0.48	0.04	0.00
R-Square	0.79		0.99		0.02	
D - W Stat	2.62		1.70		1.99	

The dummy variable for the perilude is not included to avoid dummy variable trap in the presence of a constant term. For USDINR, the differenced series was considered, as the series was found to be difference stationary for the time period under consideration.

- i) The constant term is excluded for call as the model with constant term was found to be unstable.
- ii) The coefficient of 0.98 encouraged evaluation of stationary property of the series. The Call rate was found to be stationary on the basis of ADF test statistics for the period under consideration (August 2007 - October 2009).
When returns volatility was used as the dependent variable(s) the result generally supported the above findings.



of the increase in this volatility could be due to domestic factors (e.g., quarterly advance tax outflow from the banking system and festive season currency demand during October - November) (Chart V.9).

5.32 With receding inflationary pressures and accentuating global crisis, the Reserve Bank swiftly and comprehensively switched to an expansionary regime from mid-October 2008 and announced a series of measures including a cumulative 400 basis points cut in CRR, a 100 basis point cut in statutory liquidity ratio (SLR) and 425 basis points (and 275 basis points) cuts in the repo (and reverse repo) rates, respectively, to augment domestic liquidity. Following the reversal of capital flows and increase in the liquidity needs of the economy, the Reserve Bank also started unwinding of the outstanding market stabilisation scheme (MSS) balances, resulting in a steady release of liquidity. After September 2008, the issue of Treasury Bills under the MSS was suspended. With effect from November 2008, the Reserve Bank also started buyback of dated securities earlier issued under

MSS to augment its efforts to hasten the pace of liquidity creation. The buyback was conducted through auctions and largely dovetailed with the normal market borrowing programme of the central government.

5.33 The measures initiated by the Reserve Bank augmented liquidity, and the weighted average call money rate declined and mostly remained within the LAF corridor from November 3, 2008 onwards. Moreover, volumes in the money market have also grown from January 2009 (Table 5.4), which suggests that there has not been any adverse perception of counterparty risk; consequently, the interbank money market functioned normally in India, in contrast to those of certain advanced economies. The average daily net outstanding liquidity injection under LAF, which had increased to around Rs.43,000-46,000 crore during September and October 2008, also declined sharply thereafter and turned into net absorption from early December 2008, reflecting the impact of these measures.

5.34 Liquidity conditions eased even further during 2009-10, mainly on account of a decline in central government cash balances, MSS unwinding and auction-based purchases under open market operation (OMO) (discussed later in the chapter)⁴. Following the easing of liquidity conditions and the reduction in policy rates, the call money rates declined further and hovered around the lower bound of the LAF corridor during 2009-10.

5.35 Collateralised segments now dominate activity in the money market with a share of over 75 per cent of money market operations. The CBLO and market repo volumes also picked up substantially in the last quarter of 2008-09, largely reflecting the easing of liquidity conditions and enhanced lending capacity of mutual funds. The money market rates, which started hardening from January 2008 and peaked in September 2008, have been on the downward trajectory since October

⁴ On review of the liquidity conditions, it was decided on May 5, 2009 that only one Liquidity Adjustment Facility (LAF) would be conducted daily with effect from May 6, 2009 (Wednesday) and that the second LAF would be conducted only on reporting Fridays. SLAF was reintroduced on a daily basis with effect from May 28, 2010 till July 2, 2010.

Table 5.4: Activity in Money Market Segments

Month	Average Volume (One Leg) (Rs. crore)				Money Market rate (Per cent)*	Term Money Market (Rs. crore)	Commercial Paper		Certificates of Deposit	
	Call	Market repo	CBLO	Total			Out-standing (Rs. crore)	WADR (%)	Out-standing (Rs. crore)	WADR (%)
1	2	3	4	5	6	7	8	9	10	11
2006-07	10,863	8,419	16,195	35,477	6.57	506	21,329	8.08	64,821	8.24
2007-08	10,697	13,684	27,813	52,194	5.48	352	33,813	9.20	1,17,186	8.94
2008-09	11,218	14,330	30,776	56,323	6.43	397	47,183	10.54	1,62,574	9.31
Apr-08	9,758	14,966	38,828	63,552	5.31	374	37,584	8.85	1,50,865	8.49
May-08	9,740	14,729	36,326	60,795	6.29	420	42,032	9.02	1,56,780	8.95
Jun-08	10,854	11,262	35,774	57,890	7.35	253	46,847	10.03	1,63,143	9.16
Jul-08	12,368	8,591	23,669	44,628	8.09	226	51,569	10.95	1,64,892	10.23
Aug-08	11,704	10,454	22,110	44,268	8.65	501	55,036	11.48	1,71,966	10.98
Sep-08	11,690	10,654	20,547	42,891	9.26	335	52,038	12.28	1,75,522	11.56
Oct-08	14,497	9,591	16,818	40,906	8.66	345	48,442	14.17	1,58,562	10.0
Nov-08	10,906	15,191	24,379	50,476	6.58	319	44,487	12.42	1,51,493	10.36
Dec-08	10,820	16,943	32,261	60,024	5.37	415	40,391	10.7	1,51,214	8.85
Jan-09	9,248	18,053	31,794	59,095	3.99	454	51,668	9.48	1,64,979	7.33
Feb-09	11,121	19,929	38,484	69,534	3.89	669	52,560	8.93	1,75,057	6.73
Mar-09	11,909	21,593	48,319	81,821	3.76	451	44,171	9.79	1,92,867	7.53
Apr-09	10,910	20,545	43,958	75,413	2.41	332	52,881	6.29	2,10,954	6.48
May-09	9,518	22,449	48,505	80,472	2.34	338	60,740	5.75	2,18,437	6.20
Jun-09	8,960	21,694	53,553	84,207	2.69	335	68,721	5	2,21,491	4.90
Jul-09	7,197	20,254	46,501	73,952	2.83	389	79,582	4.71	2,40,395	4.96
Aug-09	7,569	23,305	57,099	87,973	2.62	461	83,026	5.05	2,32,522	4.91
Sep-09	8,059	27,978	62,388	98,425	2.73	381	79,228	5.04	216,691	5.3
Oct-09	7,888	23,444	58,313	89,645	2.70	225	98,835	5.06	2,27,227	4.70
Nov-09	6,758	22,529	54,875	84,162	2.87	191	1,03,915	5.17	2,45,101	4.86
Dec-09	6,651	20,500	55,338	82,489	2.91	289	90,305	5.4	2,48,440	4.92
Jan-10	6,411	14,565	50,571	71,547	2.97	404	91,564	4.80	2,82,284	5.65
Feb-10	6,809	19,821	63,645	90,275	2.95	151	97,000	4.99	3,09,390	6.15
Mar-10	8,812	19,150	60,006	87,968	3.22	393	76,056	6.29	3,41,054	6.07
Apr-10	8,187	20,319	50,891	79,397	3.03	345	98,769	5.37	3,36,807	5.56
May-10	8,393	17,610	42,274	68,277	3.72	338	1,00,364	5.51	3,40,343	5.17

*: Weighted average rate of call, market repo and CBLO.

2008 reflecting various liquidity-inducing measures undertaken by the Reserve Bank (Chart V.10). Further, with the significant easing of liquidity

conditions, the rate in the collateralised segments generally remained below the lower bound of the LAF corridor during 2009-10.

Chart V.10: Liquidity Position and Money Market Rate

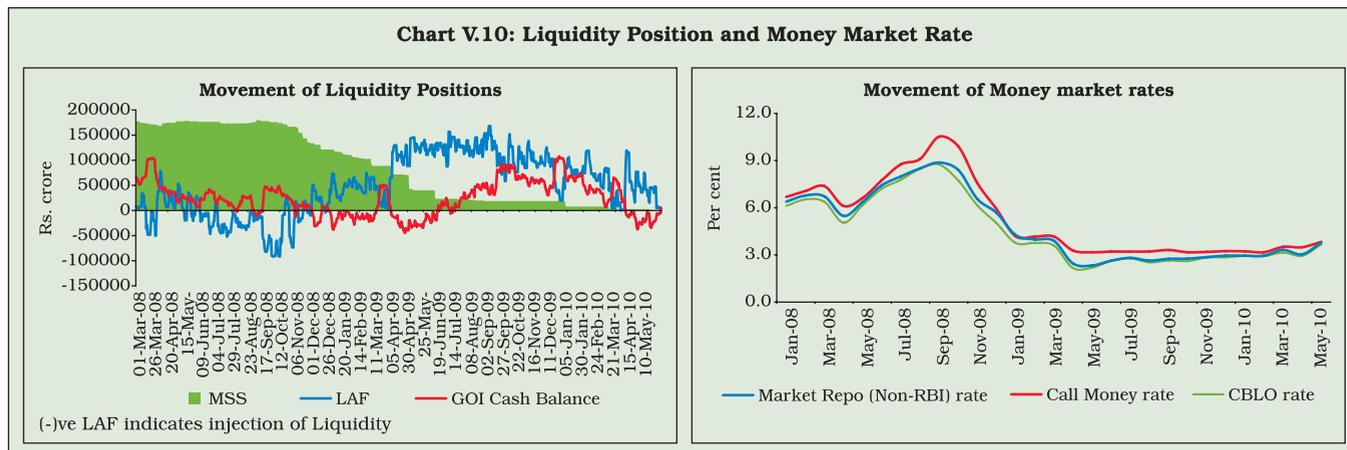
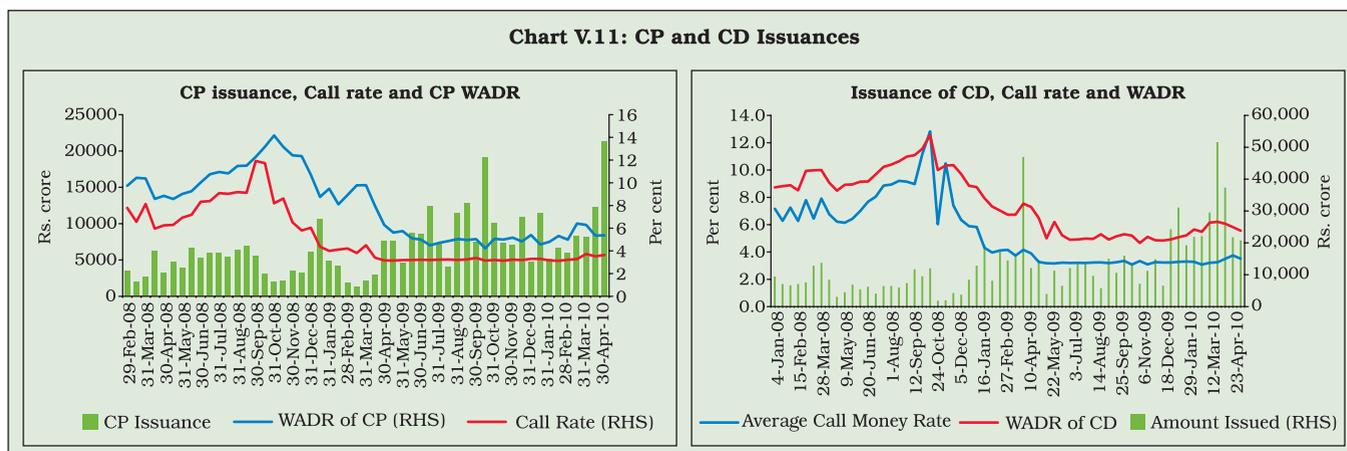


Chart V.11: CP and CD Issuances



5.36 The indirect impact of the crisis also got reflected in the Certificate of Deposits (CDs) and Commercial Paper (CP) markets. In both the markets, the outstanding amounts declined and the weighted average discount rate (WADR) rose during September-October 2008. A few cases of default by issuers (in meeting the redemptions) were also reported by Issuing and Paying Agents (IPAs) in the CP market. Subsequently, the liquidity conditions eased and the outstanding amount of CP and CDs picked up (Chart V.11). The WADR in the CP and CD markets have generally declined till December 2009 in line with the other money market rates.

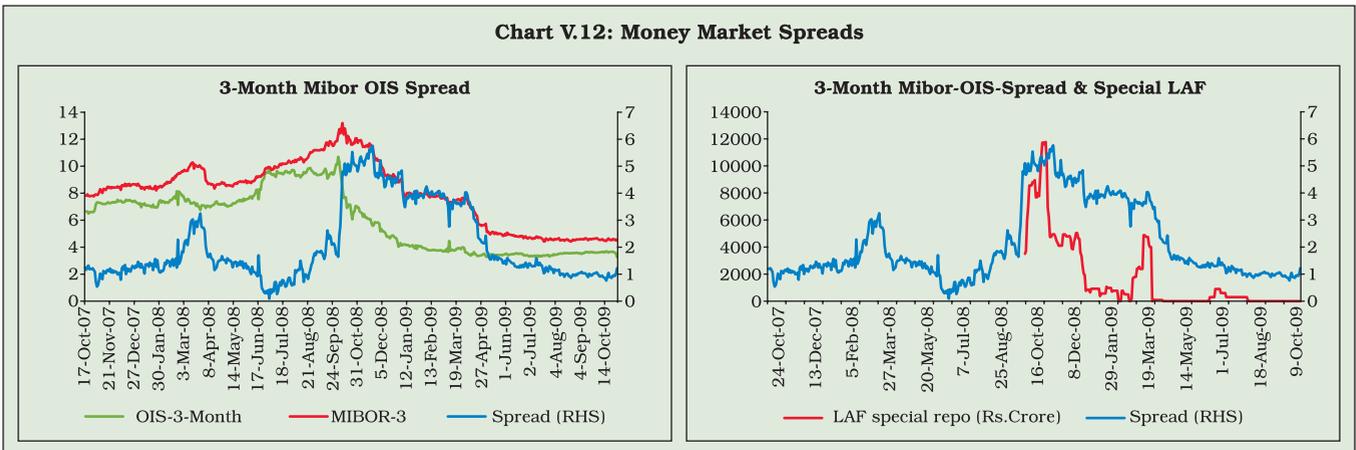
Term Repo Facility

5.37 Dwindling foreign funding and the slump in the domestic capital market exacerbated pressures on some segments of the Indian financial system, such as mutual funds and NBFCs. Facing large redemption pressures, the mutual funds started conserving their liquidity which, in turn, affected other sections of the market, particularly NBFCs that had been dependent on mutual funds for their funding needs. The Reserve Bank, acting swiftly, introduced a term repo facility (a 14-day special repo facility for a notified amount of Rs.20,000 crore) with effect from October 15, 2008 to address such liquidity shortages. Banks were allowed temporary use of SLR securities for collateral purposes by an additional 0.5 per cent of net demand and time liabilities (NDTL). Subsequently,

this facility was expanded to enable banks to meet the funding needs of NBFCs and housing finance companies (HFCs). At the same time, the notified amount was increased to Rs.60,000 crore and the relaxation in the maintenance of the SLR was enhanced up to 1.5 per cent of their NDTL from November 2008. In view of its effectiveness, the term lending facility was further extended up to March 31, 2010. A special refinance facility was also introduced on November 1, 2008 to provide funding to SCBs up to 1 per cent of their NDTL at the repo rate to enable banks to meet the liquidity demands. (Also see Section III of this chapter).

5.38 An exercise was undertaken to empirically evaluate the effect of term repo on funding liquidity stress in the Indian financial market during the crisis period. Following, Frank and Hesse (2009) study, 3-month MIBOR-OIS spread was calculated to provide a proxy for the liquidity stress in the Indian markets. The MIBOR-OIS spread increased considerably from end-September 2008 (Chart V.12), which could indicate hoarding of funding in order to cover further contingent liabilities following asset price declines, subsequent marking-to-market of securities and forced liquidations. However, following the introduction of the term repo facility, the MIBOR-OIS spread declined gradually, indicating the easing of financial stress in the financial markets. It may be mentioned that the amount under term repo facility was higher during the periods of high spread, and gradually declined with time in line with the declining spread.

Chart V.12: Money Market Spreads



5.39 The effectiveness of the term repo facility on the MIBOR /OIS volatility was empirically investigated using the MIBOR / OIS volatility (standard deviation of a 5-day moving window) as the dependent variable and dummy variable for term repo (which took value 1 post-October 14, 2008, otherwise 0) and term repo amounts as independent variables. The lagged value of the dependent variable (i.e. volatility) was also included as independent variable. In both regressions, the dummy variables had negative sign and the coefficients of dummy variables were significant at conventional levels⁵. The negative sign of the dummy variables (for term repo facility) indicated that the term repo facility was effective in containing liquidity stress in the Indian economy during the crisis period. Taking into account the prevailing liquidity conditions and declining spreads, the term repo facility was discontinued by the Reserve Bank from October 27, 2009.

Liquidity Injection and the Reserve Bank's Balance Sheet

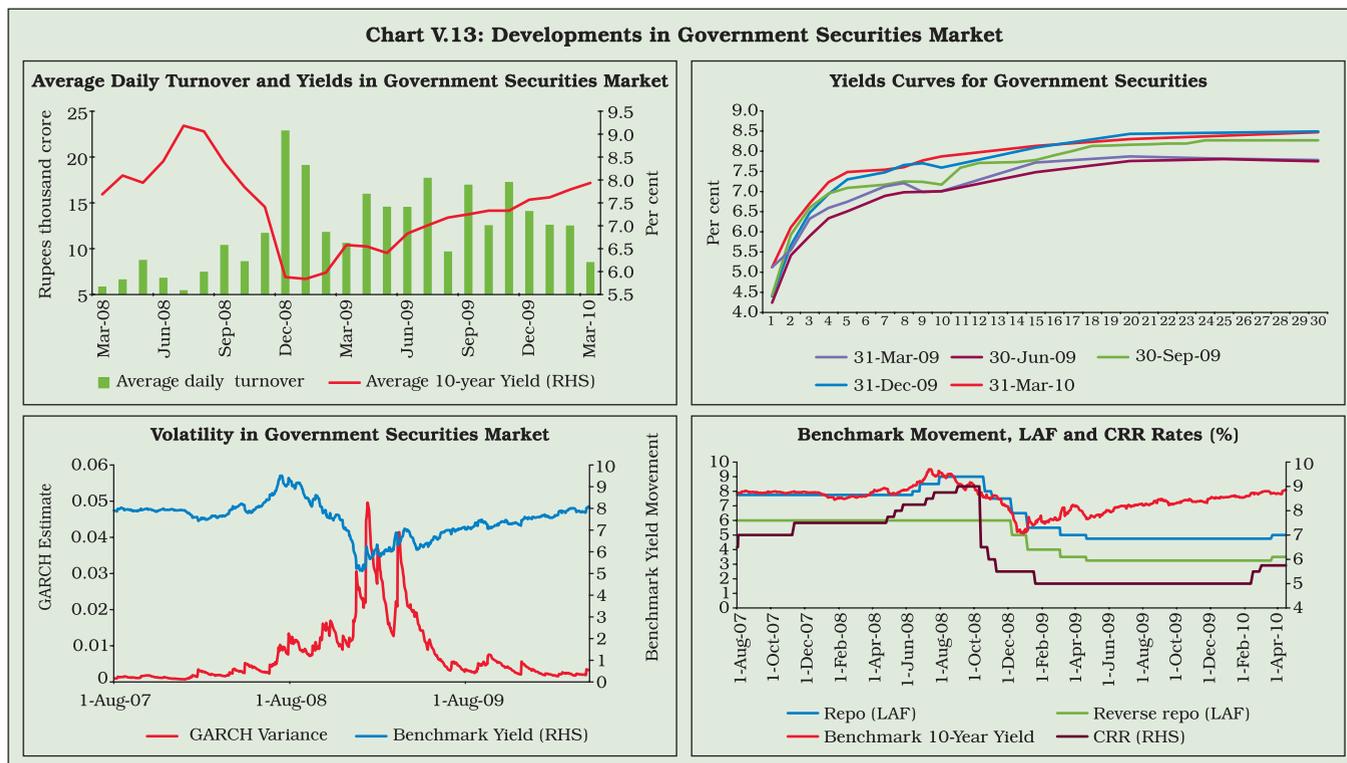
5.40 With large capital outflows during the third quarter of 2008, the net foreign exchange assets

(NFA) came under pressure. The Reserve Bank responded by injecting liquidity in the system through conventional OMO, provision of liquidity through repos and term repos under LAF, unwinding of MSS balances and CRR reduction. The unwinding of MSS balances not only created scope for adequate liquidity expansion by the Reserve Bank without expanding its balance sheet in any significant measure, but the timing of the unwinding could also be modulated in such a way that the large borrowing programme of the government was managed smoothly without exerting undue market stress.

5.41 Thus, the Reserve Bank addressed the financial stress faced by non-banks/banks indirectly through the banking channel and without compromising either the eligible counterparties or the asset quality of its balance sheet, which was in contrast to the approach adopted by the central banks of some of the advanced countries. By synchronising the liquidity management operations with those of exchange rate management and non-disruptive internal debt management operations, the Reserve Bank of India ensured that appropriate

⁵ $MIBORV_t = 0.02 - 0.004 DUMMY_t + 0.83 MIBORV_{t-1} + 0.002 TERMREPO_t$
 (0.0) (0.05) (0.00) (0.08)
 $R^2=0.71$ $DW=1.39$
 $OISV_t = 0.02 - 0.01 DUMMY_t + 0.89 OISV_{t-1} + 0.001 TERMREPO_t$
 (0.0) (0.05) (0.00) (0.35)
 $R^2=0.82$ $DW = 1.49$
 MIBORV= Mibor volatility.
 OISV= OIS volatility
 Figures in parentheses indicate P-values. Sample period October 2007 - October 2009.

Chart V.13: Developments in Government Securities Market



liquidity was maintained in the system, consistent with the objective of price and financial stability (Mohanty, 2009). The cumulative impact of the various liquidity measures put in place since mid-September 2008 augmented actual/potential liquidity in the system on the aggregate by Rs.5,61,000 crore up to September 2009. (Also see section on Policy Responses towards the end of this chapter). The term repo facility was effective in containing the liquidity stress in the Indian economy during the crisis period.

Government Securities Market

5.42 The government securities market in India has evolved over the years. Recognising the need for a well-developed government securities market, the Reserve Bank, in coordination with the government, initiated a series of measures from the early 1990s to deregulate the market of administered price and quantity controls. Consequently, the government securities market has witnessed significant transformation in various dimensions, viz., market-based price discovery,

widening of the investor base, the introduction of new instruments, establishment of primary dealers, and implementation of an electronic trading and settlement infrastructure. The switchover to an auction-based system of issuance of government securities in the early 1990s was a major step. This, in turn, led to consistent increases in the size of the market in tandem with the growth in market borrowings of both the central and state governments.

5.43 The operationalisation of the Clearing Corporation of India Ltd. (CCIL) has ensured guaranteed settlement of trades and has, therefore, imparted considerable stability to the government securities market. The operation of a system of market intermediaries in the form of primary dealers (PDs) has facilitated the Reserve Bank’s smooth withdrawal from the primary market from April 1, 2006 as provided in the Fiscal Responsibility and Budget Management (FRBM) Act. Reflecting the effectiveness of various measures initiated to develop the market, turnover in the secondary market has increased manifold over the years.

5.44 The impact of the global financial crisis led India to implement extraordinary measures, both on the fiscal and monetary fronts, to stimulate domestic demand. The fiscal consolidation norms set earlier under the Fiscal Responsibility and Budget Management (FRBM) Act have been justifiably suspended for the time being, with the assurance that the government will revert to it as early as feasible. As a result, there were sharp increases in both the borrowings of the central and state governments during 2008-09 over their respective budget estimates.

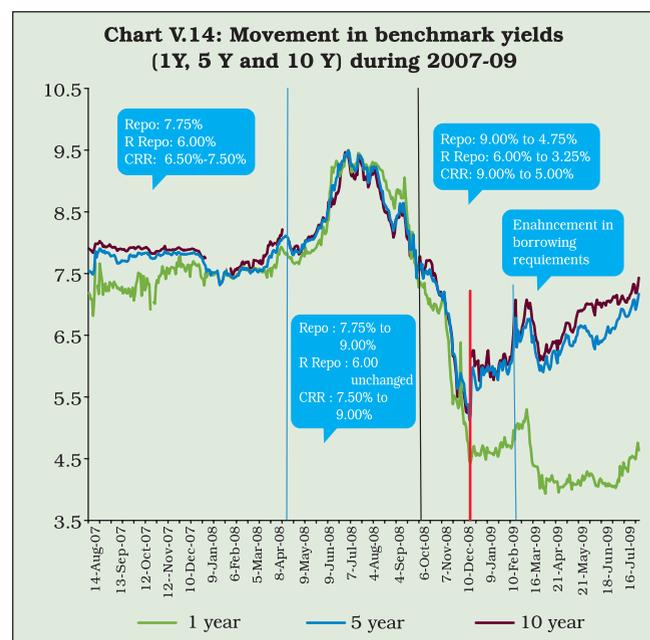
5.45 The primary market yields of Treasury Bills across all maturities hardened up to August 2008 and softened thereafter, reflecting the interest rate cycle coupled with improvement in liquidity conditions from October 2008. During March 2009, however, the yields hardened from their levels in January and February 2009 due to increased market borrowings by both the central and the state governments and quarterly advance tax outflows. (Chart V.13).

5.46 The movement in the 10-year yield since April 2008 can be categorised into three broad phases (Chart V.14). During the first phase, *i.e.*, April to mid-July 2008, the 10-year yield hardened on heightened inflationary expectations and

reached a high of 9.51 per cent on July 15, 2008. During the second phase (mid-July to end-December 2008), the 10-year yield generally eased, following the reduction in inflationary pressures in tandem with the softening of crude oil prices, easing of domestic liquidity conditions and decline in domestic policy rates in response to the indirect impact of the global financial turmoil (from mid-September 2008) and monetary policy easing in the US (Table 5.5). During the third phase (since January 2009), the 10-year yield generally hardened (barring some brief interludes in February and April), notwithstanding the continued prevalence of easy liquidity conditions and further reduction in the domestic policy rates in January 2009

Table 5.5: Transactions in Government Securities Market

Period	Average Turnover in Govt. Securities (Rs. crore)	Average 10-Year Yield@ (per cent)	Average Implicit Yield at Minimum Cut-off Price (364 days) (per cent)	Average Bid-Cover Ratio (364 days) (per cent)
1	2	3	4	5
2006-07	4,863	7.78	7.01	2.45
2007-08	8,104	7.91	7.42	3.21
2008-09	10,879	7.54	7.15	3.47
2009-10	13,939	7.24	4.38	3.64
April-08	6,657	8.10	7.53	2.36
May-08	8,780	8.04	7.61	3.05
June-08	6,835	8.43	7.93	2.80
Jul-08	5,474	9.18	9.39	2.70
Aug-08	7,498	9.06	9.24	4.35
Sept-08	10,418	8.45	8.83	3.57
Oct-08	8,641	7.85	7.92	4.00
Nov-08	11,732	7.41	7.23	4.33
Dec-08	22,903	5.55	5.07	5.14
Jan-09	19,136	5.84	4.64	4.80
Feb-09	11,831	5.98	4.62	2.62
Mar-09	10,644	6.59	5.25	1.44
Apr-09	15,997	6.55	4.07	5.07
May-09	14,585	6.41	3.58	3.14
Jun-09	14,575	6.83	3.99	2.86
Jul-09	17,739	7.01	3.76	3.90
Aug-09	9,699	7.18	4.25	3.76
Sept-09	16,988	7.25	4.47	4.05
Oct-09	12,567	7.33	4.57	2.86
Nov-09	17,281	7.33	4.49	3.36
Dec-09	14,110	7.57	4.63	4.10
Jan-10	12,614	7.62	4.67	4.61
Feb-10	12,535	7.79	4.95	2.49
Mar-10	8,544	7.94	5.13	3.48



and March 2009. This was largely on account of the worsening of market sentiments following the upsurge in the government's market borrowing programme for 2008-09 as well as the large market borrowing requirement of the government for 2009-10.

5.47 Like forex and money markets, the volatility of the 10-year benchmark G-sec movement increased from September 2008 (see Chart V.14). The change in the volatility has been found to be statistically significant at conventional levels. Market borrowings of the Government of India increased sharply during the last quarter of 2008-09 to finance the additional expenditure by way of two supplementary demands for grants to support various stimulus packages. For more effective liquidity management and to ensure that the market borrowing programme of the government was conducted in a non-disruptive manner, the scope of the open market operations (OMO) was widened with effect from February 19, 2009 by including purchases of government securities through an auction-based mechanism in addition to purchases through the Negotiated Dealing System – Order Matching (NDS-OM) segment. The Reserve Bank, as against its intention to purchase government securities amounting to Rs.80,000 crore under the OMO programme for the first half of 2009-10, purchased securities amounting to Rs.57,487 crore up to end-September 2009, through the auction route. Furthermore, the Memorandum of Understanding (MoU) on the MSS was amended on February 26, 2009 to permit the transfer of the sequestered liquidity from the MSS cash account to the normal cash account of the government.

5.48 In sum, the Reserve Bank successfully managed the government market borrowing programme during the crisis year, 2008-09, and 2009-10, without creating any disruptive pressures on the government securities market. The Reserve Bank employed a combination of measures involving monetary easing and the use of innovative debt management tools such as synchronising the Market Stabilisation Scheme (MSS) buyback auctions and open market purchases with the government's normal market borrowings and de-

sequestering of MSS balances. By appropriately timing the release of liquidity to the financial system to coincide with the auctions of government securities, the Reserve Bank ensured a relatively smooth conduct of the government's market borrowing programme, resulting in a decline in the cost of borrowings during 2008-09 for the first time in the past five years. Reflecting the continued need for fiscal stimulus in 2009-10 which led to large borrowing requirements, the Reserve Bank continued with an active debt management strategy so as to mitigate pressures on interest rates and avert possible crowding out of private sector demand for credit.

Capital Markets and Asset Prices

5.49 The Indian equity market has witnessed a significant improvement since the reform process began in the early 1990s. The equity market in India is now comparable with international markets. The changes in regulatory and governance framework have increased investors confidence. There has been a visible improvement in trading and settlement infrastructure, risk management systems and levels of transparency. These improvements have reduced transaction costs and led to improvements in depth and liquidity

5.50 Before the onset of the sub-prime crisis in the US in August 2007, capital markets across advanced and emerging market economies had witnessed a strong rally. The mounting losses of large financial institutions on account of the sub-prime crisis, however, intercepted the rally and capital markets started sliding in most of the advanced economies. Confidence in many large financial institutions was severely shattered by the sub-prime mortgage losses and the share prices of these institutions, especially investment banks, crumbled drastically from the later part of 2007. Subsequently, capital markets of emerging market economies also started decelerating, primarily on account of large pullouts by foreign institutional investors (FIIs).

5.51 Although Indian banks/ financial institutions had no significant exposure to the US sub-prime

market, Indian capital markets caught the global downswings in January 2008, largely driven by selling pressures by FIIs. Besides pullouts by FIIs, turmoil in international financial markets also weakened domestic sentiments and amplified the downturn in Indian capital markets. Major events involving losses of mortgage companies and international commercial/ investments banks continued to spike the stress in capital markets across advanced and emerging market economies during 2008-09. Indian stock markets also responded to these major global events, reflecting the increased financial integration of the Indian economy.

Primary Markets

5.52 The primary segment of the capital market, which remained buoyant in the years before the recent crisis, subdued significantly during 2008-09 (Table 5.6). The slump in the primary market during the second half of 2008-09 was driven by

Table 5.6: New Capital Issues by Non-Government Public Ltd. Companies

Month	Equity Shares		ADRs/ GDRs	
	No. of Issues	Amount (Rs. crore)	No. of Issues	Amount (Rs. crore)
1	2	3	4	5
April-08	2	439	4	2,151
May-08	4	307	3	1,901
June-08	9	1,285	1	3
Jul-08	5	262	1	30
Aug-08	5	368	1	567
Sept-08	7	9,700	0	0
Oct-08	3	129	2	35
Nov-08	2	148	0	0
Dec-08	3	1,370	0	0
Jan-09	0	0	0	0
Feb-09	1	24	0	0
Mar-09	4	640	1	102
Apr-09	0	0	1	167
May-09	1	9	0	0
Jun-09	4	227	1	48
Jul-09	3	3,179	1	48
Aug-09	4	366	4	4,618
Sept-09	12	2,853	1	7,763
Oct-09	4	2,023	1	446
Nov-9	3	878	2	1,774
Dec-09	5	3,586	2	299
Jan-10	8	2,101	4	349
Feb-10	8	5,274	0	0
Mar-10	15	4,803	1	455

heightened volatility and uncertainty in the financial markets, slowdown in growth and incumbent demand for investment and dampened sentiment due to depressed secondary markets.

5.53 The number of initial public offerings (IPOs) in the private sector plummeted significantly during the second half of 2008-09. Similarly, resources mobilised through ADRs/GDRs declined sharply in the second half of 2008-09. The private placements market that had been a major alternative source of funding for Indian corporates in the recent past also contracted in 2008-09. The primary market activities, however, revived since June 2009 and picked up sharply during the last quarter of 2009-10 as indicated by IPOs.

Secondary markets

5.54 The global crisis had a pronounced effect on financial markets in general and stock markets in particular through a rapid decline in stock prices and the market capitalisation of listed companies, leading to adverse consequences of the wealth effect on macroeconomic aggregates. Over the past two decades, stock markets had witnessed rapid growth due to globalisation, reform and advancement in information technology. The bulk of this expansion came from EMEs in the Asia-Pacific region and, as a result, market capitalisation of stock exchanges as a percentage to GDP in the low- and middle-income countries had almost converged with high-income countries during recent periods (Table 5.7). This rapid expansion of market capitalisation also provided adequate lubricant to the finance channels to transmit shocks across the equity markets, with stock markets emerging as key channels during the financial crisis.

5.55 The market capitalisation of stock exchanges in regions such as East Asia, including China, and South Asia, including India, which experienced high economic growth during 2003-2007, surpassed the high-income OECD countries. With the global crisis, the market capitalisation of stock exchanges in East Asia and the Pacific region in 2008 fell by more than 50 per cent, comparable to the position one and a half

Table 5.7 : Market Capitalisation of Stock Exchanges: Region-wise

(per cent to GDP)

Year	East Asia & Pacific	High income	High income: OECD	Euro area	Latin America & Caribbean	Low & middle income	Lower middle income	Middle income	South Asia	Upper middle income	World
1	2	3	4	5	6	7	8	9	10	11	12
1991	16.4	57.0	56.7	22.5	18.9	18.2	11.2	18.5	16.2	22.5	51.5
1993	55.0	62.6	60.5	26.1	31.1	34.0	28.2	34.4	30.3	38.2	58.3
1997	25.5	89.1	88.6	44.8	29.6	29.9	21.7	30.3	26.7	36.8	78.1
1998	30.9	106.1	106.9	63.0	19.5	23.8	23.0	24.0	20.9	24.8	91.3
1999	42.6	134.2	134.2	83.4	32.8	38.9	33.1	39.6	33.5	45.3	118.3
2000	47.1	116.8	117.1	87.0	31.8	35.5	35.3	36.1	26.1	36.7	102.3
2001	42.2	102.0	101.8	68.3	32.5	32.6	30.2	33.0	19.1	35.7	89.4
2002	35.9	81.6	81.0	50.9	25.4	30.1	27.4	30.4	22.2	33.6	72.5
2003	46.7	98.2	96.9	58.3	29.7	39.6	39.0	40.3	39.5	41.7	87.6
2004	40.2	104.6	102.4	61.0	35.6	42.1	37.7	42.9	48.1	48.1	92.6
2005	40.6	110.5	107.1	62.7	40.5	48.6	42.5	49.5	60.2	56.0	97.5
2006	84.9	122.8	120.9	80.7	49.1	71.7	75.7	72.9	76.9	70.3	111.1
2007	158.9	123.5	119.9	85.3	70.8	112.1	140.4	113.5	133.4	86.5	120.7
2008	58.0	62.9	61.8	38.0	31.9	48.9	53.5	49.5	47.0	45.5	59.2

Source: World Development Indicators, World Bank.

decades ago (Table 5.8). Further, the decline was comparable to the OECD countries, which underlines the importance of global integration in transmitting shocks across the markets.

5.56 The reversal of private capital flows to emerging and developing economies was the major factor that contributed to the decline of stock markets in the EMEs. According to the IMF, private

Table 5.8: Market Capitalisation of Stock Markets in Emerging Market Economies

(Per cent to GDP)

Year	Brazil	China	India	Indonesia	Malaysia	Korea	Philippines	Thailand	Mexico	Russia
1	2	3	4	5	6	7	8	9	10	11
1991	10.5	0.5	17.8	5.3	119.3	31.3	25.1	36.4	31.2	0.0
1996	25.8	13.3	31.6	40.0	304.6	24.9	97.4	54.9	32.0	9.5
1997	29.3	21.7	31.3	13.5	93.5	8.9	38.1	15.6	39.0	31.7
1998	19.1	22.7	25.3	23.2	136.6	35.1	54.2	31.2	21.8	7.6
1999	38.8	30.5	41.0	45.8	183.8	88.8	55.3	47.7	32.0	36.9
2000	35.1	48.5	32.2	16.3	124.7	32.2	34.2	24.0	21.5	15.0
2001	33.6	39.5	23.1	14.3	129.3	43.6	58.3	31.5	20.3	24.9
2002	24.6	31.9	25.8	15.3	122.8	43.3	50.8	36.4	15.9	36.0
2003	42.5	41.5	46.6	23.3	152.8	51.2	29.6	85.0	17.5	53.5
2004	49.8	33.1	55.3	28.5	152.3	59.4	33.3	72.3	22.6	45.3
2005	53.8	34.9	68.3	28.5	131.4	85.0	40.6	74.4	28.2	71.8
2006	65.3	91.3	89.5	38.1	150.5	87.8	58.2	71.0	36.7	106.7
2007	102.8	184.1	154.6	49.0	174.4	107.1	71.7	82.9	38.9	116.5
2008	36.6	64.6	53.0	19.2	96.0	53.2	31.2	39.4	21.4	82.2
Growth rate of Stock Market Capitalisation										
2008	-56.8	-61.4	-64.4	-53.3	-41.8	-58.1	-49.4	-47.7	-45.7	-
2009	125.9	89.8	101.9	117.6	51.2	77.3	66.0	71.6	89.2	-

Source: World Development Indicators, World Bank; World Federation of Exchanges.

capital flows to emerging and developing economies declined by 81 per cent in 2008 from the peak in 2007. Though direct investment flows showed stability, there was a sharp decline in other private capital flows comprising portfolio flows, external debt and official assistance.

5.57 The mounting losses of large financial institutions on account of spiralling default in mortgage loans and deteriorating valuations of mortgage-backed and other securities since August 2007 triggered deleveraging by these institutions based in the US and other advanced economies. With increasing deleveraging along with weakening of earnings prospects on the back of the intensifying economic slowdown, the stock markets began decelerating from January 2008 in advanced and emerging market economies. The failure of Lehman Brothers in September 2008, however, led to a sharp jump in counterparty risk that was reflected in a steep rise in spread on credit default swaps (CDS) and, eventually, amplified the pace of decline in stock markets across countries. During the recent crisis, stock market crashes were widespread despite varying macroeconomic fundamentals across countries.

Global Synchronisation

5.58 Indian stock markets also responded, taking their cue from markets in advanced economies, the epicentre of the current global crisis, and started decelerating from their peak on January 8, 2008 (the BSE Sensex was at 20,873), despite relatively robust macroeconomic fundamentals. In fact, of late, the movements in Indian stock markets have been highly synchronised with advanced and emerging market economies. The inter-temporal cyclical synchronisation of Indian stock markets has been estimated with select advanced and emerging market economies and it has gone up significantly with all these countries, barring Japan, during recent periods (Table 5.9). This increasing cyclical synchronisation of Indian stock markets reflects the increasing financial globalisation of the Indian economy over the past few years, which has been largely propelled by large inflows by foreign institutional investors (FIIs).

Table 5.9: Cyclical Synchronisation of Indian Stock Market with Select Countries

Country	2001: M1 to 2005: M12	2006: M1 to 2009: M8
1	2	3
China	0.66	0.76
Singapore	0.64	0.86
Korea	0.48	0.91
Japan	0.63	0.62
USA	0.65	0.87

Source: Data on country-wise Share Prices Index has been taken from IFS, IMF.

5.59 Foreign investors, through their buying and selling activities across countries guided by portfolio diversification objectives, contribute to price co-movement and integration among regional and global stock markets (Dhal, 2009). From this perspective, it is important to analyse the impact of global stock markets on the national stock markets. An empirical analysis confirmed that the regional stock markets in Asia including India, Hong Kong, and Singapore and global markets such as the US, UK, and Japan shared a single long-run co-integrating relationship in terms of stock price indices measured in US dollars rather than the local currencies (Table 5.10). The Indian market held the

Table 5.10: Integration of India's Stock Market with Regional and Global Markets

1	Long-run Co-integrating Relation among Stock Price Indices in US dollar				
	2	3	4	5	6
India	1.0000	1.0000	1.0000	1.0000	1.0000
Hongkong	-1.2407 (-5.83)	0	-0.7263 (-5.35)	-1.6178 (-6.34)	0
Singapore	0.4451 (2.99)	-0.0436 (-0.35)*	0	0.4454 (2.50)	0
Japan	-0.4353 (-3.39)	-0.7451 (-4.40)	-0.3645 (-2.82)	0	0
UK	-3.7438 (-11.47)	-3.9411 (-9.01)	-3.4277 (-10.81)	-3.9663 (-10.14)	-5.9019 (-11.41)
US	4.5296 (13.17)	4.3599 (10.01)	3.9150 (13.32)	4.7709 (11.48)	6.2101 (11.57)
TREND	-0.0033 (-17.92)	-0.0040 (-17.05)	-0.0033 (-17.31)	-0.0030 (-13.69)	-0.0046 (-12.87)
Intercept	-2.2409	-2.5587	-1.7563	-2.5748	-5.6351
Restriction on the coefficients of regional markets: Chi-square statistic (significance)		16.83 (0.00)	7.03 (0.01)	6.26 (0.01)	30.04 (0.00)

* Not significant at 5 per cent level.

Note: 1. Estimate based on the stock price indices in US dollar over natural logarithm scale.

2. Figures in parentheses indicate asymptotic 't' statistic.

Source: Dhal (2009).

key to this integration process. This was evident from the analysis that, excluding India, the other five stock markets did not show a co-integrating relationship. The coefficients of the long-run co-integration vector showed that the impact of the global markets on the Indian stock market was more pronounced than the impact of the regional markets. In terms of forecast error variance decomposition, global and regional markets together accounted for the bulk of variation in the Indian stock market.

Global Developments and Equity Prices

5.60 Foreign institutional investors (FIIs) started withdrawing from Indian stock markets from January 2008 as manifested by their larger net negative investments reflecting global deleveraging. The selling pressure by FIIs in Indian stock markets accentuated during October 2008,

following heightened turmoil in international financial markets fuelled by Lehman Brothers' bankruptcy, and stock markets plummeted to a large extent. The Indian stock markets appear to have reacted to all major global events during the current crisis (Box V.3).

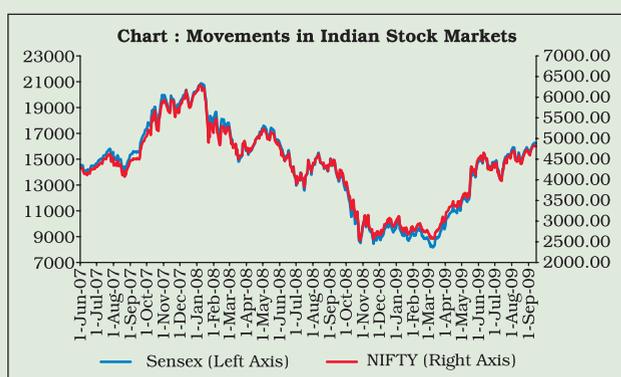
5.61 Along with large pullouts by FIIs as part of the deleveraging process and lowering of sentiments due to adverse events in international financial markets, the other impacts on the Indian economy were in the form of collapsing exports, tightening financial conditions and elevated uncertainty in the backdrop of the accentuated economic slowdown unleashed by the global crisis since October 2008. The dampening of the earning prospects of Indian corporates on the back of the real sector effects since the beginning of the third quarter of 2008-09 amplified the setback faced by

**Box V.3
Major Global Events and Response of Indian Stock Markets**

The current global crisis, which originated with the eruption of the sub-prime crisis in the US in August 2007, deepened with the unfolding of various events connected with financial markets. Some of these events and the response of Indian stock markets are discussed below.

- JP Morgan and Citibank announced huge losses as a result of a sharp fall in asset valuations and other exotic instruments in early March 2008. Furthermore, Bear Stearns was engulfed by a severe liquidity shortage in mid-March 2008 on account of cumulative mounting valuation losses. The US government facilitated the JP Morgan Chase takeover of Bear Stearns on March 16, 2008. The BSE Sensex slipped to 14,809 on March 17, 2008.

- The US government-sponsored mortgage guarantors Fannie Mae and Freddie Mac, which had guaranteed over US\$ 12 trillion in US home mortgage loans, had a drastic fall in their asset valuations on July 2008. The BSE Sensex, responding to the spillovers of this event, dipped to 12,576 on July 16, 2008, which was lower by 19.6 per cent from the end-March 2008 level and by 39.8 per cent from the January 8, 2008 peak.
- Lehman Brothers, one of the largest investment banks in USA, filed for bankruptcy protection on September 15, 2008. Another major investment bank, Merrill Lynch, however, was rescued by merging with Bank of America. The Indian stock markets started sliding further and the BSE Sensex dipped to 12,860 on September 30, 2008.
- The US Federal Reserve announced plans for purchases of up to US\$ 300 billion of longer-term Treasury securities over a period of six months on March 18, 2009.
- The G-20 issued a communiqué pledging joint efforts by governments to restore confidence and growth, including measures to strengthen the financial system on April 6, 2009. The market has been recovering since the beginning of 2009-10.



the Indian stock markets. All these factors affected the confidence of domestic retail and institutional investors, and stock markets witnessed a continuous slide until March 2009 (Table 5.11).

5.62 The BSE Sensex dipped by about 38 per cent to 12,860 at end-September 2008 from a peak of 20,873 on January 8, 2008, reflecting the initial impact of the crisis. Subsequently, it declined further by about 37 per cent to a new low of 8,160 on March 3, 2009 from the end-September 2008 level. The decline in the BSE Sensex from the peak to the new low was to the extent of 61 per cent. The volatility in Indian stock markets has also increased in sync with global stock markets since the beginning of 2008. The volatility measured in terms of the standard deviation of daily stock market indices (BSE Sensex and Nifty) shot up sharply in January 2008, October 2008, and May 2009, reflecting global events and domestic developments (Table 5.9). This was also confirmed when volatility was measured by GARCH (1,1) (Chart V.15).

5.63 The sharp fall in the stock markets was also visible in the major indicators. The P/E ratio and price-book value ratio of both the BSE Sensex and Nifty declined significantly during 2008-09 (Table 5.12). The market capitalisation of both the markets, which made rapid strides during the past 2-3 years, also slumped drastically by almost half during 2008-09 over the preceding year.

5.64 During 2009-10, volatilities in the stock markets declined and asset prices recovered from

Table 5.11: Trends in BSE and Nifty Indexes

Month	NIFTY	BSE SENSEX	FII Investment (Net) (Rs. crore)	Mutual Funds Investment (Net) (Rs. crore)	IIP (growth in per cent)
1	2	3	4	5	6
Jan-08	5756	19326	-17,227	7,703	6.2
Feb-08	5202	17728	4,883	514	9.5
Mar-08	4770	15838	125	-1,971	5.5
Apr-08	4902	16291	979	-112	6.2
May-08	5029	16946	-4,672	64	4.4
June-08	4464	14997	-10,578	3,179	5.4
Jul-08	4125	13716	-1,012	1,412	6.4
Aug-08	4417	14722	-7,937	-369	1.7
Sept-08	4207	13943	-2,066	2,292	6.0
Oct-08	3210	10550	-14,249	1,432	0.1
Nov-08	2835	9454	-3,362	-373	2.5
Dec-08	2896	9514	1,319	341	-0.2
Jan-09	2854	9350	-4,250	-864	1.0
Feb-09	2819	9188	-2,690	-1,496	0.2
Mar-09	2802	8995	269	1,477	0.3
Apr-09	3360	10911	7,384	39	1.1
May-09	3958	13046	20,607	2,291	2.1
Jun-09	4436	14782	3,225	839	8.3
Jul-09	4343	14635	11,625	1,826	7.2
Aug-09	4571	15415	4,029	570	10.6
Sept-09	4859	16338	19,939	-2,335	9.3
Oct-09	4994	16826	8,304	-5,194	10.2
Nov-09	4954	16684	5461	-696	12.0
Dec-09	5100	17090	10367	1762	17.7
Jan-10	5156	17260	-1137	-1311	16.3
Feb-10	4840	16184	2114	-697	15.1
Mar-10	5178	17303	20318	-4082	13.9
Apr-10	5295	17679	8416	-1410	17.6
May-10	5053	16845	-9175	99	-

their previous lows across countries. In Indian markets also, FIIs returned with net purchases and retail investors and mutual funds also made a swift

Chart V.15: Volatility in Stock Markets

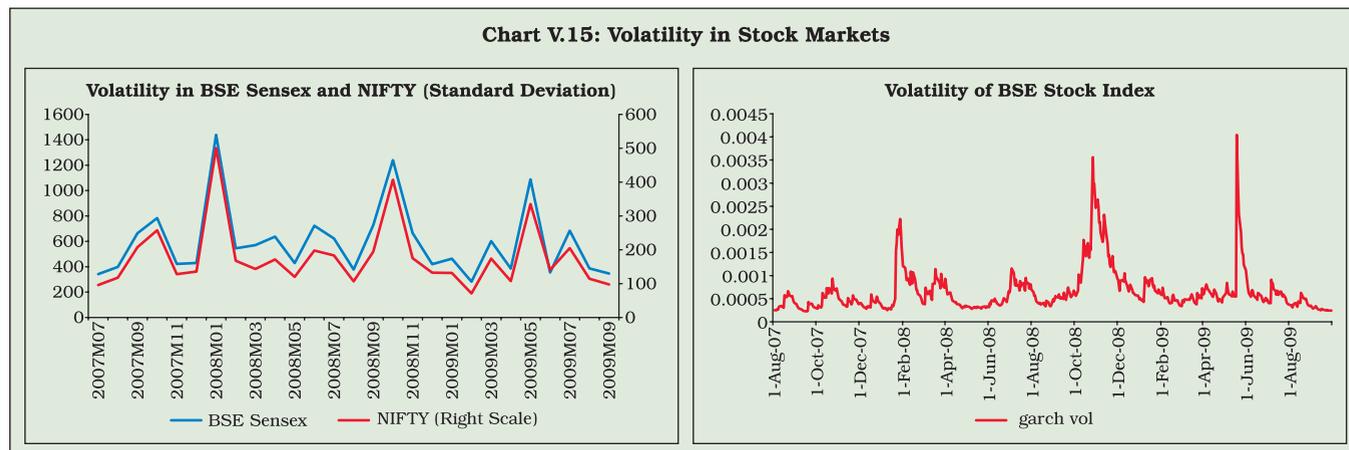


Table 5.12: Stock Market Indicators

Indicator	BSE						NSE					
	2000-01	2006-07	2007-08	2008-09	2009-10	2010-11 (Apr-May)	2000-01	2006-07	2007-08	2008-09	2009-10	2010-11 (Apr-May)
1	2	3	4	5	6	7	8	9	10	11	12	13
1 BSE Sensex / S&P CNX Nifty												
(i) End-period	3,604	13,072	15,644	9,709	17,127	16,945	1,148	3,822	4,735	3,021	5,249	5,086
(ii) Average	4,270	12,278	16,569	12,366	15,585	17,251	1,335	3,572	4,897	3,731	4,658	5,171
2 Coefficient of Variation	8.8	11.1	13.7	24.2	11.9	3.0	7.5	10.4	14.5	23.2	11.3	2.9
3 Price-Earnings Ratio (end-period)*	23.9	20.7	20.1	13.7	21.32	20.40	20.4	19.5	20.6	14.3	22.3	21.3
4 Price-Book Value Ratio (end-period)*	3.6	5.1	5.2	2.7	3.9	3.5	4.2	4.9	5.1	2.5	3.7	3.6
5 Yield* (per cent per annum) (end-period)	1.3	1.3	1.1	1.8	1.10	1.12	1.2	1.3	1.1	1.9	0.94	0.97
6 Market Capitalisation to GDP Ratio (per cent)@	25.8	85.5	113.1	59.0	106.5	87.8	28.9	81.6	107.0	55.4	103.8	85.5

*: Based on 30 scrips included in the BSE Sensex and 50 scrips included in the S&P CNX Nifty.
@: As at end-period.
Source: Bombay Stock Exchange Ltd. (BSE) and National Stock Exchange of India Ltd. (NSE).

reversal with a buying spree from March 2009. The price-earnings and price-book value ratios of both stock markets also surged significantly at the end of March 2010 from end-March 2009, on the back of fast recovery. Similarly, the stock market's capitalisation bounced back and, as the percentage of GDP, reached over 100 per cent at end-March 2010, which is almost the level achieved in end-March 2008. The recovery in the Indian stock markets could be attributed to a number of factors such as reduction in policy rates, the positive results of corporates and banks during 2009-10, political stability after the general elections, and stabilisation of the global economy.

Drivers of Stock Markets

5.65 In the long run, information tends to be symmetric and, hence, stock market movements are anchored to economic fundamentals. Besides the nature of available information, at times herd behaviour among investors spurred by domestic or global factors outplays the fundamentals and dictates movements in the stock markets in the short run. Similarly, other factors such as enabling liquidity, capital flows, and governance greatly influence the course of movements in stock markets. Illustratively, before the recent crisis economies across the world witnessed easing liquidity on account of accommodative monetary

policy and large capital flows, and stock markets made rapid strides in advanced and emerging market economies (EMEs). As discussed above, the stock markets have become highly synchronised across countries over the past few years with increasing cross-border capitals flows, especially for FIIs. During the recent crisis also, deleveraging by FIIs along with other factors such as the economic downturn, declining exports, exposure to troubled financial institutions and toxic assets appear to have triggered a significant downturn in stock markets.

5.66 In India too, though foreign direct investment showed stability, the decline of portfolio flows played a crucial role in the decline of stock prices. An empirical analysis within the framework of the VAR model showed that FII flows were Granger-caused by developments in the real economic activity abroad measured by US industrial production growth and the differential between domestic interest rates (call money rate) and foreign interest rates (3-month LIBOR rate) (Table 5.13). The differential interest rates reflect the arbitrage opportunity. Further, a bivariate VAR model revealed that there was a significant Granger causal relationship from FII flows to the Indian stock market. The feedback causality from the BSE index to FII flows was also significant, *albeit* at a 10 per cent level of significance. The variation in FII flows could explain about 35 per cent of the variation in the Indian stock market.

Table 5.13: FII Flows and India’s Stock Market: Causal Relationship

Null Hypothesis	Chi-square statistic (level of significance)	Result: Reject / Accept the Null
1	2	3
Real economic growth of the US does not cause FII flows to India	11.59 (0.02)	Reject
FII flows to India do not cause real economic growth of the US	6.79 (0.15)	Accept
Interest rate differential does not cause FII flows to India	7.91 (0.09)	Reject
FII flows to India do not cause interest rate differential	3.01 (0.56)	Accept
Variation in FII flows does not cause variation in BSE Sensitive Index	16.79 (0.00)	Reject
Variation in BSE Sensitive Index does not cause variation in FII flows	9.51(0.09)	Reject

5.67 Another exercise was undertaken to find the drivers of Indian stock markets. In this regard, a general vector autoregression (VAR) framework with monthly data from 2001 to 2009 was estimated with BSE Sensex (BSES), net FII investment (NFIs), net investment by mutual funds (NMF), money supply (M3) and index of industrial production (IIP). The Cholesky variance decomposition suggests that, in the first period, net investment by FIIs explains about 4 per cent variation in BSES, which increases to about 35 per cent by the end of the 12th period, but descends slowly afterwards. On the other hand, variation in the BSES caused by net investments by mutual funds, IIP and money supply also rises over time and reaches 4 per cent, 6 per cent and 5 per cent, respectively, by the end of the 12th period.

5.68 The Granger Causality estimation between BSES and NFIs, NMF, IIP and M3 in the VAR framework also suggests unidirectional causality running from NFIs and M3 to BSES, and BSES to NMF and IIP. This shows that FII investment and money supply do exert significant influence on the movements of stock markets in India; while the relationship is the other way round in the case of investments by mutual funds wherein stock markets cause their variations. On the basis of the above empirics, it can be inferred that FIIs have been driving a large part of the swings in Indian stock markets.

Asset Prices and Real Activity

5.69 Asset prices could affect private consumption demand through three key channels. First, according to the life-cycle hypothesis, as

consumption is a function of agents’ lifetime resources, changes in the prices of financial (*e.g.*, stock prices) and non-financial (*e.g.*, housing prices) assets can significantly affect consumption. Second, real asset prices also signal expected future income growth. Given that consumption in a period would be affected by agents’ expectations about their future income, changes in asset prices may influence current consumption. Third, the availability and cost of external finance to households may depend on the assessment of the lender about their net worth. Since household net worth may undergo changes due to changes in asset prices, fluctuations in expected income may have a significant impact on consumption.

5.70 The impact of asset prices on investment may take place through three channels. First, a decline in asset prices can increase the cost of new capital relative to the existing capital. Second, as asset prices are assumed to contain information about future growth prospects, changes in asset prices would impact current investment activity (Mullins and Wadhvani, 1989). Third, through the credit channel, fluctuations in the net worth of a firm (originating from stock price shocks) impact the financing premium for the firm. Falling asset prices would lead to deterioration in the balance sheets of firms and banks and, hence, lower the lending and raise the cost of capital.

5.71 One of the key elements of the asset price channel that has gained importance is capital flows, which affects the demand for assets and then asset prices. There could also be spillover effects to other segments of markets, such as the housing market.

Large capital inflows may engender high liquidity growth in the economy, which in turn can raise asset prices. Capital inflows can also lead to a sharp rise in asset prices by feeding into the investment and real activity in the economy, which in turn reduces risk perception. An adverse external shock in the form of adverse news or reversal of financial flows affects domestic asset prices in several ways. Given the greater integration of financial markets relative to the goods market, an adverse shock to equity prices in major markets could be swiftly transmitted.

5.72 The macroeconomic impact of the declining stock market was evident in various ways. In India, the share of household savings in equities to their total savings declined. Declining household savings in equities coupled with the decline of portfolio flows and stock prices adversely affected the new issues of capital raised by private companies. Accordingly, the share of new capital issues in gross domestic capital formation fell in 2008-09.

5.73 Understanding the impact of the stock market on real activity in India is important to gauge the impact of global financial shocks on the domestic economy as equity prices affect the domestic economy through both the wealth effect and corporate balance sheets. Using monthly data over April 1994 to July 2009, it was found that the real return on stocks and the growth of industrial production shared a unidirectional causal relationship due to the former significantly Granger-causing the latter (Table 5.14). This causal relationship was derived from the impact of real stock return on industries such as basic goods, capital goods and intermediate goods. These results reflect the role of stock markets in terms of wealth effect on investment activities and thus, the output growth of capital intensive industries such as capital goods and intermediate goods.

5.74 In sum, Indian capital markets were also affected by the current global crisis from January 2008 largely on account of selling pressures by FIIs, besides weakened domestic sentiments on account of turmoil in international financial markets. Indian stock markets responded to the major global events during the crisis period, reflecting the increased

Table 5.14: Real Stock Return and Industrial Production Growth Pair-wise Granger Causality Tests

Null Hypothesis:	F-Statistic	P-value
1	2	3
GIIP does not Granger Cause BSER-INF	1.48	0.136
BSER-INF does not Granger Cause GIIP	2.47	0.006
GBG does not Granger Cause BSER-INF	1.85	0.045
BSER-INF does not Granger Cause GBG	2.20	0.014
GKG does not Granger Cause BSER-INF	1.29	0.230
BSER-INF does not Granger Cause GKG	1.80	0.053
GIG does not Granger Cause BSER-INF	0.79	0.660
BSER-INF does not Granger Cause GIG	2.48	0.006
GCG does not Granger Cause BSER-INF	1.18	0.301
BSER-INF does not Granger Cause GCG	1.12	0.346
GCDG does not Granger Cause BSER-INF	1.39	0.176
BSER-INF does not Granger Cause GCDG	0.76	0.690
GCNDG does not Granger Cause BSER-INF	1.20	0.286
BSER-INF does not Granger Cause GCNDG	1.28	0.238

GIIP=growth in IIP, BSER-INF= Real growth in stock prices, GBG= growth of production of basic goods, GKG= growth of production of capital goods, GIG = growth of production of intermediate goods, GCDG= growth of production of consumer durables, GCNDG= growth of production of consumer non-durables.

financial integration of the Indian economy. The steep decline witnessed from January 2008 to September 2008 was reinforced in the period after Lehman Brothers failed and stock markets reached a new low in March 2009. The deleveraging by FIIs, along with other factors such as the economic downturn, declining exports and weakened sentiments, has driven the significant downturn in stock markets during the current crisis. Declining asset prices also affected real activities such as consumption and investments. The empirical results suggest that FIIs have been driving the Indian stock markets to a large extent.

III. BANKING SECTOR, MUTUAL FUNDS AND NON-BANKING FINANCIAL COMPANIES

5.75 The banking sector in India, as in most of the emerging market economies (EMEs), displayed resilience during the current global financial meltdown. The strength and resilience in the balance sheets of Indian banks was derived from them being well-capitalised and having greater exposure to domestic conventional assets,

unlike advanced countries where the banking sector had extensive exposure to sub-prime mortgage markets (particularly, in the US) and other exotic structured products. Furthermore, the banking sector in India, unlike advanced countries, is dominated by commercial banking and not investment banking.

5.76 The direct effects of the global financial crisis on the Indian banking and financial system were almost negligible due to the limited exposure to riskier assets and derivatives and the relatively low presence of foreign banks (Thorat, 2009). *Prima facie*, Indian banks faced the stress because foreign investors pulled out of the economy and created a liquidity crunch. There was suddenly less money available to borrow or lend. The tightened global liquidity situation in the period immediately following the failure of Lehman Brothers in mid-September 2008, coming as it did on top of a turn in the credit cycle, increased the risk aversion of the financial system and made banks cautious about lending (Subbarao, 2009). At the same time, corporates and retail investors exerted redemption pressures on mutual funds, some of which got transmitted to NBFCs due to their dependence for funds on mutual funds. Thus, despite not being

getting a hit on the balance sheets, banks and other financial institutions were impacted by the indirect spillovers of the crisis during 2008-09.

5.77 The capital to risk-weighted assets of Indian banks stood higher than many of the advanced and emerging market economies indicating that Indian banks were comparatively better positioned in terms of capitalisation compared to their peers across countries. All commercial banks met the minimum capital adequacy norm of 9 per cent as at end-March 2009. Similarly, Indian banks were saddled with lower non-performing loans (NPLs) *vis-à-vis* banks in many EMEs and advanced countries in 2008. The rate of return on assets of Indian banks, however, was on the low side compared to banks in most of the EMEs, but higher than those in advanced countries. The proportion of time deposits to total deposits improved during 2008-09 across bank groups, indicating the improved confidence of the public in banks despite the intensified turmoil in international financial markets. The share of liquid assets held by banks in their portfolios, however, declined marginally during 2008-09, except for large banks, for which it remained almost at the previous year's level (Table 5.15).

Table 5.15: Bank Size and Average Operating Performance

(Per cent)

Indicators	Large banks		Big banks		Medium banks		Small banks	
	2008	2009	2008	2009	2008	2009	2008	2009
1	2	3	4	5	6	7	8	9
(i) No. of banks	9	9	17	17	20	19	16	16
(ii) Proportion of time deposits to total deposits	62.79	66.29	66.05	68.69	68.51	68.81	67.19	72.51
(iii) Proportion of liquid assets to total assets	31.30	31.39	32.39	31.94	33.48	32.51	38.13	37.26
(iv) Proportion of term loans to total loans	55.75	55.61	61.50	61.52	54.96	54.00	42.07	37.36
(v) Return on advances	8.86	9.40	8.92	9.91	9.52	11.25	8.62	10.50
(vi) Return on investments	6.66	6.55	6.80	6.56	6.58	6.28	6.50	6.26
(vii) Cost of deposits	5.33	5.65	5.42	5.74	5.63	5.93	4.15	5.47
(viii) Proportion of contingent liability to total assets	129.65	86.72	262.03	148.91	331.19	302.81	3325.33	1698.61
(ix) Interest spread	3.53	3.75	3.50	4.17	3.89	5.32	4.47	5.04
(x) Proportion of interest income to total income	85.14	85.60	85.19	85.35	83.57	83.98	75.25	73.16
(xi) Proportion of other income to total income	14.86	14.40	14.81	14.65	16.43	16.02	24.75	26.84
(xii) Proportion of provision to total loans	1.67	1.73	1.71	2.36	1.66	2.51	4.42	7.92
(xiii) CRAR	13.12	13.15	11.80	12.18	13.06	13.67	14.93	16.28
(xiv) NNPA ratio	1.04	1.06	0.78	0.90	0.80	0.92	0.87	1.48

Source: Report on Trend and Progress of Banking in India, 2008-09.

5.78 In terms of size distribution, large banks maintained a much smaller spread than their counterparts in other groups and hence, despite recording much higher interest earnings, received much lower returns on their loan portfolio during 2008-09. Notably, banks across the size-groups were able to realise higher interest rate spreads during 2008-09 compared to 2007-08, possibly on account of deposit rates easing at a faster pace than the rates on loans and advances. The surge in interest spread during the crisis period reflected the augmented confidence of the public in banks on the back of heightened volatility and uncertainty in financial markets. As a safety measure against the erosion of quality assets, all banks made higher provisions (as per cent to total loans); however, provisioning made by small-size banks were the highest during 2008-09. Scheduled commercial banks, as a precautionary measure, cut their operations in off-balance sheet items substantially in 2008-09 over the previous year, marking an exception to the prevailing upward trend.

5.79 The deposit growth of commercial banks decelerated marginally during 2008-09 compared to the previous year; on the other hand, growth in bank credit decelerated at a faster rate than

deposits during 2008-09 (Table 5.16). In terms of size, the slowdown in deposit growth was greater in the case of medium and small banks during 2008-09. A similar pattern was reflected in the credit contraction being more pronounced for medium and small banks. The broad pattern of the maturity structure of banking assets/ liabilities suggests a shift from short-term maturity (up to one-year) to medium-term maturity (1-3 years and 3-5 years).

5.80 The growth in borrowings by commercial banks declined sharply during 2008-09, manifesting the liquidity pressures in the financial markets and lower credit off-take. The steep fall in the incremental credit-deposit ratio, emanating from lower credit off-take on the back of the economic slowdown, relieved commercial banks from the pressure for resource mobilisation through borrowings. Investments growth also decelerated marginally during 2008-09. However, prevailing uncertainties induced a degree of risk-averse behaviour; commercial banks parked a higher share of their available resources in terms of net demand and time liabilities (NDTL) in statutory liquidity ratio (SLR) securities.

5.81 The income growth rate in 2008-09 was much lower than that in 2007-08. However, such

Table 5.16: Growth of Balance Sheet of Scheduled Commercial Banks-Bank Group-wise

(Per cent)

Item	Public Sector Banks			Old Private Sector Banks			New Private Sector Banks			Foreign Banks			All SCBs		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Capital	0.7	5.2	3.6	4.4	1.8	8.2	5.6	14.6	-3.1	45.4	71.4	16.3	17.3	35.2	10.2
2. Reserve & Surplus	20.0	31.3	20.4	11.6	47.1	14.6	17.4	97.9	9.1	30.6	34.7	25.8	20.0	45.3	17.7
3. Deposits	22.9	23.1	26.9	6.0	19.8	20.3	38.8	23.1	5.4	31.5	26.8	12.0	24.6	23.1	22.4
4. Borrowings	5.7	28.4	1.2	22.3	8.0	22.6	42.8	26.3	7.1	33.0	14.1	20.3	19.6	24.5	6.8
5. Other Liabilities & Provisions	16.3	25.6	21.3	16.1	21.6	8.1	51.1	17.3	12.8	72.4	65.5	57.8	28.1	29.0	15.4
Total Liabilities / Assets	21.1	23.8	24.6	7.1	21.2	19.3	38.7	27.5	6.7	37.6	32.7	22.8	24.2	25.0	21.2
1. Cash & Balances with RBI	26.1	61.5	-2.4	25.9	74.4	-14.6	93.7	74.2	-20.7	49.8	81.2	-28.9	35.2	65.4	-8.0
2. Balances with Banks & Money at Call & Short Notice	26.8	-32.6	106.5	5.8	-24.2	47.1	91.9	-33.7	27.8	41.9	-25.1	66.8	35.9	-33.1	82.0
3. Investments	4.9	20.3	26.6	-3.6	23.9	33.7	26.4	31.3	4.3	36.4	38.4	31.8	9.7	23.8	23.1
4. Loans & Advances	30.2	24.8	25.7	12.0	20.2	15.1	39.9	26.4	9.9	29.5	27.5	2.7	30.6	25.0	21.2
5. Fixed Assets	37.7	42.6	17.2	-5.6	26.1	8.0	4.2	15.9	1.2	24.4	32.3	19.4	25.0	35.2	14.1
6. Other Assets	7.1	31.0	2.0	0.7	-1.7	28.2	33.9	28.3	19.8	72.9	67.0	68.1	22.5	38.2	25.0

Source : Balance sheets of respective banks.

deceleration in income growth was somewhat offset by a decline in expenditure growth in 2008-09. The reduction in both income and expenditure growth was partly explained by the decline in overall interest rates during the latter half of the year.

5.82 To analyse the direct impact of the slowdown on credit deceleration and other banking indicators, banks were classified into four different credit growth classes (Table 5.17). The banks which recorded negative deposit growth and a resource squeeze during 2008-09 witnessed a significant fall in their credit growth. Indeed, these banks had higher non-performing loans as well. Interestingly, these banks had a significantly lower proportion of time deposits in their deposit portfolio. The financial crisis, thus, seems to have had a greater adverse impact on banks that had fewer core deposits. During the time of distress, the stable deposit buffer played an important role in withstanding the liquidity squeeze. Banks with a significant decline in credit growth in 2008-09 witnessed a steep fall in their off-balance sheet exposure. In contrast, banks

witnessing high credit growth (of over 20 per cent) expanded their off-balance sheet exposure even further during the economic slowdown. Higher credit growth was also backed by higher equity growth and provided a capital buffer in the wake of increased default risk from credit extension.

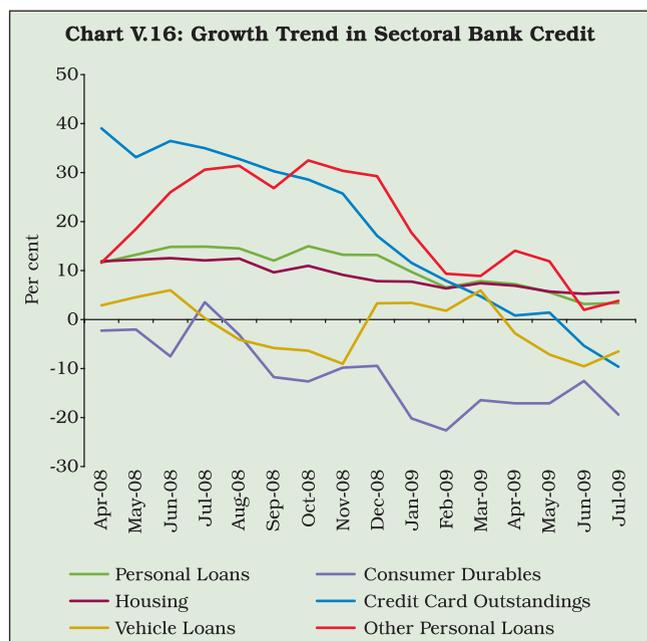
Sectoral Credit Growth

5.83 The impact of liquidity easing and prudential measures is reflected in lower credit growth for the year ended June 2009. Though there was a slowdown in credit off-take from October 2008, the credit growth during the period October 2008 to June 2009 clocked an annualised growth rate of 8.9 per cent. Credit growth during this period was higher for sectors such as infrastructure, real estate, NBFCs, SMEs, and agriculture and certain industries like iron and steel. The credit to medium and large companies declined more sharply than to small industries. However, the personal loan category was more adversely affected than other loans (Chart V.16 and Table 5.18).

Table 5.17: Credit Growth and Financial Performance: 2008-09

Credit growth	Less than 0 per cent	0-10 per cent	10-20 per cent	More than 20 per cent
1	2	3	4	5
(i) No. of banks	11	5	17	28
(ii) Proportion of time deposits to total deposits	63.6	72.6	70.4	70.5
(iii) Proportion of liquid assets to total assets	39.6	33.8	33.0	31.2
(iv) Proportion of term loans to total loans	44.2	53.5	51.2	55.2
(v) Return on advances	11.8	11.9	10.4	9.6
(vi) Return on investments	6.6	6.3	6.3	6.4
(vii) Cost of deposits	5.0	6.5	5.9	5.8
(viii) Proportion of contingent liability to total assets	2377.6	291.1	226.9	170.6
(ix) Interest spread	6.8	5.4	4.5	3.9
(x) Proportion of interest income to total income	65.2	81.5	85.9	85.8
(xi) Proportion of other income to total income	34.8	18.5	14.1	14.2
(xii) Proportion of provision to total loans	11.8	3.2	2.2	1.7
(xiii) CRAR	15.9	15.9	13.3	13.1
(xiv) NNPA ratio	1.5	1.4	0.9	1.0
(xv) Deposits growth	-3.4	3.1	18.8	28.9
(xvi) Contingent liability growth	-29.4	-10.2	-11.2	20.0
(xvii) Investments growth	30.4	24.6	27.7	31.2
(xviii) Advances growth	-10.5	5.0	15.2	30.9
(xix) Equity growth	23.5	22.3	30.6	33.5
(xx) Liquidity growth	18.9	10.2	17.7	23.0

Source: Report on Trend and Progress of Banking in India, 2008-09.



Pro-cyclical behaviour of banks

5.84 It is argued in the recent literature that Basel II may contribute to pro-cyclical behaviour by banks. Pro-cyclical is defined as easy credit in good times and tighter credit in bad times when borrowers need credit the most. In particular, this could happen with the internal rating based (IRB) approach where credit risk is a function of debtor's income, which presumably moves with the business cycle. Pro-cyclical behaviour existed in banks prior

Table 5.18: Growth in Sectoral Bank Credit

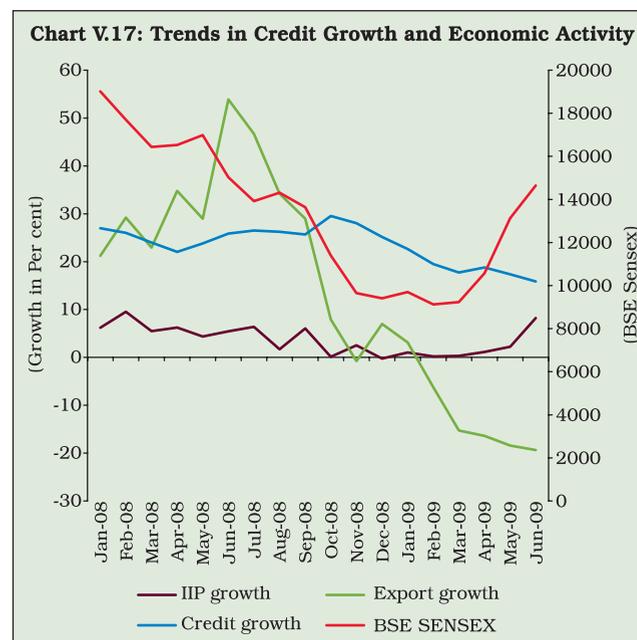
(Per cent)

	Agriculture	Small-Scale	Industry	Wholesale	Non-
		Industries	(Medium	Trade (other	food
			and	than Food	Gross
			Large)	Procurement)	Bank
					Credit
	1	2	3	4	5
	6				
2000-05	18.8	5.2	20.9	10.1	17.5
2005-06	37.6	22.9	28.6	22.0	40.5
2006-07	33.7	29.2	27.0	26.3	28.2
2007-08	19.5	12.6	23.1	11.2	22.3
2008-09	23.0	27.4	22.8	20.9	18.1
2008-09:H1	-0.1	8.8	14.2	12.1	8.4
2008-09:H2	23.1	17.0	7.6	7.9	8.8
2009-10:H1	-0.5	9.3	8.2	11.2	3.5

Source: Report on Trend and Progress of Banking in India, various issues.

to Basel II, but there is a concern that this behaviour will be more dramatic under Basel II. In particular, the financial crisis has generalised the concern about the pro-cyclical embedded in the financial system and, more specifically, in institutional and regulatory aspects such as accounting rules, trading and risk-management rules, and bank capital requirements. All recent reviews of the challenges for the immediate reform of financial regulation stress the need to make the financial system less pro-cyclical (Brunnermeier *et al.*, 2009; FSF, 2009; Repullo and Suarez, 2009) (Chart V.17).

5.85 The impact of the crisis on India, as on many EMEs, spilled over from the real sector to the financial sector. Industry and businesses, especially the small and medium enterprise (SME) sector, had to grapple with a host of problems, such as delays in payment of bills from overseas buyers as also domestic buyers affected by the global slowdown; increase in stocks of finished goods; fall in the value of inventories, especially raw material which, in many cases, were acquired at higher prices such as metal and crude oil-based products; slowing of capacity expansion due to a fall in investment demand; and demand compression for employment-intensive industries, such as gems and jewellery, construction and allied activities, textiles, auto and auto



Box V.4 Regulatory Measures

- Provisioning requirements for all types of standard assets (for residential housing loans beyond Rs.20 lakh, standard advances in the commercial real estate sector, personal loans including outstanding credit card receivables, loans and advances qualifying as capital market exposure and non-deposit taking systemically important NBFCs) was reduced to a uniform level of 0.40 per cent, except in the case of direct advances to the agricultural and SME sectors which shall continue to attract provisioning of 0.25 per cent, as hitherto.
- Risk weights on banks' exposures to certain sectors were revised downward, which had been increased counter-cyclically earlier. However, risk weights in the case of asset financing companies (AFCs) were not changed, which continues to be governed by the credit rating of the AFCs, except for claims that attract a risk weight of 150 per cent under the new capital adequacy framework, reduced to a level of 100 per cent.
- As one-time measures and for a limited period, prudential regulations for restricted account were modified for applications received up to March 31, 2009 and restructured packages implemented within 120 days of application or by June 30, 2009, whichever was earlier. The modification in regulations for restructuring were effected to preserve the economic and productive value of assets, which were otherwise viable. The modifications permitted restructured accounts to be treated as standard assets, provided they were standard on the eve of the crisis, *i.e.*, September 1, 2008, even if they turned non-performing at the time of restructuring.

components and other export-oriented industries. Hotels and airlines, apart from IT, also witnessed a fall in demand due to the global downturn. Major economic activities such as growth in the index of industrial production (IIP) turned negative and continued at sub-zero levels for more than two quarters in 2008-09, exports continued to contract in the second half, and capital market activities dwindled significantly. The slowdown in all the economic activities spilled over to the financial market and bank credit growth fell sharply. During the slowdown, when it was even more necessary to maintain credit flow to productive sectors, credit was hard to come by. Therefore, the pro-cyclical behaviour by banks became more evident during the crisis.

5.86 Recognising that the unexpected and swift turn of events could lead to a spiralling downturn, the Reserve Bank took a series of regulatory measures in addition to providing liquidity and special refinance (Box V.4 and see next section on Policy Responses). Since 2005-06, in the context of high growth in bank credit to certain sectors, the Reserve Bank had raised in stages the risk weights and provisioning requirements for standard assets for these sectors. In November 2008, as a countercyclical measure, the additional risk weights and provisions were withdrawn and restored to their previous levels.

5.87 The prudential regulations for restructured accounts were modified, as a one-time measure and for a limited period in view of the extraordinary external factors, to preserve the economic and productive value of assets which were otherwise viable. The modified regulations were in operation for applications for re-structuring received up to March 31, 2009 and restructured packages implemented within 120 days of receipt of application or by June 30, 2009, whichever was earlier. Banks were, therefore, required to take swift action for detecting weaknesses and putting in place the re-structured packages in order to avail of the benefits in asset classification under the modified prudential regulations (Box V.4).

5.88 The role of banks in the financial system in solving asymmetric information problems in credit markets laid the foundation of the credit channel of monetary policy. As money supply goes up, bank deposits and reserves increase, which in turn increases the quantity of bank loans. On the other hand, a contraction in deposit resources affects aggregate demand by shifting the supply schedule to the left in the bank loan market. In this context, Kashyap and Stein (2000) showed that with cross-sectional differences in bank-lending response to policy shocks, the impact of monetary policy on lending behaviour is stronger for banks with less liquid balance sheets (Box V.5).

**Box V.5
Balance Sheet Effect of Monetary Policy**

In order to examine cross-sectional differences of bank-lending response to policy shocks, the Kashyap and Stein (2000) model is followed⁶. The model explicitly assumes a homogeneous reaction of the loan demand which is crucial for the identification of monetary policy effects on loan supply. Until recently, bank loans were the main source of finance in India, even for large firms, and thus the assumption seems reasonable. In order to allow for asymmetric responses of bank loans to changes in economic activity and in the inflation rate, interaction terms with individual bank characteristics are also included in the model. Besides, the use of first differences presumably ensures the stationarity of the variables.

The asymmetric effects of monetary policy are captured by significant coefficients for the interaction terms. Because of its cross-sectional nature, the model can exploit both aspects of the data. With respect to time, the interaction effect captures the degree to which lending is liquidity-constrained during the periods of tight or loose money. On the other hand, one can look at the sensitivity of lending volume to monetary policy for a particular bank in the sense that this sensitivity is greater for banks with weaker balance sheets, which is captured by

both liquidity and size. The structure of the model with a lagged dependent variable in (1) clearly demands an estimation procedure suitable for dynamic panel data. In this connection, the standard procedure in the literature during the last decade or so has been the GMM technique due to Arelleno and Bond (1991) and the same has been used here. A similar approach was followed by Pandit *et al.*(2006).

The dataset consists of a balanced panel of a total of 1314 balance sheets (observations) spread over 18 months from January 1998 to June 2009 of all scheduled commercial banks, excluding regional rural banks (RRBs). These data are collected from the statutory returns, called Section 42(2) returns, designed to estimate reserve requirements and submitted to the Reserve Bank of India by every bank on a fortnightly basis⁷. Besides deposit resources, the returns report a wealth of information on most of the balance sheet indicators including cash, interbank transactions, investments, and domestic lending classified by various categories.

The results⁸ show that the direct impact of changes on the repo rate is negative and significant when size as well as

⁶ The regression model is specified as follows:

$$\Delta \log(L_{it}) = \sum_{j=1}^m \alpha_j \Delta \log(L_{it-j}) + \sum_{j=1}^m \mu_j \Delta M_{t-j} + \sum_{j=1}^m \pi_j \Delta GDP_{t-j} + \sum_{j=1}^m \beta_j \Delta INFL_{t-j} + B_{it-1} \left(\eta + \partial TIME_t + \sum_{j=1}^m \phi_j \Delta M_{t-j} + \sum_{j=1}^m \gamma_j \Delta GDP_{t-j} + \sum_{j=1}^m \delta_j \Delta INFL_{t-j} \right) + \varepsilon_{it} \dots (1)$$

where $i = 1, \dots, N$, $t = 1, \dots, T$ and Δ is the difference operator. N denotes the number of banks, T denotes the length of the time series and m is the number of lags. L_{it} is the amount of loans extended by bank i in period t , M_t is the monetary policy instrument (in our case, it is the cash reserve ratio or repo rate). ΔGDP_t is the growth rate of the economic activity indicator, captured by the log of monthly index of industrial production. $\Delta INFL_t$ is the first difference of the monthly inflation rate. Individual bank characteristics are denoted by B_{it} . Two bank characteristics (B_{it}) are considered, namely, size, measured in terms of deposits and liquidity, measured in terms of liquid assets like cash, call money, net assets with other banks and investments in government securities of the i -th bank at time point t . $TIME_t$ is a time dummy.

⁷ Till 1985, these data were reported on a weekly basis on Fridays and subsequently they are being reported fortnightly. However, banks file a special return in the same format on the last Friday of every month, if that is not a reporting Friday. Thus, comparability of data is maintained over monthly frequency also.

⁸ Parameter Estimates- Arelleno Bond Dynamic Panel Regression

Balance sheet variable: Liquidity			Balance sheet variable: Size (deposits)								
D.Loan	Coefficient	SE (Robust)	D.Loan	Coefficient	SE (Robust)	D.Loan	Coefficient	SE (Robust)	D.Loan	Coefficient	SE (Robust)
Loan			Inflation			Loan			Inflation		
LD.	0.484 *	0.128	D1.	0.093 *	0.022	LD.	0.767 *	0.117	D1.	0.078 **	0.023
L2D.	0.037	0.025	LD.	0.014	0.070	L2D.	0.042 ***	0.024	LD.	0.006	0.066
L3D.	0.056	0.047	Liquidity*Repo			L3D.	0.019	0.041	Deposits*Repo		
Liquidity			D1.	-0.016 **	0.005	Deposits			D1.	-0.019 **	0.005
D1.	0.021	0.310	LD.	0.006	0.009	LD.	0.370	0.283	LD.	-0.006	0.009
LD.	0.498 **	0.199	Liquidity*IIP			L2D.	0.574 **	0.254	Deposits*IIP		
L2D.	-0.009	0.035	D1.	-0.020	0.059	Repo	0.009	0.040	D1.	-0.026	0.061
Repo			LD.	-0.058	0.052	D1.	-0.165	0.096	LD.	-0.085	0.053
D1.	0.110	0.088	Liquidity*Inflation			LD.	-0.111 *	0.017	Deposits*Inflation		
LD.	-0.093 *	0.016	D1.	-0.001	0.001	IIP			D1.	-0.001	0.001
IIP			LD.	-0.001	0.004	D1.	0.836	1.171	LD.	0.000	0.003
D1.	0.508	1.091	Constant	0.009 *	0.002	LD.	1.665 ***	0.813	Constant	0.001	0.003
LD.	1.326	0.651									

(...Concl.)

liquidity are considered as balance sheet strength. *Prima facie*, there is clear evidence that policy rate changes have a direct impact with a lag of at least one month on bank loans and, therefore, at least for the average bank, we may not reject the hypothesis that the bank lending channel of monetary policy transmission works well through repo rate change. The coefficient of economic activity is positive, as expected, while the coefficient for inflation is negative. Both coefficients are significant. The impact of liquidity is positive and significant, implying that banks with more liquid assets also lend more. Furthermore, the interaction coefficient of repo with liquidity also turned out to be significant and negative. That is, the impact of monetary policy on lending behaviour is stronger for banks with less liquid balance sheets. In the absence of any substitute for deposit resources, more liquid banks could

relatively easily protect their loan portfolios by simply drawing down on their large buffer stock of securities. On the other hand, less liquid banks cut loans significantly in response to a contractionary monetary policy. Following Kashyap and Stein (1995), the relative hypothesis that was also tested. In other words, the effect of bank size on transmission of monetary policy was tested to ascertain whether the lending of large banks is less sensitive to monetary shocks than those of small banks. One expects that large banks have easier access to alternative finance, which would make their lending less dependent on monetary policy changes. Accordingly, the interaction effect is found to be negative and significant, suggesting that small banks do tend to feel the pressure of increased policy rates and respond by reducing their loan disbursement.

Industrial Activity Effect on Bank Lending

5.89 In order to examine the impact of the economic slowdown and the interaction of liquidity on bank credit, a panel vector auto-regression (PVAR) approach was attempted. At the bank level, the variables considered were loans, deposits and liquidity (as defined earlier) and for macro-economic and monetary developments IIP, inflation and CRR were used⁹. The dataset consists of a balanced panel of a total of 1314 balance sheets (observations) spread over 18 months from January 1998 to June 2009 of all scheduled commercial banks, excluding regional rural banks (RRBs). Estimated parameters¹⁰ based on the short-run equation show that decline in IIP is significantly

associated with fall in credit demand. While higher inflation leads to an increase in loan demand, increase in CRR is associated with contraction in loan supply.

Interest Rate Movement

5.90 The reduction in the Reserve Bank's policy rates and the easy liquidity conditions were expected to moderate interest rates. Irrespective of ownership, Indian commercial banks have reduced their deposit and lending rates. The decline in lending rates, however, comes with a lag due to the old contractual structure of assets and liabilities. The interest rates offered by public sector banks on deposits of all maturities showed

⁹ All variables are in logarithm terms except CRR and inflation. Variables are in first difference.

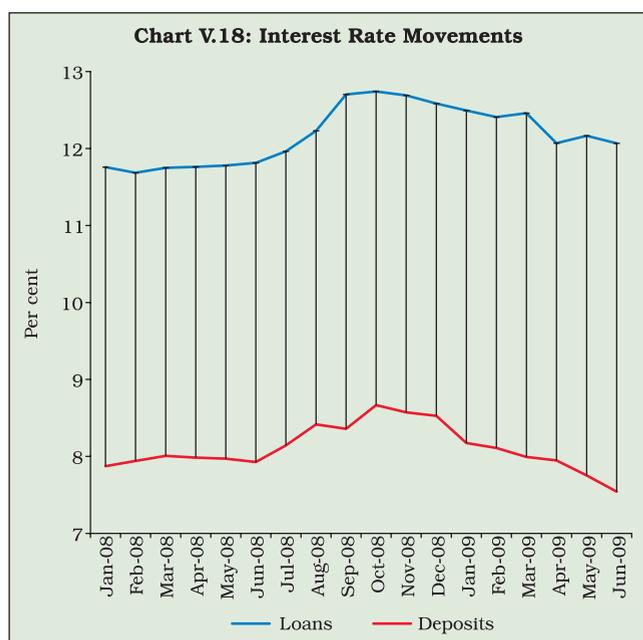
¹⁰ Parameter estimates – Panel VAR are as under:

D.Loan	Coefficient	Standard error	t-statistic
LD.Deposits	0.0075	0.0784	0.0957
LD.Loan	0.0305	0.0323	0.9437
LD.Liquidity	0.0244	0.0209	1.1703
LD.IIP	-0.1751	0.0509	-3.4380
LD.Inflation	-0.0100	0.0027	-3.7359
LD.CRR	-0.0072	0.0028	-2.6014
L2D.Deposits	-0.0064	0.0733	-0.0877
L2D.Loan	-0.0083	0.0260	-0.3201
L2D.Liquidity	0.0134	0.0208	0.6428
L2D.IIP	-0.1717	0.0407	-4.2193
L2D.Inflation	0.0068	0.0020	3.3870
L2D.CRR	-0.0162	0.0049	-3.3093

Note: L - lag operator and D – difference operator.

moderate easing after October 2008. Further, a decline could be seen in the deposit rates of all maturities of private sector banks and foreign banks after December 2008. The benchmark prime lending rate (BPLR) of public sector and private sector banks too showed a decline from October 2008. However, the BPLR of foreign banks showed considerable rigidity. Further, actual lending rates on non-export credit and terms loans above Rs.2 lakh eased for public sector banks, but in the case of private sector banks and foreign banks, the rates somewhat firmed up between September 2008 and December 2008, notwithstanding the fall in policy rates and inflation, and declined between December 2008 and June 2009. Initial estimates based on the data submitted by selected banks indicate that Indian banks maintained a steady spread of more than 4 per cent during the pre- and post-crisis periods (Chart V.18).

5.91 During the first quarter of 2009-10, the decline in deposit rates was greater than that in lending rates. Thus, the lower cost of deposits was not fully passed on to borrowers and banks continued to enjoy a higher spread, manifesting a higher allocative inefficiency even during a soft interest regime.



Mutual Funds

5.92 Some segments of the financial system, particularly non-banking entities came under severe liquidity pressures due to reduced foreign funding and the lacklustre domestic capital market. The capital flow reversals and drying up of funding from external markets for banks and corporates also created liquidity pressure on mutual funds during 2008-09. A substantial proportion of collections of mutual funds reflected bulk funds from the corporate sector under money market schemes, partly reflecting tax and other regulatory arbitrage. In the wake of credit tightening, corporates which had been parking funds substantially with mutual funds withdrew their investments from mutual funds to supplement their resources for investments. The stock market reversals exerted redemption pressure on mutual funds from retail investors too. With increasing redemption pressure from all sides and heightened uncertainty rendering it difficult for mutual funds to mobilise resources from alternate sources, the mutual funds were compelled to sell off their positions in the stock markets. While the mutual funds promised immediate redemption, their assets were relatively illiquid. Maturity mismatches between the assets and liabilities of mutual funds further aggravated the problems.

5.93 The growth of gross mobilisation by mutual funds fell sharply during 2008-09. The net mobilisation of resources by mutual funds in India declined by 118 per cent in 2008-09 as against an increase of 64 per cent in the previous year. It may be noted that the steep fall in stock prices and net resources mobilised by mutual funds have been intertwined since January 2008, reflecting the redemption pressures on mutual funds (Chart V.19 and Table 5.19). The assets held by mutual funds at the end of March 2009 declined by 17 per cent over the end of March 2008 due to large redemptions and negative valuations stemming from substantial corrections in equity prices.

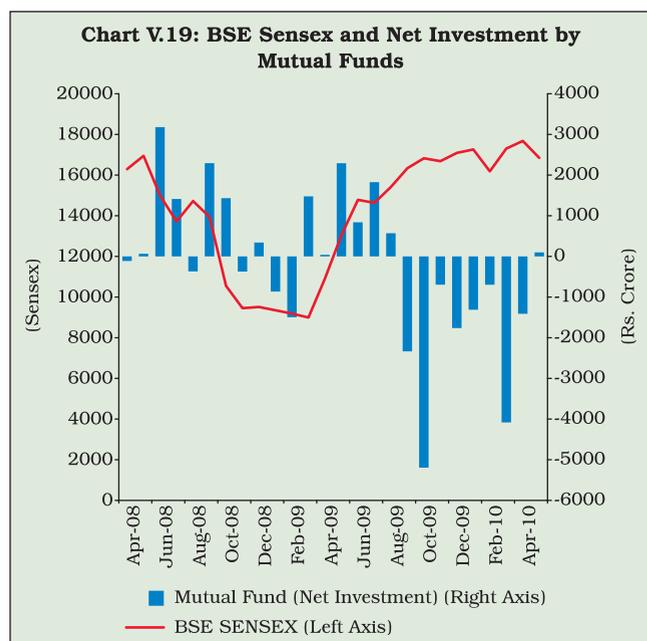


Table 5.20: Sector-wise Net Resources Mobilised by Mutual Funds

(Rs. crore)

Year	UTI	Public Sector	Private Sector
1	2	3	4
2000-01	9,850	-1,045	323
2001-02	13,050	1,409	-7,284
2002-03	12,069	1,561	-9,434
2003-04	42,545	2,597	1,667
2004-05	7,600	-2,677	-2,722
2005-06	42,977	6,379	3,424
2006-07	79,038	7,621	7,326
2007-08	1,33,304	10,677	9,820
2008-09	-3,659	9,380	-34,018
2009-10	15,753	12,499	54,928
2010-11 (Apr-May)	7,162	11,397	1,04,437

5.94 The liquidity stress emanating from the stock market reversals and heightened uncertainty varied across the categories of mutual funds. Private sector mutual funds, followed by UTI, were affected the most. The net resources mobilised by private sector mutual funds turned hugely negative during 2008-09 as a result of the steep rise in redemptions by both retail and corporate investors. On the other hand, public sector mutual funds were able to withstand the redemption pressure and

mobilised fresh resources during 2008-09 which continued in 2009-10 (Table 5.20).

Table 5.19: Resource Mobilisation by Mutual Funds

(Rs. thousand crore)

	Gross Mobilisation	Redemptions	Net Inflows	Assets at the end of Period
1	2	3	4	5
2000-01	93.0	83.8	9.1	90.6
2001-02	164.5	157.3	7.2	100.6
2002-03	314.7	310.5	4.2	109.3
2003-04	590.2	543.4	46.8	139.6
2004-05	839.7	837.5	2.2	149.6
2005-06	1,098.1	1,045.4	52.8	231.9
2006-07	1,938.5	1,844.5	94.0	326.3
2007-08	4,464.4	4,310.6	153.8	505.2
2008-09	5,426.4	5,454.7	-28.3	417.3
2009-10	10,019	9,935.9	83.1	614.0
2010-11 (Apr-May)	1,874.3	1,751.3	123.0	743.1

5.95 The Reserve Bank responded swiftly to address the liquidity stress faced by the mutual funds. A term repo facility for an amount of Rs.60,000 crore under the LAF was introduced to enable banks to ease the liquidity stress faced by mutual funds, NBFCs and housing finance companies (HFCs), with an associated SLR exemption of 1.5 per cent of NDTL. Further, the policy measures initiated by the Reserve Bank and other central banks across countries have enabled the restoration of stability conditions in domestic and international financial markets and the revival of stock markets since the beginning of 2009-10. The revival in the stock markets and ample liquidity in the system buoyed sentiments and provided support to the activities of mutual funds during 2009-10.

Impact on Non-Banking Finance Companies (NBFCs)

5.96 The drying up of liquidity with mutual funds, which have perennially provided resources to other sectors including NBFCs, coupled with tightening foreign funding and domestic liquidity enforced further pressure for funds availability to NBFCs. The total assets of NBFCs (excluding RNBCs) increased marginally during 2008-09 compared to a

substantial rise during 2007-08 (Table 5.21). The growth in the borrowing portfolio of NBFCs, which is their major source of financing, witnessed steep deceleration. The resource mobilisation through public deposits by NBFCs declined at a higher pace during 2008-09 than in the previous year. At the same time, the Reserve Bank tightened the regulatory and soundness norms for NBFCs in order to safeguard financial stability and the interests of depositors.

5.97 On the liabilities side also, the business activities of NBFCs decelerated sharply during 2008-09. The loans & advances extended by them grew at a considerably lower rate in 2008-09 than in 2007-08, reflecting the drying up of resources from various sources due to the global financial

crisis. The increase in investments made by NBFCs also fell substantially during 2008-09 compared to the previous year. The liquidity crunch forced NBFCs to cut their exposure to other assets such as hire purchase assets, equipment leasing, and the bill business. The dampening real activities led to a rise in the default of repayments, especially in the case of hire purchase assets and, hence, gross non-performing assets as a percentage of gross advances of NBFCs, which was on a descending trajectory from 2001, increased in 2009 (Table 5.22).

5.98 In view of the funding inter-linkages between NBFCs, mutual funds and commercial banks, when the contagion from the global financial crisis created selling pressures in the stock markets

Table 5.21: Consolidated Balance Sheet of NBFCs-D

(Amount in Rs. crore)

Item	As at end-March		Variation			
	2007-08	2008-09 P	2007-08		2008-09	
			Absolute	Per cent	Absolute	Per cent
1	2	3	4	5	6	7
Liabilities						
1. Paid-up Capital	3,266 (4.4)	3,508 (4.6)	998	44.0	242	7.4
2. Reserves & Surplus	8,695 (11.7)	9,337 (12.4)	2,834	48.4	642	7.4
3. Public Deposit	2,042 (2.7)	1,941 (2.6)	-35	-1.7	-101	-4.9
4. Borrowings	50,577 (67.8)	55,289 (73.2)	18,125	55.9	4,712	9.3
5. Other Liabilities	9,982 (13.4)	5,441 (7.2)	4,087	69.3	-4,541	-45.5
Liabilities/Assets	74,562	75,516	26,008	53.6	954	1.3
Assets						
1. Investments	11,210 (15.0)	14,813 (19.6)	3,798	51.2	3,603	32.1
i) Approved Securities @	7,146	9,230	2,859	66.7	2,084	29.2
ii) Other Investments	4,064 (5.5)	5,583 (7.4)	939	30.0	1,519	37.4
2. Loan & Advances	18,823 (25.2)	21,073 (27.9)	7,764	70.2	2,250	12.0
3. Hire Purchase Assets	33,525 (45.0)	35,647 (47.2)	7,303	27.9	2,122	6.3
4. Equipment Leasing Assets	1,048 (1.4)	585 (0.8)	-317	-23.2	-463	-44.2
5. Bill Business	12 (0.0)	23 (0.0)	5	71.4	11	91.7
6. Other Assets	9,944 (13.3)	3,375 (4.5)	7,456	299.7	-6,569	-66.1

NBFCs-D: Refers to deposit taking NBFCs. P : Provisional.

@ : SLR Asset comprises 'Approved Securities' and 'unencumbered term deposits' in Scheduled Commercial Banks.

Note: Figures in parentheses are percentage shares in respective total.

Source: Report on Trend and Progress of Banking in India, 2008-09.

Table 5.22: NPA Ratios of NBFCs-D

(Per cent)

End-March	Gross NPAs to Gross Advances	Net NPAs to Net Advances
1	2	3
2001	11.5	5.6
2002	10.6	3.9
2003	8.8	2.7
2004	8.2	2.4
2005	5.7	2.5
2006	3.6	0.5
2007	2.2	0.2
2008	2.1	0*
2009 P	2.7	0*

P : Provisional.

* : Provision exceeds NPA.

Source: Report on Trend and Progress of Banking in India 2008-09.

in India, the liquidity needs of the financial system as a whole had to be addressed by the Reserve Bank (Chakrabarty, 2009). The Reserve Bank

announced a series of measures to provide respite to the financially stressed NBFCs during 2008-09 (Box V.6). In the case of NBFCs, in view of their need to raise capital, they were allowed to issue perpetual debt instruments qualifying for capital. They were also allowed further time of one year to comply with the increased Capital to Risk-Weighted Asset Ratio (CRAR) stipulation of 15 per cent as against the existing requirement of 12 per cent. Risk weight on banks' exposures to NBFCs, which had been increased earlier, was brought down. NBFCs also benefited from the refinance facility provided to the Small Industries Development Bank of India (SIDBI) by the Reserve Bank to ease the liquidity constraint.

5.99 In sum, the financial performance of NBFCs deteriorated during 2008-09 compared with the previous year on account of exacerbated liquidity stress that eventually subdued fund-

Box V.6

Policy Measures to Address Financial Stress Faced by NBFCs

- Non-banking finance companies – non-deposit taking & systematically important (NBFCs-ND-SI) – were permitted, as a temporary measure, to raise short-term foreign currency borrowings under the approval route subject to fulfilment of certain conditions. While the resources raised were to be used only for refinancing short-term liabilities and not for the creation of fresh assets, it was also advised that the maturity of such borrowing should not exceed three years and the maximum amount should not exceed 50 per cent of the NOF or US\$ 10 million (or its equivalent), whichever was higher. Eleven companies were granted permission under the facility to borrow funds to the tune of US\$ 834.95 million + foreign currency equivalent of Rs 1,566.38 crore (not availed of), out of which seven have borrowed so far to the extent of US\$ 645.58 million.
- Banks were permitted, on a temporary basis, to avail of liquidity support under the LAF window through relaxation in the maintenance of SLR up to 1.5 per cent of their NDTL, exclusively for meeting the funding requirements of NBFCs and mutual funds.
- The risk weight on banks' exposure to NBFCs-ND-SI was reduced to 100 per cent from 125 per cent irrespective of credit rating, while exposure to AFCs which attracted risk weight of 150 per cent was also reduced to 100 per cent.
- NBFCs-ND-SI were permitted to augment their capital funds by issue of Perpetual Debt Instruments. The amount of PDI raised by NBFCs-ND-SI would not be treated as 'public deposit' within the meaning of Reserve Bank directives.
- Deferred the proposed increase in the CRAR to be maintained by NBFCs-ND-SI to 12 per cent and subsequently to 15 per cent by one year, *i.e.*, 12 per cent by March 31, 2010 and 15 per cent by March 31, 2011.
- Provided direct lending facility as a Lender of Last Resort (LOLR) where RBI lends to NBFCs-ND-SI against their rated CPs through an SPV by subscribing to its bonds. The facility was operationalised in January 2009 through an SPV called 'IDBI SASF Trust' to provide liquidity support against investment-grade paper of NBFCs, subject to their fulfilling certain conditions. It was designed as an LOLR facility to facilitate an orderly downsizing of the balance sheets of financially-sound NBFCs that faced short-term temporary liquidity requirements. The facility has been availed of by only one NBFC so far, which has drawn Rs.1,040 crore under the scheme and there is no outstanding balance as of date. The Government of India had extended the facility to be available for any paper issued till September 30, 2009 and the SPV would cease to make fresh purchases after December 31, 2009 and would recover all dues by March 31, 2010.

based activities (Table 5.23). The growth in the fund-based income of NBFCs decelerated sharply, while the deceleration in the growth of fee-based income was moderate during 2008-09. At the same time, growth in expenditure incurred by NBFCs also decelerated during 2008-09, but the rate of deceleration was not as steep as that in income. The escalated cost-to-income ratio of NBFCs during 2008-09 over the preceding year also reflected the sharp deceleration in the growth of income.

Table 5.23: Financial Performance of NBFCs-D

(Amount in Rs. crore)

Indicator	As at end-March		Percentage Variation	
	2008	2009 P	2007-08	2008-09
1	2	3	4	5
A. Income (i+ii)	10,038	11,799	75.5	17.5
(i) Fund-Based	9,832 (98.0)	11,498 (97.0)	75.9	16.9
(ii) Fee-Based	206 (2.0)	301 (3.0)	57.4	46.0
B. Expenditure (i+ii+iii)	6,913	8,742	43.1	26.5
(i) Financial	4,525 (60.0)	5,641 (66.0)	63.7	24.7
<i>of which</i>				
Interest Payment	226 (6.0)	211 (2.3)	-55.5	-6.6
(ii) Operating	2,178 (30.5)	2,369 (27.6)	72.7	8.8
(iii) Others	210 (3.4)	732 (4.1)	-73.9	248.6
C. Tax Provisions	1,213	1,002	215.1	-17.4
D. Operating Profit (PBT)	3,125	3,057	251.1	-2.2
E. Net Profit (PAT)	1,912	2,055	279.4	7.5
F. Total Assets	74,562	75,516	53.6	1.3
G. Financial Ratios (as percentage to Total Assets)				
i) Income	13.5	15.6		
ii) Fund-Based Income	97.9	15.2		
iii) Fee-Based Income	0.3	0.4		
iv) Expenditure	9.3	11.6		
v) Financial Expenditure	6.1	7.5		
vi) Operating Expenditure	2.9	3.1		
vii) Tax Provision	1.6	1.3		
viii) Net Profit	2.6	2.7		
H. Cost-to-Income Ratio	68.9	74.1		

P : Provisional.
Note: Figures in parentheses are percentages to respective total.
Source: Annual Returns.

Financial Stress

5.100 As discussed earlier in this section, EMEs felt stress in their financial markets, especially equity, foreign exchange, and sovereign debt markets in the last quarter of 2008. Exchange rates came under severe pressure, leading to depreciation and depletion of foreign exchange reserves, while equity markets witnessed a large exodus of equity and debt funds, triggering sharp downward movements in stock prices from September 2008. There was a strong link between financial stress in advanced and emerging economies, with crises tending to occur at the same time on both sides (World Economic Outlook, IMF, April 2009).

5.101 In fact, the transmission of stress tends to be stronger and more direct in an economy that is financially well-linked to advanced economies. Sometimes, common global factors spill over rapidly across economies which are financially integrated, and financial stress moves in tandem among them. The common factors could be, *inter alia*, global shocks such as heightened risk aversion, a shift in market sentiments and the failure of large financial institutions that have a presence across the countries. The role of such common factors has increasingly become discernible in most of the EMEs, including India, over the past several years as these economies became increasingly integrated. Accordingly, financial stress travelled to Indian financial markets almost contemporaneously from advanced economies, especially from the third quarter of 2008-09.

5.102 Against the above background, an attempt has been made to quantify and analyse the evolving financial stress in India. Financial stress may be defined as the uncertainty and changing expectations of loss in financial markets. Financial stress for an economy may be felt in different sectors simultaneously. There are many indicators for different sectors of the economy which exhibit the occurrence in that particular sector (Table 5.24). Financial Stress Indicator

Table 5.24: Monthly Financial Stress Indicators¹¹

Month	beta	cd-y91	EMP	usd_garch_sd	Inv_yield	cp-y91	stock_yoy_calb	garch_bse_sd
1	2	3	4	5	6	7	8	9
Jan-07	2.5	1.6	-0.7	0.5	0.7	1.8	56.3	2.1
Feb-07	2.8	3.2	-3.1	0.6	0.9	2.8	70.5	3.5
Mar-07	2.8	3.7	4.1	0.6	0.9	3.8	80.0	4.2
Apr-07	2.6	4.4	-6.1	0.6	2.1	5.3	75.8	2.7
May-07	2.5	5.9	-3.2	1.2	4.0	6.4	57.4	2.2
Jun-07	2.4	2.6	-3.3	0.6	2.0	3.3	54.2	4.0
Jul-07	2.3	1.3	-3.5	0.7	1.1	0.5	48.2	3.8
Aug-07	2.0	1.8	4.1	0.6	1.4	2.6	61.5	1.9
Sep-07	2.1	1.1	-2.3	0.7	0.6	1.9	52.4	2.8
Oct-07	1.8	1.0	-3.2	0.7	0.5	2.3	34.7	4.4
Nov-07	1.9	1.6	0.0	0.7	1.0	3.1	46.6	3.8
Dec-07	1.9	1.8	0.5	0.7	0.7	3.0	37.5	2.0
Jan-08	2.0	1.6	-2.5	0.7	0.8	4.0	66.5	3.4
Feb-08	2.0	2.7	0.4	0.8	1.4	2.6	52.8	5.2
Mar-08	2.0	2.5	0.5	0.9	1.2	4.2	68.4	3.6
Apr-08	1.9	1.7	-1.2	0.9	1.0	1.7	65.9	1.7
May-08	2.0	0.9	3.4	1.0	0.6	0.9	78.9	4.4
Jun-08	2.3	0.6	2.2	1.6	0.5	1.6	98.7	4.9
Jul-08	2.4	0.7	1.8	0.9	0.1	1.9	96.6	3.7
Aug-08	2.5	1.4	1.9	0.9	0.0	3.2	94.6	3.0
Sep-08	2.4	3.1	5.6	1.0	0.5	4.9	114.2	4.3
Oct-08	2.1	5.9	7.6	1.8	0.7	7.7	143.4	4.7
Nov-08	1.9	4.8	-0.6	1.4	0.7	7.1	144.5	5.5
Dec-08	1.8	5.5	-1.9	0.9	1.2	7.8	144.1	4.6
Jan-09	1.5	4.7	0.4	0.8	1.4	5.9	136.3	3.3
Feb-09	1.3	4.0	0.7	0.8	1.6	4.2	139.4	4.5
Mar-09	1.4	3.9	2.2	0.9	2.4	5.2	128.5	5.0
Apr-09	1.2	4.4	-1.2	1.4	2.7	4.2	125.0	3.5
May-09	1.4	2.4	-2.7	1.4	3.6	3.4	100.9	3.3
Jun-09	1.6	2.7	-0.7	0.9	3.9	4.2	86.1	5.6
Jul-09	1.8	2.8	0.4	0.7	4.0	3.0	85.3	4.9
Aug-09	1.9	2.7	-0.4	1.0	4.2	3.1	85.4	1.5
Sep-09	2.0	1.9	0.3	0.8	4.5	3.1	62.6	3.7
Oct-09	2.0	2.0	-2.0	0.8	4.6	2.7	29.0	5.5
Nov-09	2.1	2.2	0.0	1.3	4.7	2.8	9.6	3.7
Dec-09	2.1	1.9	0.8	0.9	4.5	3.3	16.5	0.3
Jan-10	2.2	1.8	0.0	0.9	4.2	1.8	10.5	4.4
Feb-10	2.3	1.8	1.1	1.0	4.3	2.2	14.2	5.0
Mar-10	2.3	1.3	-0.1	1.0	3.5	2.4	18.5	2.0
Apr-10	2.4	2.2	-1.0	1.1	2.8	2.3	40.4	1.8

(FSI) combines these different indicators into a unified indicator and provides a measure of the current degree of stress in the financial system.

5.103 The FSI increased significantly in the third quarter of 2008-09 as manifested in the steep rise in the FSI during September and October 2008. In fact, the FSI for India witnessed an upward movement from August 2007, following the unravelling of the sub-prime crisis, and peaked in October 2008, reflecting the deepening turmoil in international financial markets subsequent to the failure of Lehman Brothers in September 2008. But swift and calibrated policy measures, both monetary and fiscal, have eased the financial stress in Indian financial markets since November 2008 and since then the FSI has been on a downward trajectory (Chart V.20).

5.104 It has been observed that all major advanced economies simultaneously experienced a sudden rise in financial stress in the month of August 2008 which continued till November 2008 and receded thereafter. The FSI for India exhibited synchronised movements with that of the US, Western Europe, Japan and aggregate advanced economies (Figures V.20 & V.21). This either shows that financial stress in India and other advanced countries is driven by a common factor or that transmission of stress to Indian markets from advanced markets is contemporaneous.

5.105 To sum up, this section analysed the impact of the global financial crisis on Indian financial institutions, such as banks, mutual funds and non-banking financial companies. As their international exposures in complex financial products was very

¹¹ **beta** = cov(r,m)/var(m), calculated monthly over a rolling 1-year time horizon, where r = year-over-year percentage change in the Bank Total price Index (e.g., BANKEX) and m = year-over-year percentage change in the general stock index (e.g., SENSEX).

cd-y91= Certificate of deposits (CD) spread over Treasury bill rate.

Exchange Market Pressure Index (EMP): EMP is constructed based on the weighted average of change in the exchange rate, foreign exchange reserve and interest rate (EMP=(ex-mean(ex)/sd(ex) – (res-mean(res)/sd(res) + ((int-mean(int)/sd(int))), where ex=change in exchange rate (INR-USD), res=change in foreign exchange reserve, int=change in short-term interest rate (Mumbai Inter-Bank Offer Rate – MIBOR). sd=standard deviation.

usd_garch_sd: Garch (1,1) volatility of INR-USD exchange rate.

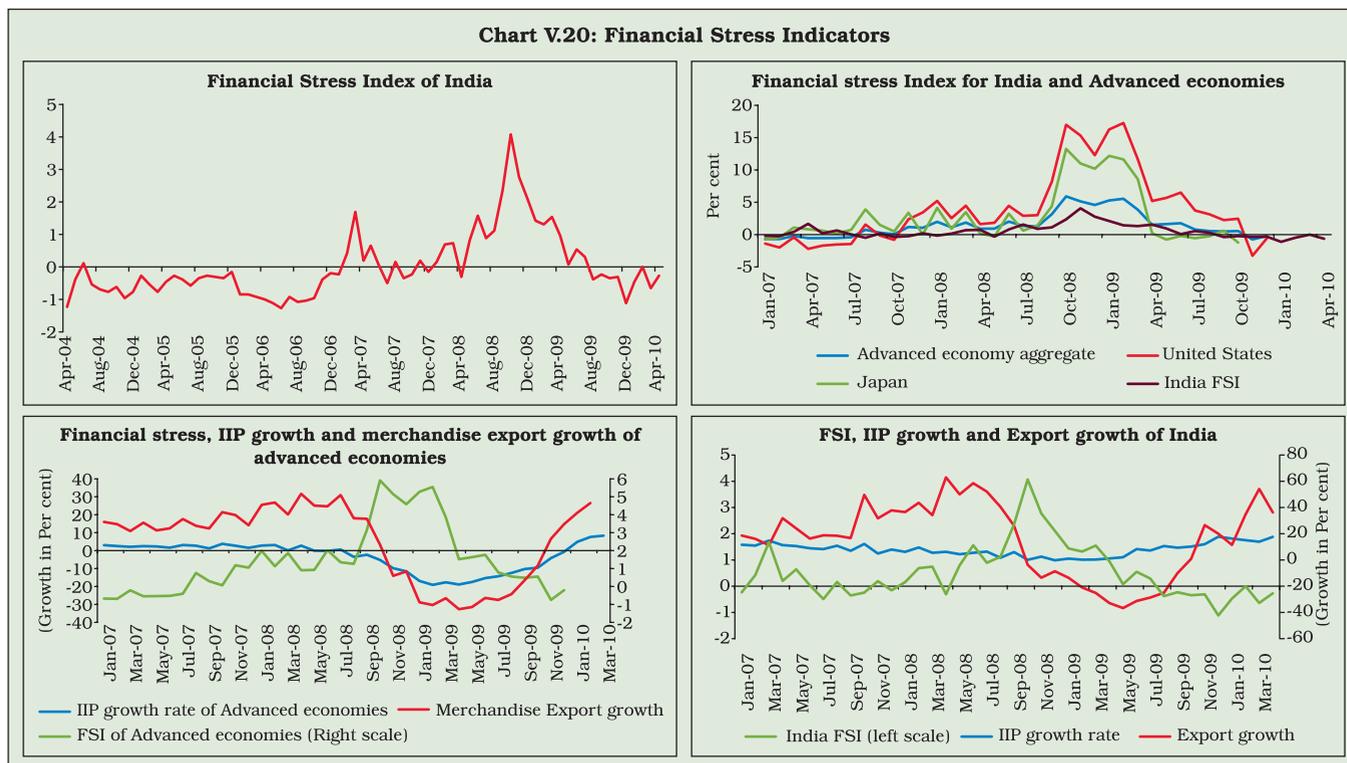
Inv_yield (Inverted yield curve): The average of 5- and 10-year Government of India benchmark bond yields minus the 91-day Treasury bill rate.

cp-y91: Commercial paper spread: 90-day's commercial paper rate minus 91-day Treasury bill rate.

stock_yoy_calb: Monthly year-on-year return of BSE SENSEX Stock Price Index.

garch_bse_sd: Garch(1,1) volatility of BSE SENSEX

Chart V.20: Financial Stress Indicators



limited, the Indian banking sector did not feel the heat in the first round. However, with the financial crisis deepening and beginning to spread across countries, especially after the fall of Lehman Brothers in September 2008, Indian financial institutions along with several other EMEs started to face the challenges of the recent financial crisis in a manner that was somewhat different from their counterparts in advanced economies. The knock-on effects of the global financial crisis were felt first through the equity markets, which eventually spread to other segments of the financial market, viz., the money market and the foreign exchange market. The tightening of liquidity conditions in the domestic market and drying of resources available from international markets along with capital flow reversals imposed new challenges for financial institutions in financing the productive needs of the economy. As the impact of the crisis through the trade channel threatened to jeopardise the Indian growth story, the Reserve Bank initiated a spate of liquidity-easing and confidence-building measures to ensure that banks and mutual funds got ample resources to be able to meet the demand for credit

from Indian corporates. In contrast to the loss of confidence that the banking system in advanced economies faced, Indian banking system continued to command the confidence of the public as was evident in the continued deposit growth.

5.106 The analysis of the balance sheets of the scheduled commercial banks amply illustrates how Indian banks made adjustments to take up the emerging challenges in their business operations. The behaviour of large banks stood distinctly different from those of medium and small banks. The Indian banking sector also displayed maturity in going slow with their off-balance sheet activities. The policy measures were able to contain the spread of the liquidity problems to other segments of the financial system and restore normalcy at a fast pace. The financial stress index, when analysed in the Indian case, demonstrates a steep rise in September and October 2008 and displays synchronised movements with those of the US, Western Europe, Japan and aggregate advanced economies. This underscores the high interconnectedness of financial systems globally

and almost instantaneous spread of stress conditions across nations. This could be the biggest challenge to the decoupling theory.

IV. POLICY RESPONSES

5.107 Before the intensification of the global financial meltdown from September 2008, both monetary and fiscal policy measures in India were guided by an overriding intention to contain spiralling inflationary expectations that were largely driven by international commodity prices. Monetary policy was striving to dampen demand-side pressures through monetary tightening. At the same time, fiscal policy was attempting to ease supply-side constraints with a slew of measures, such as slashing excise duties and custom duties and encouraging imports of necessary goods, among others.

5.108 India's policy response to the crisis was aimed at containing the contagion from the outside – to keep the domestic money and credit markets functioning normally and see that the liquidity stress did not trigger solvency cascades. In particular, three objectives were pursued with respect to the financial sector: first, to maintain a comfortable rupee liquidity position; second, to augment foreign exchange liquidity; and third, to maintain a policy framework that would keep credit delivery on track so as to arrest the moderation in growth. Besides challenges thrown by the global financial meltdown, the policy responses also involved the challenge of balancing short-term mitigation and medium-term sustainability (the tyranny of the short-term!). This section delineates various policy responses undertaken in India against the backdrop of the global financial crisis. The measures to meet the above objectives came in several policy packages from the Government of India and the Reserve Bank of India starting in mid-September 2008. These measures were, on some occasions, in response to unanticipated global developments and, at other times, in anticipation of the impact of potential global developments on the Indian markets.

Fiscal Policy Response

5.109 The unprecedented global developments in the second half of 2008-09 forced the government to adopt an expansionary fiscal stance to cushion the economy from the effects of the global crisis. This shift in the fiscal policy stance was in line with the international trend to minimise the adverse effects of the global crisis and also consistent with mainstream views that in situations of deep and prolonged economic downturn, as in the present context, fiscal policy could play a leading role in stabilisation. Although financial markets in India experienced heightened volatilities in sync with international developments generating collateral damages, the banking system remained strong and well-capitalised. The stress tests conducted on Indian banks suggest that it can withstand significant shocks arising from large potential changes in credit quality, interest rate and liquidity conditions. Therefore, the fiscal policy in India did not have to extend support to the banking sector in the form of capitalisation/financial bailout, which was rampant in most advanced economies. Thus, the fiscal response has been highly weighted towards containing the economic slowdown by raising aggregate demand through discretionary fiscal policy. The depth and extraordinary impact of this crisis, however, clearly indicated the need for counter-cyclical public spending and, accordingly, the central government invoked the emergency provisions of the FRBM Act to seek relaxation from fiscal targets and launched fiscal stimulus packages in December 2008 and January 2009 (Subbarao, 2009).

5.110 The fiscal policy measures undertaken in the form of three fiscal stimulus packages during the second half of 2008-09 constituted tax cuts, encouraging investment on infrastructure and increased expenditure on both investment and consumption, with the latter accounting for the major share. The expansionary fiscal stance continued in the Union Budget for 2009-10, which was presented against the backdrop of moderation of growth in the economy and signs of stabilisation

in the global economy. The allocation for crucial sectors such as infrastructure, education and health, rural employment and empowerment of disadvantaged sections of the population was enhanced significantly during the Union Budget 2009-10. Indeed, the Union Budget for 2009-10 went a step further and proposed to address important challenges in the short and medium term, viz., revive the economy to attain a growth of 9.0 per cent per annum at the earliest; deepen and broaden the agenda for inclusive development; re-energise the government; and improve delivery mechanisms. Notably, the fiscal policy for 2009-10 also reiterated the importance of reverting to the path of fiscal consolidation at the earliest and as soon as the negative effects of the global crisis on the Indian economy have been overcome. In order to attain medium-term sustainability, the fiscal policy also recognised the importance of institutional reforms encompassing all aspects of the Budget such as subsidies, taxes, expenditure and disinvestment.

5.111 Additional expenditure amounting to 3.0 per cent of GDP was provided through three supplementary demands for grants during October-December 2008 and February 2009. Of the expenditure measures, revenue expenditure constituted around 84 per cent and the remainder accounted for the capital component (RBI Annual Report, 2008-09). On the whole, the fiscal stimulus measures appear to have given more emphasis to support consumption demand rather than investment demand. The fiscal deficit increased to 6.0 per cent of GDP in 2008-09 from 2.7 per cent of GDP in 2007-08 (Box V.7).

5.112 It may be mentioned that the cyclical downturn, which was already underway, was reinforced by the unfolding of the recent global crisis, especially during the second half of 2008-09, with the effect of subdued financial intermediation and a sharp fall in consumer and business confidence. Therefore, the role of fiscal policy in the current context may be different from previous episodes of normal business downturns. Thus, the efficacy of the counter-cyclical fiscal

policy in containing the slowdown and reviving the economy during 2008-09 and 2009-10 needs to be judged differently than normal cyclical downturns in the past in India. During normal economic situations or economic cycles in a country like India, the fiscal policy response to boost growth may endanger the sustainability of the fiscal deficit and become detrimental to growth in the medium to long run. It was observed that growth based on a large fiscal deficit during the 1980s led to the unsustainable twin deficits in India.

5.113 Given that the recent slowdown was characterised by a sharp fall in private sector demand due to loss of confidence as well as a slowdown in exports, it was expected that the rise in government expenditure could provide the required temporary fillip to the falling aggregate demand. Monetary policy was accommodative; when combined with the increased appetite for government securities by financial institutions, it was felt that interest rates may not increase substantially. Therefore, discretionary fiscal stimulus was supposed to have different implications from those in the past.

5.114 Fiscal policy in India appears to have attained the desired objective of constraining the slowdown in the economy to a large extent during 2008-09. The contribution of government consumption to the incremental GDP at market prices made a large jump from about 8 per cent in the first half to 80 per cent during the second half of 2008-09 (Chart V.21). This large increase in government consumption, coupled with additional expenditure especially on infrastructure undertaken by the government, possibly revived the green shoots in the economy and growth rebounded since the beginning of 2009-10 (see Chapter 6). From the above evidence it could be construed that, in the absence of fiscal stimulus, the slowdown in growth could have been much more severe during 2008-09.

Exit Strategy

5.115 The fiscal stimulus measures have largely achieved the objective of containing the economic

Box V.7

Fiscal Policy Responses against the Backdrop of the Global Financial Crisis

Union Budget : 2008-09

Tax cuts

Excise

- The three major *ad valorem* rates of Central Excise duty, viz., 14 per cent, 12 per cent and 8 per cent applicable to non-petroleum products were reduced by 4 percentage points each to 10 per cent, 8 per cent and 4 per cent, respectively. The *ad valorem* component in the composite rates (specific and *ad valorem* rates) on cars, other than small cars, was reduced from 24 per cent to 20 per cent.
- The tax rate on cement was also reduced. The rate of duty on cotton textiles and textile articles was reduced from 4 per cent to nil.
- General reduction in excise duty rates by 4 percentage points with effect from December 7, 2008 was extended beyond March 31, 2009. The general central excise duty rate was reduced to 8 per cent from 10 per cent. The rate of central excise duty on bulk cement was reduced from 10 per cent or Rs.290 PMT, whichever is higher, to 8 per cent of Rs.230 PMT, whichever is higher.

Service Tax

- Refund of service tax paid by exporters on 18 taxable services attributable to export of goods was extended to services provided by a clearing and forwarding agent to exporters also.
- The threshold limit for refund of service tax paid by exporters on foreign commission agent services was enhanced from 2 per cent of FOB value to 10 per cent of FOB value of export of goods.
- Service tax on taxable services was reduced from 12 per cent to 10 per cent.

Customs

- Naphtha imported for generation of electric energy was fully exempted from basic customs duty.
- The export duty of 8 per cent on iron ore fines was withdrawn, while the rate of export duty on iron ore lumps was reduced from 15 per cent to 5 per cent *ad valorem*.
- Additional funds of Rs 1,100 crore will be provided to ensure full refund of Terminal Excise duty/CST.
- As pre- and post-shipment export credit for labour-intensive exports, i.e., textiles (including handlooms, carpets and handicrafts), leather, gems and jewellery, marine products and the SME sector were extended, an interest subvention of 2 per cent up to

March 31, 2009 subject to a minimum rate of interest of 7 per cent .

Expenditure

- To mainly finance schemes/plans announced in the Budget for 2008-09, supplementary demand for grants amounting to gross expenditure of Rs.2,37,286 crore with net cash outgo of Rs.1,05,613 crore was provided in October 2008.
- A second supplementary demand for grants of Rs. 55,605 crore with net cash outgo of Rs. 42,480 crore was sanctioned in December 2008.
- The third and final supplementary demand for grants with a net cash outgo of Rs.10,765 crore was approved in February 2009. The tranche of grants also included an additional expenditure of Rs. 4,60,952 crore of a technical nature, mainly comprising appropriation on account of repayment of debt.
- Two fiscal packages each amounting to Rs. 20,000 crore were also announced following the impact of the global financial crisis on the Indian economy during 2008-09.

Industry

- In the textile sector, an additional allocation of Rs.1,400 crore was made to clear the entire backlog of the Technology Upgradation Fund (TUF) Scheme.
- All items of handicrafts were included under 'Vishesh Krishi & Gram Udyog Yojana'.

Infrastructure

- India Infrastructure Finance Company Limited (IIFCL) was allowed to raise Rs,10,000 crore through tax-free bonds by March 31, 2009 to refinance bank lending of longer maturity to eligible infrastructure projects, particularly in the highways and port sectors in order to support a Public-Private Partnership programme of Rs.1,00,000 crore.
- IIFCL was authorised to raise an additional Rs.30,000 crore by way of tax-free bonds to fund additional projects of about Rs.75,000 crore in the next 18 months.

State Governments

- The ceiling of fiscal deficit that the states can incur in 2009-10 in terms of the debt consolidation and relief facility was increased by 0.5 per cent to 3.5 per cent of the Gross State Domestic Product for 2008-09.
- State governments were allowed to raise additional market borrowings of 0.5 per cent of their Gross State

(Contd...)

(...Concl.)

Domestic Product (GSDP), amounting to about Rs 30,000 crore, for capital expenditures during 2008-09.

Other Measures

- In order to provide predictability and stability of the regime in the short term for future contracts, the DEPB Scheme was extended till December 31, 2009.
- Duty drawback benefits on items such as knitted fabrics, bicycles, agricultural hand tools and specified categories of yarn were enhanced, effective from September 1, 2008.
- The exemption of naphtha imports for generation of electrical energy from basic customs duty was extended beyond March 31, 2009.
- Necessary changes in Section 10AA of the Income Tax Act were made to remove the anomaly arising in the treatment of assesseees having units located both in SEZs and Domestic Tariff Areas (DTA) *vis-à-vis* assesseees having units located only within the SEZs.

Union Budget: 2009-10

Tax Cuts

Income

- The threshold limit for exemption for personal income tax was raised by Rs.15,000 to Rs.2,40,000 for senior citizens, while it was raised by Rs.10,000 each for women and all other categories of individual tax payers to Rs.1,90,000 and Rs.1,60,000, respectively.
- An additional deduction of Rs.25,000 was allowed under Section 80 D from the present limit of Rs.75,000 to an individual who pays for maintenance, including medical treatment of a dependant with severe disability.
- The fringe benefit tax (FBT) was abolished.

Excise

- The proposed measures relating to excise rates include: differential rates between the cotton textile sector and the man-made fibre sector; restoration of the erstwhile optional rate of 4 per cent for cotton textiles beyond the fibre stage; restoration of 8 per cent duty on man-made fibre and yarn on a mandatory basis and on stages beyond fibre and yarn at that rate on an optional basis; full exemption of petro-diesel blended with bio-diesel from excise duty; and reduction of basic customs duty on bio-diesel from 7.5 per cent to 2.5 per cent –at par with petro-diesel – in order to encourage the use of this environment-friendly fuel and augment its availability.

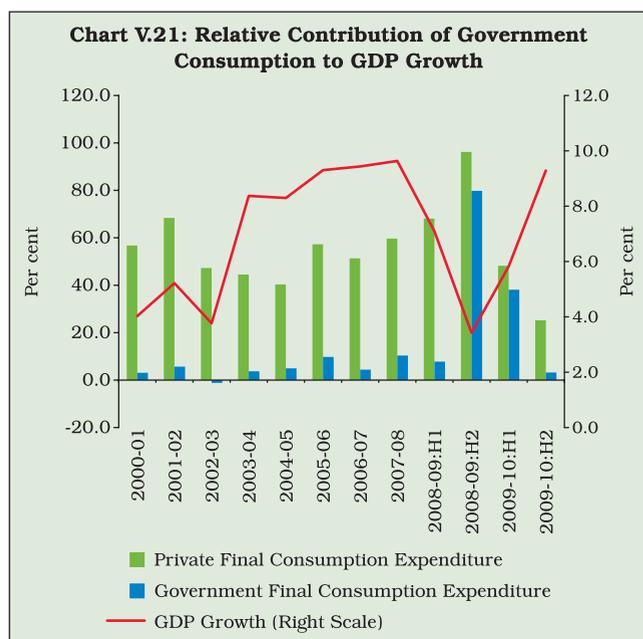
- In order to tide over the slowdown in exports, the government extended sunset clauses for one more year, *i.e.*, to 2010-11.
- To incentivise businesses, it was proposed to extend investment-linked tax incentives to the businesses to set up and operate 'cold chain' and warehousing facilities for storing agricultural produce and to lay and operate cross-country natural gas, crude, or petroleum oil pipeline networks for distribution on the common-carrier principle.
- As a measure of relief, it was proposed to extend the period allowed to carry forward the tax credit under MAT from seven years to ten years.
- Excise duty on petrol-driven trucks was reduced from 20 per cent to 8 per cent.

Customs

- The basic customs duty on liquid crystal display (LCD) panels was reduced from 10 per cent to 5 per cent to support indigenous production.
- The accessories, parts and components imported for the manufacture of mobile phones were exempted from countervailing duty (CVD) of 4 per cent for another year.

Expenditure

- The government had taken a conscious decision to increase public expenditure in select sectors in order to continue the momentum of growth, with a focus on intended outcomes.
- The allocation of expenditure on infrastructure, health and education, rural employment and other flagship programmes of the government has been enhanced.
- Keeping in view the critical role of infrastructure in the growth of the economy, the allocation to the national highway development programme and urban infrastructure has been increased considerably during 2009-10.
- The allocation for health and education was increased considerably in the Budget 2009-10. Keeping in view the demographic advantage, the provision for the scheme 'Mission in Education through ICT' was increased substantially. The government also made an allocation to establish a central university in each uncovered state. In order to improve the delivery of public services, the government allocated an amount of Rs.120 crore to the Unique Identification Authority of India.



slowdown in the short-term as reflected by growth revival during 2009-10. Thus, fiscal policy, shifting the stance from containing slowdown to recovery management in order to revert back to high growth trajectory, announced a calibrated exit of expansionary stance in the Union Budget 2010-11 with partially rolling back of tax cuts and better expenditure management. The Budget 2010-11 has proposed to bring down revenue deficit (RD) and gross fiscal deficit (GFD) during 2010-11 to 4.0 per cent and 5.5 of GDP, respectively. The Medium Term Fiscal Policy Statement (MTFPS), laying down the fiscal consolidation path in terms of rolling targets, indicates that RD and GFD in 2012-13 will be brought down to 2.7 per cent and 4.1 per cent of GDP, respectively. The Government, accepting in principle the medium-term fiscal consolidation path recommended by Thirteenth Finance Commission (ThFC), has also indicated in the MTFPS to reduce the debt to GDP ratio to 48.2 per cent by 2012-13.

Monetary Policy Response

5.116 The monetary policy response was in terms of easing liquidity into the system through conventional measures such as cutting policy rates [cash reserve ratio (CRR), reverse repo, and statutory liquidity ratio (SLR)] and open market

operations, and unconventional measures, viz., opening refinance facilities to SIDBI and EXIM Banks and clawing back prudential norms in regard to provisioning and risk weights. The total amount of actual/potential liquidity injected was Rs.5,85,000 crore (Table 5.25).

5.117 There are, however, some key differences between the actions taken by the Reserve Bank of India and the central banks in many advanced countries. First, in the process of liquidity injection the counterparties involved were banks; even liquidity measures for mutual funds, NBFCs and housing finance companies were largely channelled through the banks. Second, there was no dilution of collateral standards which were largely government securities, unlike the mortgage securities and commercial papers in the advanced economies. Third, despite a large liquidity injection, the Reserve Bank's balance sheet did not show an unusual increase, unlike global trends, because of release of the earlier sterilised liquidity. Fourth, the availability and deployment of multiple instruments facilitated better sequencing of monetary and liquidity measures. Finally, the experience in the use of pro-cyclical provisioning norms and counter-cyclical regulations ahead of the global crisis helped enhance financial stability (Mohanty, 2009).

Table 5.25: Liquidity Injection/ Availability during September 2008 - September 2009

Measure/Facility	Amount (Rs. crore)	% of GDP (2008-09)
1	2	3
1. CRR Reduction	1,60,000	2.9
2. Unwinding/Buyback/De-sequestering of MSS Securities	1,59,044	2.9
3. Open Market Operations (purchases) *	1,04,128	1.9
4. Term Repo Facility	60,000	1.1
5. Increase in Export Credit Refinance	22,328	0.4
6. Special Refinance Facility for SCBs (Non-RRBs)	38,500	0.7
7. Refinance Facility for SIDBI/NHB/EXIM Bank	16,000	0.3
8. Liquidity Facility for NBFCs through SPV **	25,000	0.4
9. Total (1 to 8)	5,85,000	10.5
<i>Memo:</i>		
Statutory Liquidity Ratio (SLR) Reduction	40,000	0.7

* Includes Rs.57,487 crore of OMO purchases against the proposed OMO purchases of Rs.80,000 crore during the first half of 2009-10.

** Includes an option of Rs.5,000 crore.

5.118 Wide-ranging initiatives were also taken in the areas of financial inclusion, employment generation in the rural and unorganised sectors, financial literacy and credit counselling. These include strengthening of rural co-operatives and regional rural banks which cater predominantly to the rural areas; liberalisation of the branch licensing policies of RRBs; encouraging multiple channels of lending such as

self-help groups (SHGs), micro-finance institutions (MFIs) and adoption of the banking facilitator/banking correspondent (BC) model; simplification of the procedures and processes for lending to agriculture and micro, small and medium enterprises (MSME) sectors; and encouraging the adoption of ICT solutions to not only increase outreach but also to reduce transaction costs (Box V.8).

Box V.8 Monetary Policy Response

Monetary Measures

- The repo rate under liquidity adjustment facility (LAF) has been cut by 425 basis points from 9.00 per cent to 4.75 per cent during October 2008-April 2009.
- The reverse repo rate under LAF has also been reduced by 275 basis points from 6.00 per cent to 3.25 per cent during December 2008-April 2009.
- The effective policy rate has, thus, seen a larger cut of 575 basis points from 9.00 per cent in mid-September 2008 to 3.25 per cent in April 2009.

Domestic Liquidity Measures

- The cash reserve ratio (CRR) was reduced from 9 per cent (September 2008) to 5 per cent by early January 2009, injecting nearly Rs.1,60,000 crore of primary liquidity in the system.
- Reduction in the statutory liquidity ratio (SLR) by one percentage point from 25 to 24 per cent of NDTL was effected from the fortnight beginning November 8, 2008.
- Special refinance facility was introduced for all SCBs (excluding RRBs), enabling them to avail of refinance from the Reserve Bank up to 1.0 per cent of each bank's NDTL as on October 24, 2008 at the LAF repo rate up to a maximum period of 90 days. Banks were encouraged to use this facility to extend finance to micro and small enterprises. This was discontinued in October 2009.
- The term repo facility for an amount of Rs.60,000 crore under the LAF was introduced to enable banks to ease the liquidity stress faced by mutual funds, NBFCs and housing finance companies (HFCs) with associated SLR exemption of 1.5 per cent of NDTL. This facility was available up to September 30, 2009 and was discontinued in October 2009.
- Fresh issuances under MSS were stopped and buyback of existing MSS securities was also used to inject liquidity into the system. Reflecting the various operations, MSS balances declined from Rs.1,75,362

crore at end-May 2008 to around Rs.88,000 crore by end-March 2009 and further to around Rs.19,000 crore by September 2009.

- Extension of the period of entitlement for the first slab of pre-shipment and post-shipment rupee export credit by 90 days each was provided with effect from November 15, 2008 and December 1, 2008, respectively.
- In order to provide liquidity support to the housing, export and MSE sectors, the Reserve Bank provided a refinance facility of Rs.4,000 crore to the NHB, Rs. 5,000 crore to the EXIM Bank and Rs. 7,000 crore to the SIDBI up to March 2010.

Exit

- The statutory liquidity ratio (SLR), which was reduced from 25 per cent of demand and time liabilities to 24 per cent, was restored to 25 per cent with effect from November 7, 2009.
- The limit for export credit refinance facility, which was raised to 50 per cent of eligible outstanding export credit, was returned to the pre-crisis level of 15 per cent.
- The cash reserve ratio (CRR) of scheduled banks was increased by 75 basis points from 5.0 per cent to 5.75 per cent of their net demand and time liabilities (NDTL) in two stages; the first stage of increase of 50 basis points was effective the fortnight beginning February 13, 2010, followed by the next stage of increase of 25 basis points effective the fortnight beginning February 27, 2010.
- The cash reserve ratio (CRR) of scheduled banks was enhanced by 25 basis points from 5.75 per cent to 6.0 per cent of their NDTL effective the fortnight beginning April 24, 2010.
- The repo rate under the Liquidity Adjustment Facility (LAF) was raised by 25 basis points from 5.0 per cent to 5.25 per cent with immediate effect on April 10, 2010. An increase of 25 basis points in reverse repo rate from 3.5 per cent to 3.75 per cent was also affected.

5.119 Taken together, the measures put in place by the Reserve Bank and the Government of India since mid-September 2008 have ensured that the Indian financial sector continued to function in an orderly manner. The cumulative amount of primary liquidity potentially available to the financial system through these measures was over US\$ 122 billion¹² or about 11 per cent of GDP¹³. This sizeable easing has ensured a comfortable liquidity position starting mid-November 2008 as evidenced by a number of indicators.

5.120 The monetary policy in India, like most other countries, had instituted both conventional measures and unconventional measures to be accommodative for containing the spillovers emanating from the recent global financial crisis. In the backdrop of firming up recovery and risk of rising food prices impinging on inflationary expectations, the monetary policy started its first phase of exiting its accommodative stance with reversing some of the unconventional measures during October 2009 (Box V.8).

V. CONCLUDING OBSERVATIONS

5.121 In the recent period, the financial linkages have become stronger resulting in a higher degree of business cycle co-movement, which has also resulted in faster transmission of shocks across countries. In India, too, trade openness has increased along with the higher capital account openness, which was reflected in greater synchronisation of the domestic business cycles with advanced and emerging market economies. The elevated synchronisation was eventually reflected in larger transmission of global developments to the Indian economy. Further, among the trade and finance channels, the latter has been found to be more dominant in transmitting the effects of global developments to the Indian economy during the recent period.

5.122 The financial markets in India were the first to be impacted, mainly because of the reversal of capital flows as part of the global deleveraging process. The rupee-US dollar depreciated considerably in the second half of 2008-09 and turnover in the forex markets also declined sharply on the back of steep declines in merchandise exports and substantially modulated capital flows. The balance of payments came under pressure which led to a reserve drawdown. A number of measures were initiated to ease the foreign exchange supply situation, partly by assuring greater access to the Reserve Bank's foreign reserves and partly by improving inflows in response to specific measures. Besides actual large-scale intervention sales in the foreign exchange market, the Reserve Bank also opened the forex swap facility for the banks. To ease the demand pressure from oil-importing companies during the high and rising phase of international prices, the Reserve Bank had already started special market operations in the secondary market through commercial banks, involving the direct supply of forex liquidity against the bonds of public sector oil marketing companies. The policy measures that aimed at improving the supply of forex liquidity included permitting banks to borrow from their overseas branches within prudential limits, further relaxing the external commercial borrowing policy, including allowing NBFCs and housing finance companies to borrow in foreign currency, and raising the interest rates on NRI deposits. Notwithstanding the demand pressure in the forex market, in view of depressed international asset prices, corporates were permitted to prematurely buy back their FCCBs at prevailing discounted rates.

5.123 The money market, which remained by and large orderly during the first half of 2008-09, came under liquidity pressure following the failure of

¹² The exchange rate used is the average exchange rate of Rs per US dollar for 2008-09.

¹³ The GDP of 2008-09 is used.

Lehman Brothers and a few other global financial institutions, and volatility in the call market increased significantly. With increased volatility in the financial markets during the third quarter of 2008, the Reserve Bank had to ensure an adequate supply of rupee as well as foreign currency liquidity to restore the call money rate within the LAF corridor and also to contain volatility in the exchange rate. The Reserve Bank had to expand the net domestic assets (NDA) to compensate for the decline in reserve money due to the decline in net foreign assets so as to ensure the necessary growth in money supply consistent with the needs of economic growth, besides the provision of ample liquidity to alleviate any fears of liquidity shortage in the Indian markets. The Reserve Bank used all instruments like the LAF, OMO, CRR and MSS to augment liquidity in the system. While dealing with the challenge of expanding the NDA to offset the impact of contracting NFA on reserve money, the unwinding of MSS balances not only created the scope for adequate liquidity expansion by the Reserve Bank without expanding its balance sheet, but the timing of the unwinding could also be modulated in such a way that the large borrowing programme of the government was managed smoothly without exerting any market stress. The monetary operations of the Reserve Bank were significantly different from the experiences of many central banks of the advanced economies, even though the ultimate objective was almost the same, which was to ensure adequate liquidity in the banking system. Thus, the transmission of the Reserve Bank's policies to the money, forex and government securities markets has been effective, thereby ensuring speedy restoration of orderly conditions over a short time span.

5.124 The credit market functioned normally in India as against almost defreezing of this market in many advanced countries. Given the overriding importance of containing the moderation in flow of credit to the private sector for sustaining the growth momentum, counter-cyclical prudential regulations were used to encourage banks to lend. The credit growth of the commercial banks,

however, decelerated sharply during 2008-09, especially in the second half, on account of subdued economic activities and banks being extra cautious about viability. The banks, which recorded a negative deposit growth and resource squeeze during 2008-09, ended up witnessing a significant fall in credit growth. Interestingly, these banks had a significant lower proportion of time deposits in their deposit portfolio.

5.125 Like forex and money markets, the volatility of the 10-year benchmark G-sec movement increased from September 2008, reflecting general pressures in the financial markets and a sharp increase in the market borrowings of the Government of India during the last quarter of 2008-09. The global financial crisis also affected India through the asset price channel. Global financial and real shocks to domestic asset prices, particularly stock prices, led to erosion of household wealth and corporate balance sheets in terms of value of their collaterals. Both factors affected household consumption demand and corporate investment. Asset prices shocks also adversely affected exchange rate expectations which led to further uncertainty about external trade. The decline in stock market capitalisation following the financial crisis has been of almost comparable magnitude across OECD countries and EMEs, which underlines the increased severity of the global shocks.

5.126 The stock markets in India, responding to all major international events, started sliding from the peak in January 2008 and touched a new low in March 2009. The long-run co-integration vector showed that the impact of the global markets on Indian stocks was more pronounced than the impact of the regional markets. The global and regional markets together accounted for the bulk of the variation in the Indian stock market. A bi-variate VAR model for India indicates a significant causal relationship from the FII flows to the stock market. The feedback causality from the BSE index to FII flows was also significant, *albeit* less significant.

5.127 Although the banking sector in India was not directly affected by the crisis because of meagre

exposure to sub-prime mortgages and to failed institutions, the liquidity stress in the money and forex markets eventually enhanced credit pressures on banks. Indian banks were also able to weather the slipovers of current global crisis due to their better financial health *vis-à-vis* their peers in EMEs and advanced countries. The macro-prudential dimension of systemic risk assessment has become particularly important in the context of the current global financial crisis. In India, elements of macro-prudential regulation were visible even before the global crisis started, in terms of counter-cyclical use of risk-weights and provisioning norms. Macro-prudential analysis could provide the early warnings for timely identification of systemic risks, while macro-prudential regulation could prevent the emergence of systemic risk in the financial system. The Reserve Bank is in the process of revising guidelines on stress testing and liquidity risk management, taking into account the new guidance issued by Basel Committee on Banking Supervision (BCBS). It is also considering laying down a risk management and capital adequacy framework for bank-sponsored private pools of capital (*e.g.*, private equity funds/ venture capital funds), especially in view of the reputational risk arising from undertaking such activities.

5.128 The estimation of asymmetric effects of monetary policy shocks revealed that changes in policy rates as well as liquidity have a significant positive effect on bank lending and the impact of monetary policy on lending behaviour is stronger

for banks with less liquid balance sheets. The falling stock prices and drying up of resources for corporates generated redemption pressure on mutual funds during the second half of 2008-09 and, at the same time, mutual funds were unable to raise funds from alternate sources. NBFCs and mutual funds, given the nature of their sources of funds, also faced a major liquidity shortage. The term-repo facility extended by the Reserve Bank to banks for onward lending to mutual funds, NBFCs and others and the recovery in the stock market at the beginning of 2009-10 provided a respite to these institutions. Indications are clearly visible that pressures on mutual funds have eased and that NBFCs too are making the necessary adjustments to balance their assets and liabilities.

5.129 In sum, all the constituents of the financial sector in India were affected directly or indirectly by the recent global crisis during 2008-09. This is also reflected in the financial stress, which increased significantly in the third quarter of 2008-09 as manifested by the steep rise in the financial stress indicator (FSI). In fact, the FSI for India began rising from August 2007 and peaked in October 2008, reflecting the deepening turmoil in international financial markets subsequent to the failure of Lehman Brothers. The swift and calibrated monetary and fiscal policy measures have eased the financial stress in Indian financial markets greatly since November 2008 and, since then, the FSI has been on the downward trajectory.