III MONEY MARKET

3.1 The money market is a key component of the financial system as it is the fulcrum of monetary operations conducted by the central bank in its pursuit of monetary policy objectives. It is a market for short-term funds with maturity ranging from overnight to one year and includes financial instruments that are deemed to be close substitutes of money. The money market performs three broad functions. One, it provides an equilibrating mechanism for demand and supply of short-term funds. Two, it enables borrowers and lenders of short-term funds to fulfil their borrowing and investment requirements at an efficient market clearing price. Three, it provides an avenue for central bank intervention in influencing both quantum and cost of liquidity in the financial system, thereby transmitting monetary policy impulses to the real economy. The objective of monetary management by the central bank is to align money market rates with the key policy rate. As excessive money market volatility could deliver confusing signals about the stance of monetary policy, it is critical to ensure orderly market behaviour, from the point of view of both monetary and financial stability. Thus, efficient functioning of the money market is important for the effectiveness of monetary policy.

3.2 In order to meet these basic functions efficiently, money markets have evolved over time spawning new instruments and participants with varying risk profiles in line with the changes in the operating procedures of monetary policy. Changes in financial market structures, macroeconomic objectives and economic environment have called for shifts in monetary regimes, which, in turn, have necessitated refinements both in the operating instruments and procedures, and in institutional arrangements by central banks.

3.3 Internationally, following the breakdown of the Bretton Woods system, there was a shift from rule-based frameworks towards discretion in the use of monetary policy instruments, which ultimately led to the gradual abandonment of exchange rate targets. Changes in financial structures and financial innovations also rendered monetary targeting ineffective by making the money demand functions unstable. Accordingly, since the early 1990s, there has been a shift towards greater exchange rate flexibility and adoption of inflation targeting by some central banks partly because of increased capital mobility, greater financial market integration and repeated episodes of currency crises. Commensurate with these changes, central banks have moved away from conventional (direct) instruments of monetary control (working through the quantum channel) towards more use of indirect instruments (operating through the price channel). Accordingly, the use of reserve requirements and direct credit controls has been gradually de-emphasised, while relying more on interest rates for signalling the monetary policy stance. As central banks have only limited control over long-term interest rates, the most commonly adopted strategy has been to exert direct influence only on short-term interest rates and permitting market expectations to influence long-term interest rates through financial market inter-linkages. Thus, the choice of monetary policy instruments is guided by the structure of the money market.

3.4 In India, although the ultimate goals of monetary policy, *viz*., growth and price stability, have remained unchanged over the years, the Reserve Bank has modified its operational and intermediate objectives of monetary policy several times in response to changes in the economic and financial environment. For instance, in the mid-1980s, the Reserve Bank formally adopted monetary targeting with feedback as a nominal anchor to fight inflation, partly induced by the large scale monetisation of fiscal deficits. The operating procedure in this regime was modulation of bank reserves by varying reserve requirements. In order to meet reserve requirements, banks borrowed primarily from the inter-bank (call money) market. Hence, these transactions were reflective of the overall liquidity in the system. Accordingly, the Reserve Bank focussed on the money market, in particular, the call money market by using various direct instruments of monetary control to signal the policy stance consistent with the overall objectives of achieving growth and price stability. As interest rates were regulated, monetary management was undertaken mainly through changes in the cash reserve ratio (CRR), which was used to influence indirectly the marginal cost of borrowing by having an initial impact on the call money market. As the

success of this strategy was crucially dependent on the stability of the call money market and its inter-linkages with other money market segments, reforms since the late 1980s, along with changes in the reserve maintenance procedures, have aimed at developing various money market segments through introduction of new instruments, increased participation and improved liquidity management in the system.

3.5 Financial sector reforms since the early 1990s have provided a strong impetus to the development of financial markets, which, along with interest rate deregulation, paved the way for introduction of market-based monetary policy instruments. With financial innovations, money demand was seen as less stable and the disequilibrium in money markets got reflected in short-term interest rates (Mohan, 2006). Accordingly, since the adoption of the multiple indicator approach in 1998, although monetary aggregates continue to be an important information variable, interest rates have emerged as the operational instrument of policy – initially the Bank Rate and then the repo/reverse repo rates under the liquidity adjustment facility (LAF) from June 2000. This shift in emphasis from money to interest rates has been spurred by increased financial liberalisation, greater trade openness and capital flows, and innovations in payment and transactions technologies. Such a shift was gradual and a logical outcome of measures implemented in the reform period since the early 1990s (Reddy, 2002). An array of new money market instruments such as commercial paper, certificates of deposit and repos has been introduced in order to broaden the money market. Furthermore, with increased sophistication of financial markets, the risk profiles of financial market participants also changed, necessitating introduction of derivative instruments as effective risk management tools.

3.6 The liberalisation of capital controls resulting in increased integration of the Indian economy with the global economy, however, posed new challenges and dilemmas for monetary and exchange rate management in the 1990s. These developments called for a greater emphasis on orderly conditions in financial markets for ensuring financial stability. In this phase, the focus of reforms was on introducing instruments of various maturities in different money market segments and imparting liquidity to these instruments by developing a secondary market, and streamlining the money market operations. This resulted in greater control over the liquidity in the system and created an efficient mechanism to transmit interest rate signals. Thus, changes in the monetary policy operating procedures necessitated refinements in money market microstructure through introduction of new instruments and widening of participation under a deregulated interest rate environment.

3.7 The need for developed and well-integrated money market also assumes critical importance as India progressively moves towards greater capital account convertibility, as envisaged by the Committee on Fuller Capital Account Convertibility (FCAC), which submitted its report to the Reserve Bank in July 2006. Better response to such financial flows by various market segments will depend upon the extent of integration as well as the development of necessary infrastructure. The greater integration of domestic and international markets also calls for flexible use of monetary policy instruments for modulating domestic liquidity conditions and correcting any serious misalignments between short-term and long-term interest rates.

3.8 Against the above backdrop, this chapter traces the evolution of monetary policy operating procedures in India as necessitated by the changes in the financial market structure, in particular, the money market, and the risks/challenges arising out of such market orientation of monetary policy. Section I spells out the theoretical underpinnings of money market for monetary policy making. International experience on money market operating procedures, the evolving practices in liquidity management operations and the structure of money market are set out in Section II. Section III presents a brief review of the money market in India in the pre-reform period. Section IV deals with the changes in the Reserve Bank's liquidity management operations commensurate with the shifts in operating procedures. Developments in various segments of the money market since the mid-1980s are covered in Section V. It also discusses the Reserve Bank's proactive role in mitigating various risks to the financial system. Section VI identifies the emerging issues in monetary and liquidity management in India and the need for addressing them in future for the smooth functioning of the money market and the efficient conduct of monetary policy. Section VII presents the concluding observations.

I. ROLE OF THE MONEY MARKET - THEORETICAL UNDERPINNINGS

3.9 There is a general consensus among academics and central bankers that monetary policy is best geared to achieve price stability. In some countries, central banks have additional mandates such as ensuring full employment, maximising growth and promoting financial stability. In order to meet these objectives, central banks intervene in financial markets to ensure that short-term interest rates (and exchange rates) and liquidity are maintained at appropriate levels, consistent with the objectives of monetary policy. Thus, monetary policy and financial markets are linked intrinsically. It is through the financial markets that monetary policy affects the real economy. Hence, financial markets are the connecting link in the transmission mechanism between monetary policy and the real economy.

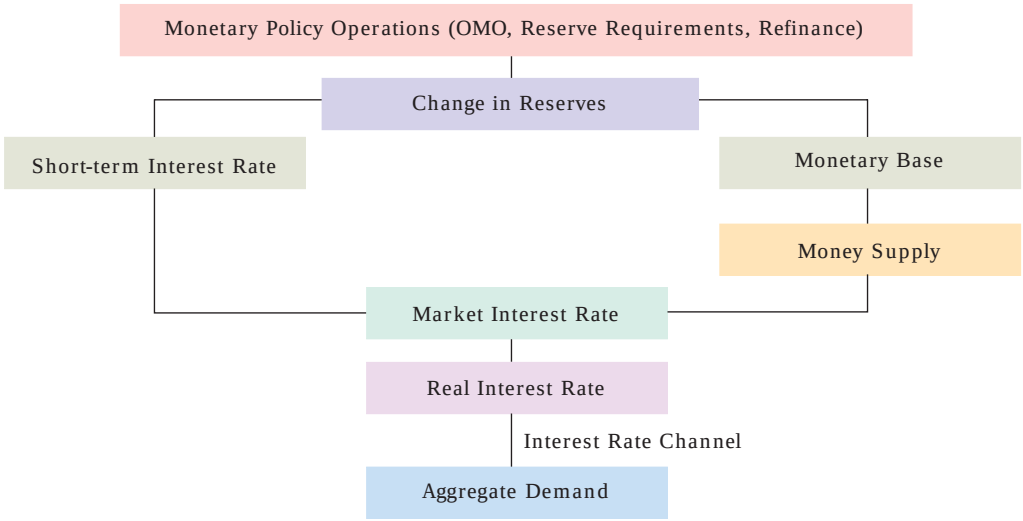
3.10 The relationship between monetary policy and financial markets is of mutual inter-dependence. Central banks conduct monetary policy by directly and indirectly influencing financial market prices. Financial market prices reflect the expectations of market participants about future economic developments. These expectations, in turn, provide valuable information to central banks in setting the optimal course of monetary policy in the future.

3.11 Monetary policy affects financial markets through various financial price and quantity channels. The transmission process from monetary policy to financial markets and finally to the real economy is typically triggered through the use of monetary policy instruments (reserve requirements, open market operations, policy rates and refinance facilities) for controlling the operating targets (like reserve money and bank reserves) consistent with intermediate targets such as money supply, which enables attainment of final objectives of economic growth and price stability. Typically, the monetary policy instrument is a financial market price, which is directly set or closely controlled by the central bank. For most central banks with floating exchange rates, the monetary policy instrument is a short-term interest rate. Changes in the short-term policy rate provide signals to financial markets, whereby various segments of the financial system respond by adjusting their rates of return on various instruments, depending on their sensitivity and the efficacy of the transmission mechanism. Under fixed exchange rate regimes, a particular exchange rate serves as the instrument. Similarly, under the monetary targeting regime, the operating target is the quantity of central bank money in the banking system, which is determined by the supply of bank reserves. If all factors having an impact on output and inflation were completely known in advance, it would make no difference whether the central bank conducts policy by fixing the supply of reserves or by setting an interest rate (Friedman, 2000b). In fact, these alternative operating strategies would be similar in impact. However, since many factors that impact the central bank's policy priorities are unpredictable, the choice of the operating instrument matters for the effectiveness of monetary policy.

3.12 The theoretical justification for the conduct of monetary policy through interest rates is derived from "the appropriate choice of instrument problem" (Poole, 1970). It was demonstrated that if aggregate demand shocks in the economy originate from the goods market (the IS curve), then the optimum policy is to target monetary aggregates for minimising output fluctuations. On the other hand, if demand shocks originate in the money market (the LM curve), from the perspective of monetary policy, targeting interest rates is the appropriate approach. The implication being that as financial markets develop with increasing financial innovations, the demand for money becomes unstable, rendering monetary targeting redundant. In other words, with the gradual financial sophistication of the economy, the speculative demand for money dominates the transaction motive. Hence, most developed countries operate through an interest rate target.

3.13 The interest rate channel is the primary mechanism of monetary policy transmission in conventional macroeconomic models where an increase in nominal interest rates, given some degree of price stickiness, translates into an increase in the real rate of interest and the user cost of capital (Exhibit III.1) . These changes, in turn, lead to a postponement in consumption or a reduction in investment spending thereby affecting the working of the real sector, *viz.*, changing aggregate demand and supply, and eventually growth and inflation in the economy (Kuttner and Mosser, 2002). This is the mechanism embodied in conventional specifications of the "IS" curve, both of the "Old Keynesian" variety (Samuelson and Solow, 1960) and the "New Keynesian" models developed during the 1990s (Rotemberg and Woodford, 1997; Clarida, Gali, and Gertler, 1999). However, the macroeconomic response to policy-induced interest rate changes is considerably larger than that implied by conventional estimates of the interest elasticities of consumption and investment

Exhibit III.1: Monetary Policy Transmission through Interest Rate Channel



Source: Adapted from Kuttner and Mosser (2002).

(Bernanke and Gertler, 1995). This suggests that mechanisms, other than the interest rate channel, may also be at work in the transmission of monetary policy[1].

3.14 Interest rates can influence the monetary policymaking process in three distinct ways (Friedman, 2000a). The first role of interest rates is as an instrument variable that the central bank sets in order to implement its chosen policy. A second potential role for interest rates in the monetary policy process is again as an instrument variable, but as an instrument that the central bank varies not for influencing output and inflation directly but rather for targeting the money stock. Finally, most central banks use short-term interest rate as their monetary policy instrument variable based on long-term interest rate movements, which are taken as more of an information variable about potential future developments. Implicit in this framework, however, is a regular term structure of interest rates whereby policy initiatives at the short end are transmitted efficiently to the longer end of the maturity spectrum. This relationship fares better under the assumption of adaptive expectations (Chow, 1989), while recent empirical evidence suggests that long-term rates are poor (and biased) predictors of future short-term rates, particularly when expectations are rational (Blinder, 2006).

3.15 Short-term interest rates alone have only limited direct effects on the economy. Long-term interest rates have a stronger impact as they determine savings and investment decisions in the economy. In order to impact the economy, monetary policy impulses must, therefore, be transmitted from the money market to the capital market by influencing asset prices such as loan rates, bond rates, exchange rates and stock market valuations. The money market and the capital market are linked by expectations. Neglecting transaction costs and risk premiums, the expectations theory of the term structure views the long-term interest rate as an average of the short-term interest rates expected to prevail till the maturity of the respective instrument. Although current short-term interest rates have some effect on longer-term bond yields, the expectations theory of the term structure indicates that it is primarily expected future short-term interest rates which determine bond yields. In practice, owing to uncertainty about the future evolution of short-term interest rates and the time-varying risk premiums, the longer the maturity, the weaker the link between current short-term rates and long-term rates. Therefore, in practice, central banks sometimes find it difficult to guide longer-term interest rates to a level commensurate with what they consider to be the optimal monetary policy stance.

[1] The changes in the policy rate, by inducing international interest rate differentials, also have a bearing on exchange rate movements through the uncovered interest rate parity condition.

3.16 Central banks, nevertheless, operate on short-term policy rates, which under a regular term-structure and a smooth market continuum would be able to influence long-term interest rates. In order to efficiently transmit monetary policy signals to long-term rates, central banks foster development of the money market. The money market, thus, serves as the corner-stone of a competitive and efficient system of market-based intervention by the central bank. It stimulates an active secondary bond market by reducing the liquidity risk of bonds and other short-term financial instruments and assists financial intermediaries in managing their liquidity risk. It also serves as the medium for Government cash management and provides the first link in the implementation of monetary policy. There are three conditions which are required to be fulfilled for developing a well-functioning money market. These are: (i) banks and other financial institutions must be commercially motivated to respond to incentives, actively manage risk and maximise profit; (ii) the central bank must shift from direct to indirect methods of implementing monetary policy; and (iii) the Government must have a good mechanism of cash management, thereby giving the central bank greater freedom in setting its operating procedures.

3.17 The central bank's operating procedures greatly influence the stability of the money market as well as banks' incentives to actively use the money market to manage risk. In this regard, operating procedures need to be designed appropriately to promote market liquidity, stability and encourage active risk management. The operating procedures that particularly influence banks' risk management incentives are the reserve maintenance period, the definition of liabilities on which reserves are levied, accommodation policy and the accuracy of operations designed to affect market liquidity - that is, the accuracy with which the central bank can control the demand for excess reserves in the system.

3.18 Development of liquidity in the inter-bank market - the market for short-term lending/borrowing amongst banks - provides the basis for growth and increased liquidity in the broader money market, including secondary market for Treasury Bills and private sector money market instruments. While the central bank's liquidity management operations encompass discretionary injections or withdrawals of primary money from the financial system at its own initiative, its accommodation policy comprises operations to meet the demand for liquidity from market participants. Market liquidity management refers to actions taken by the central bank to manage the overall level of high-powered money and, through this, to regulate money market conditions (Box III.1). The regulation of money market conditions focusses on offsetting the demand for excess reserves in order to avoid large fluctuations in bank reserves causing volatility in short-term interest rates. Successful market liquidity management requires that the daily level of excess reserves in the banking system be close to the level demanded by banks.

3.19 Theoretically, the speed of transmission of policy signals to financial asset prices improves with derivatives trading as it enables risk sharing across the market as well as reflects the inter-temporal adjustments of financial asset prices to monetary policy signals. A financial derivative contract derives the future price for the underlying asset on the basis of its current price and interest rates. Accordingly, the efficient pricing of derivatives is contingent upon an active and liquid market for the underlying asset. As the informational content of the market is reflected in prices of derivatives, there is a case for using derivatives as monetary policy instruments. It is, however, noted that central banks do not use derivative instruments actively for monetary policy purposes as they are normally considered to be risky and uncertain. Furthermore, the impact of derivatives trading on the real economy remains ambiguous (Gray and Place, 2001). Derivatives, however, are increasingly becoming a useful tool for risk management in financial markets.

3.20 To sum up, the interest rate channel has emerged as a key channel of monetary policy transmission mechanism. Although the central bank can directly influence mainly short-term rates, effective transmission of policy signals requires a proper term structure of interest rates, which is dependent on market participants' expectations about the future movements in policy rates. A well-functioning money market is, therefore, essential for conducting indirect, market-based monetary policy operations and for providing the liquidity necessary for the market in government securities and private sector bonds. By careful management of liquidity conditions, the central bank can realise its monetary policy objectives and encourage money market transactions while ensuring stable market conditions. A vital element for conducting effective monetary policy is knowledge of Government cash flows, which, like central bank's open market operations, also affect bank's reserve balances.

Box III.1
Role of the Money Market in the Monetary Transmission Mechanism

The money market forms the first and foremost link in the transmission of monetary policy impulses to the real economy. Policy interventions by the central bank along with its market operations influence the decisions of households and firms through the monetary policy transmission mechanism. The key to this mechanism is the total claim of the economy on the central bank, commonly known as the monetary base or high-powered money in the economy. Among the constituents of the monetary base, the most important constituent is bank reserves, *i.e.*, the claims that banks hold in the form of deposits with the central bank. The banks' need for these reserves depends on the overall level of economic activity. This is governed by several factors: (i) banks hold such reserves in proportion to the volume of deposits in many countries, known as reserve requirements, which influence their ability to extend credit and create deposits, thereby limiting the volume of transactions to be handled by the bank; (ii) bank's ability to make loans (asset of the bank) depends on its ability to mobilise deposits (liability of the bank) as total assets and liabilities of the bank need to match and expand/contract together; and (iii) banks' need to hold balances at the central bank for settlement of claims within the banking system as these transactions are settled through the accounts of banks maintained with the central bank. Therefore, the daily functioning of a modern economy and its financial system creates a demand for central bank reserves which increases along with an expansion in overall economic activity (Friedman, 2000b).

The central bank's power to conduct monetary policy stems from its role as a monopolist, as the sole supplier of bank reserves, in the market for bank reserves. The most common procedure by which central banks influence the outstanding supply of bank reserves is through "open market operations" – that is, by buying or selling government securities in the market. When a central bank buys (sells) securities, it credits (debits) the reserve account of the seller (buyer) bank. This increases (decreases) the total volume of reserves that the banking system collectively holds. Expansion (contraction) of the total volume of reserves in this way matters because banks can exchange reserves for other remunerative assets. Since reserves earn low interest, and in many countries remain unremunerated, banks typically would exchange them for some interest bearing asset such as Treasury Bill or other short-term debt instruments. If the banking system has excess (inadequate) reserves, banks would seek to buy (sell) such instruments. If there is a general increase (decrease) in demand for securities, it would result in increase (decline) in security prices and decline (increase) in interest rates. The resulting lower (higher) interest rates on short-term debt instruments mean a reduced (enhanced) opportunity cost of holding low interest reserves. Only when market interest rates fall (rise) to the level at which banks collectively are willing to hold all of the reserves that the central bank has supplied will the financial system reach equilibrium. Hence, an "expansionary" (contractionary) open market operation creates downward (upward) pressure on short-term interest rates not only because the central bank itself is a buyer (seller), but also because it leads banks to buy (sell) securities. In this way, the central bank can easily influence interest rates on short-term debt instruments. In the presence of a regular term structure of interest rates and without market segmentation, such policy impulses get transmitted to the longer end of the maturity spectrum, thereby influencing long-term interest rates, which have a bearing on household's consumption and savings decisions and hence on aggregate demand.

There are alternative mechanisms of achieving the same objective through the imposition of reserve requirements and central bank lending to banks in the form of refinance facilities. Lowering (increasing) the reserve requirement, and, therefore, reducing (increasing) the demand for reserves has roughly the same impact as an expansionary (contractionary) open market operation, which increases (decreases) the supply of reserves creating downward (upward) pressure on interest rates. Similarly, another way in which central banks can influence the supply of reserves is through direct lending of reserves to banks. Central banks lend funds to banks at a policy rate, which usually acts as the ceiling in the short-term market. Similarly, central banks absorb liquidity at a rate which acts as the floor for short-term market interest rates. This is important, since injecting liquidity at the ceiling rate would ensure that banks do not have access to these funds for arbitrage opportunities whereby they borrow from the central bank and deploy these funds in the market to earn higher interest rates. Similarly, liquidity absorption by the central bank has to be at the floor rate since deployment of funds with the central bank is free of credit and other risks. Typically, the objective of the central bank is to modulate liquidity conditions by pegging short-term interest rates within this corridor.

While the above mechanism outlines how central banks can influence short-term interest rates by adjusting the quantity of bank reserves, the same objective can be achieved by picking on a particular short-term interest rate and then adjusting the supply of reserves commensurate with that rate. In many countries, this is achieved by targeting the overnight inter-bank lending rate and adjusting the level of reserves which would keep the inter-bank lending rate at the desired level. Thus, by influencing short-term interest rates, central banks can influence output and inflation in the economy, the ultimate objectives of monetary policy.

II. OPERATING PROCEDURES AND MONEY MARKET - INTERNATIONAL EXPERIENCE

3.21 The objectives, targets and operating procedures of monetary policy worldwide have witnessed considerable shifts in tune with the evolution of monetary theory, central banking regimes and the changing macroeconomic conditions over time. By the 1970s, most central banks came to accept price stability as a key objective of monetary policy - a departure from the earlier prominence given to growth and employment objectives. In recent years, beyond the traditional growth-inflation trade-off, financial stability has emerged as another key objective in the wake of growing financial market integration and associated uncertainty and volatility arising out of contagion. Although a number of central banks in developed countries such as the Reserve Bank of New Zealand, Reserve Bank of Australia and the Bank of England have adopted price stability as their sole objective by adopting an inflation targeting framework, several other countries, *viz.,* the US and Japan continue to pursue dual objectives of price stability and growth. Similarly, while some emerging market economies (EMEs) such as South Africa, Thailand, Korea and Mexico have emphasised solely price stability by adopting an inflation targeting framework, some others tend to follow multiple objectives.

Monetary Policy Frameworks

Intermediate Targets

3.22 As central banks could not always directly target the ultimate objective, monetary policy focussed on intermediate targets that bear close relationship with the final objective. The selection of intermediate targets is conditional on the channels of monetary policy transmission that operate in the economy. The process of rapid disintermediation sparked off by a spate of financial innovations during the 1980s began to impact the monetary targeting framework (Solans, 2003). Accordingly, with money demand becoming unstable, central banks began to modulate aggregate demand by targeting interest rates. As a result, central banks in the US (1992) and Japan (1994-2001)[2], among others, adopted inter-bank rates as intermediate targets. Financial liberalisation, however, has reduced the importance of explicit intermediate targets in several countries, thereby prompting many central banks to adopt a multiple indicator approach. Under this approach, many central banks such as the US Federal Reserve, the European Central Bank and the Bank of Japan regularly monitor a number of macroeconomic indicators such as prices, output gaps, and developments in asset, credit and other financial markets, which have a bearing on price stability.

3.23 Some EMEs such as Russia and China continue to specify intermediate targets in the form of monetary aggregates. Some other countries such as Indonesia, however, use indicative monetary targets more as an important information variable, supplementing it with other indicators of developments in financial markets and the real economy. Furthermore, along with the adoption of inflation targeting by many EME central banks, there has been an increasing focus on the interest rate channel of the monetary transmission process.

Operating Targets

3.24 The process of monetary policy implementation is guided mainly by the choice of operating targets. Notwithstanding the policy objectives, the critical issue facing the monetary authorities is to strike a balance in the short-run between instruments and targets. In recent years, a certain degree of consensus has emerged both in the industrialised countries and EMEs to use market-oriented instruments, driven mainly by the rapid development and deepening of various financial market segments, the diversification of financial institutions and the globalisation of financial intermediation (Van't dack,1999).

3.25 With the gradual development and sophistication of money markets in a deregulated regime, there has been a shift from Keynesian growth- and full-employment-oriented monetary policy operating on monetary aggregates to an inflation-oriented monetary policy operating on interest rates. With the growing sophistication of markets, the traditional *dirigiste*, direct control approach to monetary policy has become obsolete, while indirect market oriented approach has gained greater acceptance (Forssbaeck and Oxelheim, 2003).

[2] The Bank of Japan shifted to quantitative easing policy since March 2001 but again decided on March 9, 2006 to change the operating target from the outstanding balances of current accounts at the Bank to the uncollateralised overnight call rate.

3.26 Among the two operating procedures, *viz.,* through bank reserves and interest rates, the focus has increasingly shifted towards the latter since the early 1990s due to the broader changes that took place in the economic environment (Borio, 1997). The trend reflects the growing role played by interest rates in the transmission mechanism as markets develop in a deregulated environment. The sharper focus on interest rates as the operating target has gone hand in hand with a tendency to move towards targeting short-term interest rates. As a corollary, the overnight rate has emerged as the most commonly pursued operating target in the conduct of monetary policy. Hence, the focus has been concentrated on money markets for transmitting monetary policy signals. The targeting of short-term interest rates is fully consistent with a market oriented approach whereby information about the expectations of future movements in interest rates is extracted from the prevailing market rates.

3.27 Although countries differ in terms of the choice of instruments, they could be broadly classified on the basis of their key operating targets (interest rates) (Annex III.1). In the first category are countries such as the US, Japan, Canada and Australia, where the key operating target is the overnight inter-bank rate although the signalling strategies differ. In the case of other developed countries such as the ECB, the key policy rate is the tender rate that is applicable to regular operations, mainly, the refinancing operations. Some central banks, however, in countries such as the UK, select overnight market interest rates as their operating target consistent with the official Bank Rate decided by the MPC. In general, the maturity of such interest rates varies from 1 to 2 weeks but could range between 1 or 2 days to 1-month.

3.28 The operating target in the case of several EMEs also is the overnight rate - determined in the inter-bank market for settlement balances (Korea and Malaysia) (Annex III.2). In order to promote financial stability, central banks, being the monopolistic suppliers of primary liquidity, have endeavoured to smoothen the movements in the overnight rate with a high degree of precision through calibrated modulation of bank reserves. Central banks have generally refrained from strict control of interest rates as it deters the development of money markets. Allowing the volatility in the overnight rate to absorb temporary pressure could enable central banks to preserve stability in other money market segments.

3.29 Central banks have used several techniques in order to contain the interest rate volatility - the averaging of reserve requirements and use of standing facilities to define an interest rate corridor. Most of these countries steer the overnight rates within a corridor - lower bound (floor) set by the deposit facility and upper bound (ceiling) represented by the lending facility. These corridors are normally considerably wide, allowing for the significant flexibility in the movement of both policy and overnight rates (Borio, *op.cit*). With regard to the frequency of interest rate adjustments, most central banks prefer a policy of small and gradual changes.

Operating Procedures

3.30 The operating procedures of liquidity management have also changed in response to the changes in the policy environment amidst financial liberalisation. The literature and the central banks' own accounts attribute five main reasons for reform in their operating procedures in the industrial countries during the 1980s and the 1990s (Mehran *et al.*, 1996 and Forssbaeck and Oxelheim, *op cit*). First, monetary policy instruments were changed to adapt to the new operational frameworks of the respective monetary authorities. Second, with financial deepening occurring more or less entirely outside the central banks' balance sheets, the share of the financial system over which monetary authorities had direct control was reduced, warranting indirect (price-oriented as opposed to quantity-oriented instruments) ways to control the non-monetary components of liquidity in the financial system. Third, in the wake of expansion, diversification and integration of financial markets all over the world, greater interest rate flexibility and narrowing of differentials between rates of return in different currencies warranted instruments that can impart flexibility to liquidity management in terms of the timing, magnitude and accuracy. Fourth, the growing importance of expectations in financial markets favoured the adoption of instruments that are better suited for signalling the stance of monetary policy. Finally, there was a growing urge on the part of central banks to stimulate money market activity and improve monetary policy transmission while emphasising the separation of monetary and Government debt management objectives.

3.31 As a result of the changes in the policy environment, the following trends could be observed at the international level, particularly during the 1990s (Borio, *op.cit* and Van't dack, *op.cit*). First, there has been a continuous reduction in reserve requirements. The marked international trend towards reduction in reserve requirements over the last decade reflects the conscious policy effort to reduce the tax on

intermediation with a view to reducing the burden of institutions and generate a level playing field, both between different types of domestic institutions and increasingly those across national borders. Although the fluctuations in liquidity levels engendered by autonomous factors could be modulated through the buffer stock property of reserve requirements and through active liquidity management by means of discretionary operations[3], internationally, the general downward trend in reserve ratios has been shifting the balance towards liquidity activism. This has also been made possible by the increase in excess maintenance of reserves whereby banks circumvent the impact of changes in reserve requirements.

3.32 Central banks in EMEs tend to use reserve requirements to offset autonomous influences on bank liquidity more frequently than in developed countries. While reserve requirements play a different role in EMEs than in developed countries, there has been a convergence towards lower levels while deemphasising their role as active instruments of monetary control. Thus, in recent years, reserve requirements have been giving way to a more market oriented approach of impounding liquidity, including through the issue of central bank paper.

3.33 Second, there has been a growing emphasis on active liquidity management driven partly by the pressures of increasingly mobile international capital and decline in reserve requirements. With a view to developing money markets by reducing the reliance on accommodation from the central bank and in order to impart greater flexibility in interest rate adjustments, liquidity management has largely been implemented through discretionary operations at the expense of standing facilities, particularly since the early 1980s. As a corollary, central banks have widened the range of instruments used in their market operations, shortened the maturity of transactions, increased their frequency and complemented regular basic refinancing operations with other fine-tuning operations.

3.34 The reliance on market operations rather than standing facilities for balancing the market for bank reserves was also necessitated by the need to develop more flexible and less intrusive implementation procedures. Hence, the main instruments for liquidity management by central banks are discretionary market operations. Conversely, standing facilities have become 'safety valves' rather than the key mechanisms for setting the interest rate. They are operated at the margin in order to bridge temporary mismatches in liquidity. In the case of EMEs also, there has been a movement away from standing facilities. With the development and integration of new financial markets, bank intermediation became less dominant as households parked a part of their savings outside the banking sector. As a result, enterprises increasingly started tapping non-bank sources of funding. Consequently, aggregate spending became sensitive to more than just bank-determined interest rates as policy induced changes in interest rates also influenced demand through the wealth effect of asset prices. Accordingly, the asset channel of monetary transmission, which focusses on developing new instruments and procedures for influencing financial market expectations and behaviour, has gained added importance.

3.35 Third, among the wide array of monetary policy instruments, repos have almost become the main policy tool, which could be considered a major milestone in the development of money markets. Countries (including EMEs) have preferred repos more than the outright open market operations because they do not require an underlying market for securities and they tend to break the link between the maturity of the paper and that of the transaction. The emergence and subsequent rapid growth of private repo markets in recent years, often encouraged by the central banks themselves, have spurred the usage of these instruments.

3.36 Most EMEs have assigned repos a major role in the day-to-day management of bank reserves. An active market for repos and reverse repos has been developed in Korea, Mexico and Thailand. The underlying eligible assets are mainly government fixed income securities. In the case of thin markets, central banks have responded by widening the range of eligible securities. The central banks of the US, the ECB, the UK, Singapore and Mexico also conduct repo operations involving corporate bonds as collaterals.

3.37 Besides the rapid growth of domestic repo markets in recent years, repurchase transactions are now easily carried out across national borders also. This has been facilitated by the International Securities Market Association (ISMA)[4], which plays

[3] Discretionary operations include purchase/ sale of securities or more often reverse transactions in domestic or foreign currency.

[4] Since July 2005, ISMA merged with Primary Market Association to become the International Capital Market Association.

an important role by establishing uniform trading procedures in the international bond markets. This has helped large banks/other financial institutions to cover short-term liquidity mismatches. Accordingly, the international financial system has experienced an increase in global integration. It is widely believed that the growth of the collateralised repo market has played an important role in enhancing the overall stability of the financial system by removing counterparty risks through funded credit protection against risky transactions in unsecured wholesale financial markets (Joshi, 2005).

3.38 Fourth, greater flexibility in liquidity management has been accompanied by a greater transparency in the policy signals relating to desired interest rate levels, driven by the broader changes in the economic and political environment, including the decline in inflation to relatively low levels, growing emphasis on inflation targeting, greater autonomy and accountability of central banks and growing influence of market forces and expectations in the formation of interest rates. The main structural factors shaping policy implementation are also induced by the changes in payment and settlement systems, particularly, the broad-based introduction of real time gross settlement system.

Central Bank Operations

3.39 With regard to market operations, most central banks conduct at least one transaction at a regular interval in order to meet the basic liquidity needs of the system. The other complementary operations that take place are calibrated responses to day-to-day market conditions, fine-tuning operations providing liquidity over longer horizons (the US and Japan) and mopping up of excess liquidity with a view to inducing *ex ante* liquidity shortage (the UK). The maturity of these operations is usually relatively short for key operations, shorter for day-to-day calibration and longer for other operations.

3.40 In some countries, outright transactions also play a role. For instance, in the US, periodic purchases and sales of government securities are used as permanent additions/withdrawals of reserves. In Japan, the central bank regularly purchases government bonds to supply the base money. In the case of EMEs, outright transactions in the secondary markets remain important instruments, particularly to offset structural liquidity surpluses/shortages. In recent years, however, there has been an increasing trend towards allowing greater leeway to market forces in determining the interest rates. Hence, there is reluctance to conduct outright transactions in the government securities market.

3.41 Although country practices vary, the operating procedures of monetary policy of most central banks are beginning to converge to one of the variants of the three-closely related paradigms. The first set of central banks, including the US Federal Reserve, estimate the demand for bank reserves and then carry out open market operations to target short-term interest rates, especially if their financial markets are deep enough to transmit changes at the short end to the longer end of the term structure. A second set of central banks such as in Russia and Mexico estimate market liquidity and carry out open market operations to target bank reserves, while allowing interest rates to adjust, especially if their credit channels are strong. In the **t**hird category, a growing number of central banks including the European Central Bank (ECB) and a large number of inflation targeters modulate monetary conditions in terms of both the quantum and price of liquidity through a mix of open market operations (OMOs), standing facilities and minimum reserve requirements and changes in the policy rate but do not announce pre-set money or interest rate targets.

3.42 These developments together with the growing integration of markets have warranted accurate forecasts of liquidity, particularly the autonomous supply of bank reserves and its demand by the banking system. The operations of central banks have become critically contingent on these forecasts. The features of the forecasting process vary significantly across the countries, reflecting their operating frameworks of monetary policy. Several EMEs also conduct forecasts on a regular basis with planning horizons ranging from one day to several months.

3.43 Regarding the number of instruments, country practices differ widely. Central banks in countries such as Canada conduct one or two type of operations at the most, which are sufficient for liquidity management, whereas central banks in Japan and the UK rely on a broad range of operations. The range of underlying securities traded and collateral accepted is broad in Japan and several European countries, including various types of public and private claims. Conversely, in the US, New Zealand and Australia, central banks operate on the basis of public sector assets.

3.44 The choice of counterparties varies substantially across the countries. For instance, in

the US, the Fed deals only with a restricted group of primary dealers. In the UK, each market operation and standing facility has a specific set of counterparties. There is a wide range of counterparties in different countries. For instance, only banks act as counterparties in Mexico, while in Korea apart from banks, merchant banks, investment/trust companies and securities companies also act as counterparties. While level playing field considerations may favour many counterparties, efficiency considerations may call for a system of primary dealers. If the domestic securities markets are not deep, central banks engage in foreign exchange swaps for liquidity management purposes (South Africa and Thailand).

3.45 Most central banks, thus, prefer open market operations (OMO) as a tool of monetary policy, which allow them to adjust market liquidity and influence the interest rate structure across tenors through an auction mechanism in which market participants are able to bid their preferences. The particular form of operations such as outright transactions in eligible securities, repos and sometimes standing deposit/ lending facility, often depend on the specific macroeconomic conditions and the existing legal framework of the country.

Government's Surplus Cash Balances

3.46 Government's large surplus cash balances held with the central bank can have a significant impact on liquidity in the banking system (and thereby could have a bearing on short-term interest rates) necessitating active management of such surplus balances. Accordingly, arrangements which facilitate transfer of surplus funds from Government's account to deficit participants in the system could help in better management of liquidity. Such arrangements not only enable the Governments to earn better returns on the cash balances, but also mitigate volatility in short-term interest rates and keep overnight money market rates stable. The cross-country practices on such arrangements vary widely. For instance, while the cash balances of the Central Government are auctioned (competitively) on a daily basis in Canada, all government balances are maintained with their respective central banks in Japan and Italy. In the US and France, a significant working balance is maintained with their central banks while amounts beyond the targeted balance are invested in the market. Such surplus balances have also been effectively used as an instrument of sterilisation by many central banks. The Government of Singapore, for instance, issues government securities in excess of the fiscal requirements and parks the surplus funds with the Monetary Authority of Singapore (MAS) as deposits, thus, supplementing its draining operations. Countries such as Malaysia, Thailand and Indonesia have modulated excess liquidity in the financial system by diverting government/ public sector deposits from the commercial banking system to the central bank.

3.47 To sum up, some lessons emerge from the international experience on liquidity management of both developed and emerging market economies. First, with the deepening of financial markets and the growth of non-bank intermediaries, central banks need to increase the market orientation of their instruments. A large proportion of reserves is supplied through open market operations with standing facilities being limited to providing marginal accommodation or emergency finance. Furthermore, high reserve requirements tend to inhibit inter-bank activity. Similarly, easy and cheap access to central bank standing facilities impedes proactive liquidity management by banks.

3.48 Second, in view of growing complexities of monetary management, monetary policy formulation has been guided by a number of macroeconomic indicators rather than a single intermediate nominal anchor.

3.49 Third, the growing importance and the flexibility of financial market price and its transmission mechanism in a deregulated environment necessitated central banks to focus increasingly on interest rates rather than bank reserves in liquidity management. Central banks need to ensure smooth trend in interest rates for several reasons. For instance, volatile interest rates can obscure policy signals, while more orderly market conditions promote a rapid and predictable transmission of monetary policy impulses. Less volatile interest rates may also help financial institutions to better assess and manage their market risks. Market participants benefit from stable rates through stabilisation of expectations, which, in turn, promote the development of a term structure in the money market.

3.50 Fourth, with reduced market segmentation and the greater ease and speed with which interest rate changes are transmitted across the entire term structure, central banks need to focus on the very short end of the yield curve, where their actions tend to have the maximum impact.

3.51 Fifth, the greater market orientation of the central banks' policy instruments has been associated

with a preference for flexible instruments. In volatile financial conditions, most notably in the EMEs, the flexibility in the design of policy instruments has emerged as a key consideration.

3.52 Finally, the growing awareness of the importance of market psychology and expectations has warranted greater transparency in the conduct of monetary policy with special emphasis on communication policy for conveying the stance and rationale of policy decisions.

Structure of the Money Market

Instruments

3.53 In view of the rapid changes on account of financial deregulation and global financial markets integration, central banks in several countries have striven to develop and deepen the money markets by enlarging the ambit of instruments[5] and participants so as to improve the transmission channels of monetary policy. The structure of money markets determines the type of instruments that are feasible for the conduct of monetary management. Evidence and experience indicate that preference for market-oriented instruments by the monetary authorities helps to promote broader market development (Forssbaeck and Oxelheim, *op cit*).

3.54 The diminishing role of quantitative controls and search for alternatives gave rise to three major market-oriented instruments, *viz.,* short-term securities, repurchase operations and swaps. These instruments prompted the central banks to create, stimulate and support the development of markets particularly, inter-bank deposit market and short-term securities market. In the absence of an efficient inter-bank market, there was a pressing need for the central banks to create adequate instruments to absorb liquidity and stimulate the formation of markets for alternative short-term assets. The emergence of the short-term securities market added a new dimension to liquidity management by central banks. In the absence of outright transactions in the securities market, the existence of a liquid securities segment in the money market is often believed to facilitate the central bank's operations by providing collateral to repurchase agreements and similar collateralised transactions.

3.55 Among developed countries, the money market in the US encompasses a large group of short-term credit instruments, futures market instruments and the Federal Reserve's discount window (Annex III.3). These are generally characterised by a high degree of safety of principal and are most commonly issued in units of US $1 million or more. Treasury Bills issued by the US Treasury and the securities issued by the State and Local Governments have the largest volume outstanding and constitute the most active secondary market amongst all money market instruments (MMIs) in the US. A key feature of most State and local securities is that the interest income is generally exempt from federal income taxes, which makes them particularly attractive to investors in high income tax brackets. Non-financial and non-bank financial businesses raise funds in the money market primarily by issuing commercial paper (CP) - a short-term unsecured promissory note. In recent years, an increasing number of firms have gained access to this market, and issue of CPs has grown at a rapid pace. The outstanding CPs is expected to increase to US $ 2.17 trillion in 2007. Besides conventional instruments, money market futures and options have also become popular in the US money market in the recent period.

3.56 Similarly in the UK, the money market has emerged as a mechanism for short-term funding through the issuance of money market instruments or an active fixed-term cash deposit market. It is principally sterling-based but also covers a wide range of other currencies. The Government, the banking sector and industry are among those who raise resources from the money market through the issuance of Treasury Bills, certificates of deposit (CDs) and bills of exchange (BE)/CPs, respectively. Besides, Acceptances and Local Authority Bills also act as MMIs. Commercial bills include bank acceptance and trade paper. Both overseas and inland trade is financed by bank acceptances. Much of the lending in the market takes place overnight. The bulk (90 per cent) of the MMIs held are CDs and the rest are BEs, Treasury Bills and CPs.

3.57 In the Euro system, during the course of the 1990s, repurchase transactions were adopted as a main liquidity management instrument in Denmark (1992), Sweden (1994), Austria (1995), Finland (mid-1990s), Switzerland (1998) and then in the whole Euro system since its inception (1999). Several countries such as Austria, the Netherlands and Denmark, in the absence of adequate liquid short-term markets, came to rely on foreign exchange operations

[5] Money market instruments facilitate transfer of large sums of money quickly and at a low cost from one economic unit (business, government, banks, non-banks and others) to another for relatively short periods of time.

(particularly swaps) for liquidity management. In addition to marketable debt instruments, non-marketable debt instruments and even some equities are eligible for repos. These are of two types, *viz.,* Tier-1 fulfilling uniform euro area-wide eligibility criteria of ECB and Tier-2, subject to the eligible criteria specified by the national central banks and the ECB.

3.58 In Japan, the most active money market segment involves very short-term transactions, which include the borrowing and lending of funds in the call market with or without collateral; the sale and purchase of short-term securities such as CPs, CDs and short-term government bills such as Treasury Bills; and repo transactions with government and/ municipal securities, government guaranteed bonds, corporate bonds and foreign government bonds as eligible collaterals. Purchases of short-term government bills are used most frequently.

3.59 In Australia, the list of securities eligible under the Intra-day Repurchase Agreement Facility (introduced in 1998) has been broadened to cover several other instruments. These include commonwealth government securities (CGS), domestic debt securities and discount instruments issued by the central borrowing authorities of State and Territory Governments (permitted in 1997), and bank bills and CDs issued by select banks and select debt securities of approved supranational institutions and foreign Governments. At the other end of the spectrum, Canadian MMIs comprise short-term papers of maturity up to 18 months that are issued by the Government, banks and corporations and are available in the US and Canadian dollars. MMIs mainly comprise Treasury Bills and money market strips issued and guaranteed by the Government of Canada. There are also Government guaranteed CPs, which are short-term promissory notes issued by the Crown Corporations such as Canadian Wheat Board and the Federal Business Development Bank. The other MMIs include Treasury Bills and promissory notes issued by the Provincial Governments, bankers' acceptances issued by corporations with an unconditional guarantee of a major Canadian chartered bank and CPs issued by the major corporations.

3.60 In several other EMEs such as Russia, South Africa, China, Malaysia and Korea, the main money market instruments are government Treasury Bills, repurchase agreements, bankers' acceptances, CPs and CDs. In countries such as Thailand and Indonesia, central banks have aimed to expand the range of instruments by issuing their own bonds/certificates, *viz.,* Bank of Thailand Bonds and Bank of Indonesia Certificates. Moreover, in Thailand, other bonds such as Financial Institution Development Fund Bonds and Government Guaranteed State Enterprise Bonds are used for repo operations. Foreign exchange swap is another instrument that the Bank of Thailand uses to influence liquidity conditions in the money market.

Tenor

3.61 In the US, although maturities of MMIs range from one day to one year, the maturity of most common instruments is three months or less. In the UK, the main items in "period money" are borrowed for 1 and 3 months, but banks may also borrow for a week or for almost any time up to 12 months. The CDs issued by the building societies and actively traded by banks and discount houses have an original maturity of less than one year (although some CDs have a maturity of over a year). They are all short-term bearer negotiable debt instruments that are either issued at a discount or bear a coupon. In the case of ECB, the maturity of refinancing operations ranges from 1-week to 3-months and for debt securities up to 12- months. Japan's tenor for its repo is in the range of 1 week to 6-months. In Canada, the maturity of Treasury Bills ranges from 1-month to 1-year and that of money market STRIPS up to 18 months and Government guaranteed CPs from 1-month to 1-year.

3.62 In other countries also, money market instruments are mostly short-term in nature – with tenor being generally less than a year. In most countries, call money transactions and the repurchase agreements serve as the shorter duration segment of money markets. The tenor of Treasury Bills is of normally 91-day, 182-day and 364-day. Market Stabilisation Bonds in Korea even have 546-day maturity period. In the case of certain instruments such as negotiable certificates of deposit (NCDs), tenor may be as long as five years also.

Participants

3.63 The major participants in the US money market are commercial banks, Governments, corporations, Government-sponsored enterprises, money market mutual funds, futures market exchanges, brokers and dealers and the Fed. Commercial banks are the major participants in the market for federal funds, which are very short-term, mainly overnight. Banks act as dealers in the money market for over-the-counter interest rate derivatives, which has grown rapidly in recent years. The Federal Reserve is also a key participant in the US money market.

3.64 Another important group of participants in the US money markets include money market mutual funds and local Government investment pools. These pools, which were virtually non-existent before the mid-1970s, have grown to be one of the largest financial intermediaries in the US. A distinct feature of the US money market is that there are groups of privately owned financial intermediaries sponsored by the Government who raise the funds and channel them to farming and housing sectors of the economy.

3.65 In the UK, trading in the money market takes place on an over-the-counter (OTC) basis for the same day settlement. The money market attracts a wide range of participants such as the Government, banking sector, industry and financial institutions such as pension funds. The Bank of England and the UK Debt Management Office also make use of the money market on a daily basis to fulfil their official obligations. Participants in the UK inter-bank market comprise the whole of the banking community (including the discount houses) and non-bank institutions (such as building societies) and the market is served by a number of money market brokers.

3.66 In the Euro system, the ECB, national central banks, the Governments and the eligible credit institutions participate in the money market. Similarly, in Australia, the Central Government, State and Territorial Governments, the Reserve Bank of Australia, banks, Government agencies, other Governments of the Commonwealth and supranational institutions are the major participants. In the case of Canada, the participants include both Federal and Provincial Governments, banks, major Crown Corporations such as Canadian Wheat Board and Federal Business Development Bank.

3.67 In Japan, business units of Japanese and non-Japanese banks located in Japan participate in the uncollateralised money market to raise funds. The major participants in the uncollateralised overnight call money market are the city banks which have the largest share as borrowers, while regional banks act as major lenders. The other participants include institutional investors such as investment trusts, trust banks, regional banks, life insurance companies, specialised money market brokers and Keito[6]. The counterparties of the Bank of Japan include banks, securities companies, security finance companies and money market brokers (Tanshi companies).

3.68 In most other countries, commercial banks, central banks, regional banks, specialised banks, investment and finance companies, merchant banking corporations, investment trust companies, insurance companies, securities finance corporations, credit insurance funds and business enterprises are the major participants in the money market.

III. MONEY MARKET IN INDIA – UP TO THE MID-1980s

3.69 The Indian money market prior to the 1980s was characterised by paucity of instruments, lack of depth and dichotomy in the market structure. The money market consisted of the inter-bank call market, Treasury Bills, commercial bills and participation certificates. Historically, the call money market has constituted the core of the money market structure in India due to lack of other instruments and strict regulations on interest rates and participation.

3.70 In the call/notice money market, overnight money and money at short notice (up to a period of 14 days) are lent and borrowed without collateral. This market enables banks to bridge their short-term liquidity mismatches arising out of their day-to-day operations. The call money market in India was purely an inter-bank market until 1971 when the erstwhile Unit Trust of India (UTI) and Life Insurance Corporation (LIC) of India were allowed to participate as lenders. The interest rate in the call money market was freely determined by the market till December 1973. However, as call money rates increased sharply to touch 25-30 per cent, the Indian Banks' Association (IBA) instituted an administered system of interest rates by imposing a ceiling interest rate of 15 per cent in December 1973 so as to maintain systemic stability and quell any abnormal rise in the call rates. The ceiling was subject to several revisions but there were several instances of violation of the ceiling rates through other means (like buy-back arrangements) during phases of tight liquidity.

3.71 Treasury Bills constituted the main instrument of short-term borrowing by the Government and served as a convenient gilt-edged security for the money market. The characteristics of high liquidity, absence of default risk and negligible capital depreciation of Treasury Bills made them another attractive instrument for short-term investment by banks and other financial institutions.

[6] Keito is a central financing organisation for financial co-operatives such as small and medium sized businesses, agriculture, forestry, and fishery co-operatives.

The Reserve Bank, being the banker to the Government, issued Treasury Bills at a discount. The issuance system of Treasury Bills migrated from an auction to tap basis in July 1965 with the rate of discount administratively fixed at 3.5 per cent per annum, which was raised to 4.6 per cent by July 1974 and remained at that level in respect of 91-day Treasury Bills till 1991. There was also a system of *ad hoc* Treasury Bills from 1955, which were created by the Central Government in favour of the Reserve Bank to automatically restore its cash balances to the minimum stipulated level, whenever there was excess drawdown of cash.

3.72 Participation certificates (PCs) and commercial bills (under bills rediscounting scheme) were introduced in the money market in 1970. PCs were utilised mostly by financial institutions to park their funds for longer maturities and could not be developed for meeting liquidity mismatches between financial institutions and/or banks. Under the bills rediscounting scheme, the Reserve Bank rediscounted genuine trade bills at the Bank Rate or at a rate specified by it. The underlying purpose of developing the bill market was to enable banks and other financial institutions to invest their surplus funds profitably by selecting appropriate maturities. Over the years, the rediscounting facility became restrictive and was made available on a discretionary basis. The main factors inhibiting the development of bill finance were lack of a bill culture, non-availability of stamp papers of required denominations, absence of specialised credit information agencies and an active secondary market. Both these instruments (participation certificates and commercial bills), however, did not develop and activity in these instruments remained insignificant.

3.73 As a result of inadequate depth and liquidity in the organised money market, the sectoral financing gaps (*i.e.,* the requirements of unsatisfied borrowers in the organised financial system) were met by the unorganised market. The interest rate in this segment was generally higher than that in the organised market reflective of the actual market conditions. As bank credit (both aggregate and sectoral) was the principal focus of monetary policy making under the credit planning approach adopted in 1967-68, this dichotomous nature of the money market served the requirement of monetary management.

3.74 To sum up, the money market during this period could not provide an equilibrating market mechanism for meeting short-term liquidity needs for banks. The prevalence of administered structure in the money market did not permit interest rates to reflect the actual extent of scarcity of funds. Owing to limited participation, money market liquidity was highly skewed, characterised by a few dominant lenders and a large number of chronic borrowers. Faced with these impediments, together with limited Reserve Bank's refinance, banks often faced either short-term liquidity problems for meeting the statutory reserve requirements or remained saddled with excess liquidity. Banks parked surplus funds, in the absence of alternative instruments, in Treasury Bills before rediscounting them with the Reserve Bank so as to meet the cash reserve requirements on an average basis during the reporting period. This led to significant fluctuations in banks' investments in Treasury Bills and also their cash balances with the Reserve Bank, thereby complicating the task of monetary management. Furthermore, in addition to the rediscounted regular Treasury Bills, the Reserve Bank also had to hold the *ad hoc* Treasury Bills (issued by the Government of India with a fixed 4.6 per cent interest rate since July 1974) under the system of automatic monetisation, thereby constraining the emergence of Treasury Bills as a money market instrument. Moreover, the government securities market was also characterised by administered interest rates and captive investor base, which made open market operations an ineffective instrument of monetary control thereby constraining, to a large extent, the regular management of short-term liquidity by the Reserve Bank.

IV. EVOLUTION OF RESERVE BANK'S LIQUIDITY MANAGEMENT

3.75 The nascent state of development of the money market in India and the administered interest rate structure inhibited active liquidity management operations of the Reserve Bank. The Reserve Bank regulated market liquidity by essentially operating through direct instruments such as CRR and sector-specific refinance. As monetary policy was largely contingent on the fiscal stance, monetary operations were undertaken to neutralise the fiscal impact. Consequently, with the dominance of the quantum channel in the transmission mechanism, there was little scope of signalling monetary policy changes through indirect instruments. Therefore, the money market increasingly reflected the spillover impact of monetary policy operations through direct instruments. The increasingly unsustainable fiscal conditions, as reflected in macroeconomic imbalances, necessitated structural reforms from the early 1990s. Consequently,

the emphasis on the market paradigm gathered momentum, warranting greater use of indirect instruments for the conduct of monetary policy. Concomitantly, the Reserve Bank refined its operating procedures of liquidity management in tandem with the changing financial landscape. Major developments in the liquidity management operations of the Reserve Bank and developments of money market have taken place since the mid-1980s. However, in order to place these developments in proper perspective, it may be useful to understand the broad contours of liquidity management by the Reserve Bank since the late 1960s.

3.76 Monetary policy up to the mid-1980s was predominantly conducted through direct instruments with credit budgets for the banks being framed in sync with monetary budgeting (Mohan, *op. cit*). This period was marked by administered interest rates, credit ceilings, directed lending, automatic monetisation of deficits and fixed exchange rates. The Indian economy functioned essentially as a closed and controlled economy with the role of market being virtually non-existent due to the existing structural rigidities in the system. In the absence of a formal intermediate target, bank credit - aggregate as well as sectoral – came to serve as a proximate target of monetary policy after the adoption of credit planning in 1967-68 (Jalan, 2002). The money market was essentially represented by the inter-bank call market, where activity was mainly driven by the banks' demand for reserves for meeting their statutory commitments. Furthermore, strong seasonality in demand for money and credit during agricultural seasons also influenced market activity. In the presence of skewed distribution of liquidity, these factors made the call money rates highly volatile, necessitating imposition of interest rate ceilings. In the absence of stability in the money market, and with planned allocation of credit under an administered structure of interest rates, the Reserve Bank had little choice but to conduct its liquidity management operations through a standard mix of OMOs and changes in the Bank Rate. The OMOs were conducted through outright transactions in government securities.

3.77 Although credit planning guided monetary policy, the concerns about rising inflation during the 1970s and the 1980s attracted a good deal of policy attention. Apart from supply shocks (oil prices and crop failures), inflation was increasingly believed to be caused by excessive monetary expansion generated by large scale monetisation of fiscal deficits during the 1980s. Accordingly, the Reserve Bank began to pay greater attention to the movements in monetary aggregates. Against this backdrop, the Committee to Review the Working of the Monetary System (Chairman: Sukhamoy Chakravarty, 1985) recommended a framework of monetary targeting with feedback. In pursuance of the recommendations of this Committee, the Reserve Bank began to target a desirable growth in money supply consistent with a tolerable level of inflation and expected output growth (RBI, 1985). Thus, broad money emerged as an intermediate target of monetary policy and the Reserve Bank began to formally announce monetary targets as nominal anchor for inflation.

3.78 The adoption of monetary targeting necessitated considerable changes in the operating procedures of monetary policy. Over the years, the Reserve Bank, through its refinancing and open market operations, had already succeeded, to a large extent, in reducing the level of interest rates in general and the call money rate in particular; *albeit* by varying the ceiling rate (it reached 8.5 per cent by March 1978 although it was again raised to 10.0 per cent in April 1980). However, the fiscal dominance since the late 1970s made the traditional instruments of Bank Rate and OMO less effective. The scope for OMO was limited as yields were governed by an administered interest rate regime, including sale of Treasury Bills on tap at a coupon of 4.6 per cent fixed since 1974 (Mohan, *op. cit*). In this scenario, the Reserve Bank began to use reserve requirements and credit planning for modulating monetary and liquidity conditions. As a result, the CRR reached the ceiling of 15 per cent of net demand and time liabilities (NDTL) in July 1989 and the SLR reached the peak of 38.5 per cent in September 1990. The increase in SLR was, however, unable to fully meet the financing requirements of the Government, thereby leading to monetary accommodation by the Reserve Bank (RBI, 2004a). As monetary financing of fiscal deficits is inflationary beyond a point, an increase in the Reserve Bank's support to the Government was accompanied by an increase in CRR to rein in monetary expansion. Despite these measures, however, money supply growth remained high and contributed to inflation. This underscored the need for monetary-fiscal co-ordination in achieving price stability.

3.79 In tandem with the shifts in operating procedures, the proper development of the money market was also emphasised, partly due to the success in lowering the call money rates, *albeit*, through reductions in interest rate ceilings. The Chakravarty Committee (1985) was the first to make

comprehensive recommendations for the development of the Indian money market. Furthermore, the Reserve Bank set up a Working Group on the Money Market (Chairman: Shri N. Vaghul, 1987) to specifically examine various aspects for widening and deepening the money market. Following the recommendations of these two committees, several new initiatives were undertaken by the Reserve Bank. These included (i) setting up of the Discount and Finance House of India (DFHI) in 1988 to impart liquidity to money market instruments and help the development of secondary markets in such instruments; (ii) introduction of instruments such as CDs (1989) and CPs (1990) and inter-bank participation certificates (with and without risk) (1988) to increase the range of instruments; (iii) freeing of call money rates by May 1989 to enable price discovery; and (iv) introduction of auctions of 182-day Treasury Bills (November 1986) with a view to moving towards a system of market-determined yields. Although these measures created the ground for the development of a proper money market, the efficient functioning of the market was hindered by a number of other structural rigidities in the system such as skewed distribution of liquidity and the prevalence of administered deposit and lending rates.

3.80 The process of financial liberalisation introduced in the early 1990s, as part of the overall economic reforms programme, led to a structural shift in the financing paradigm for the Government and the commercial sectors. The role of the financial system was reassessed and the emphasis shifted from a mere channelisation to efficient allocation of resources to sustain the higher growth. With a view to improving the resource allocation process and facilitating efficient price discovery in the financial markets, the Reserve Bank initiated a multi-pronged strategy of institutional reforms. The measures introduced by the Reserve Bank were aimed at widening, deepening and integrating various segments of the financial market, especially the money market, and smoothening the process of transmission of policy impulses across market segments. Major reforms introduced in the financial markets were liberalisation of exchange rates in March 1993, deregulation of interest rates, abolition of credit ceilings (although directed lending continued), introduction of auctions in Treasury Bills (364-day Treasury Bills in April 1992 and 91-day Treasury Bills in January 1993), market borrowing of the Government through the auction route since 1992-93 (gilt yields became market determined through rising coupon rates) and phasing out of automatic monetisation of fiscal deficits (following the signing of the Supplemental Accord in 1997). All these measures paved the way for increased financial innovations and market sophistication which, along with large swings in capital flows, induced a degree of instability in the money demand function, thereby limiting the role of money as an intermediate target.

3.81 Various changes in financial market structure necessitated a major shift in monetary policy operating framework in India from monetary targeting to a 'multiple indicator approach' in 1998. As part of this approach, the Reserve Bank started using the information content in interest rates and rates of return in different markets along with currency, credit, fiscal position, trade, capital flows, inflation rate, exchange rate, refinancing and transactions in foreign exchange, by juxtaposing it with output data for drawing policy perspectives. The success of this approach required greater monetary policy flexibility, especially in view of market orientation of policy. Therefore, the emphasis was placed on the money market as the focal point for the conduct of monetary policy and fostering its integration with other financial markets as detailed in the subsequent sections.

3.82 In the changed scenario, monetary policy, which largely operated in a closed economy framework till the early 1990s, had to contend with the dynamics of an open economy. The transition of economic policies in general, and financial sector policies in particular, from a control oriented regime to a liberalised but regulated regime was reflected in changes in the approach of monetary management (Mohan, 2004). Accordingly, in line with the increasing market orientation of the economy and shift in the operating framework, the third phase of liquidity management operations began from the second half of the 1990s with the Reserve Bank moving away from direct instruments of monetary control to indirect instruments. The CRR was brought down from 15 per cent of NDTL (during July 1989-April 1993) to 9.5 per cent by November 1997 (it reached a low of 4.5 per cent in June 2003)[7]. The SLR was reduced to the statutory minimum of 25 per cent by October 1997. Under this system, while reserve requirement was the

[7] In the light of developments in current macroeconomic, monetary and anticipated liquidity conditions, the Reserve Bank, on March 30, 2007, announced to raise CRR by 50 basis points to 6.50 per cent in April 2007.

principal medium of modulating liquidity on a systemic basis, banks took recourse to Reserve Bank's refinance facilities to meet their short-term funding requirements. Introduction of reverse repos[8] (then called repos) in 1992 provided an instrument for absorption of liquidity from banks having surplus funds. This, in conjunction with government market borrowing through auctions since 1992-93, raised the yields on government securities (from 6.5 per cent in 1985-86 to 11.5 per cent in 1997-98) and led to the shortening of maturity of the Government debt. This marked the beginning of development of a secondary market in government securities and the market determination of interest rates. With the objective of managing short-term liquidity and smoothening interest rates in the call/notice money market, the Reserve Bank began absorbing excess liquidity through auctions of reverse repos. Furthermore, with exchange rate liberalisation (the rupee became fully convertible on the current account in 1994) and opening up of the economy, the exchange rate began to play an important role in monetary management. In the process, the exchange rate became endogenous to money, income, prices and interest rates and, with financial innovations, the disequilibrium in money markets begun to be reflected in short-term interest rates (Mohan, *op cit*). In view of these changes, the call money market became the focal point of market intervention by the Reserve Bank.

3.83 The volatility in call rates, however, continued, necessitating some instruments for managing liquidity. Against this backdrop, the Committee on Banking Sector Reforms (Narasimham Committee II, 1998) stressed that interest rate movements in the inter-bank call money market should be orderly and this could only be achieved if the Reserve Bank has a presence in the market through short-term reverse repos (as per current terminology). Following the committee's recommendations, the reverse repos, which were in operation from 1992, got integrated with the interim liquidity adjustment facility (ILAF) introduced in April 1999. The absorption of liquidity continued to be at fixed rate reverse repos. Although absorption of liquidity was done through a single reverse repo rate, the system of injecting liquidity through various ways, including refinance, continued at interest rates linked to the Bank Rate, which was reactivated in April 1997. Under the ILAF, the general refinance facility was replaced by a collateralised lending facility (CLF) and additional collateralised lending facility (ACLF) linked to the Bank Rate. Similarly, export credit refinance and liquidity support to PDs were also linked to the Bank Rate. Thus, the reverse repo rate (as floor) and the Bank Rate (as the ceiling) provided an informal corridor in the money market.

3.84 In the light of the experience gained in the operation of ILAF, an Internal Group set up by the Reserve Bank recommended gradual implementation of a full-fledged LAF as suggested by the Narasimham Committee (1998). Accordingly, the system of ILAF migrated to a system of Liquidity Adjustment Facility (LAF) in stages beginning June 2000 (Box III.2). The fixed rate reverse repo was replaced by variable reverse repo auctions, while ACLF and level II liquidity support to PDs was replaced by variable repos auctions, conducted on a daily basis. Consequently, the repo rate replaced the earlier Bank Rate as the ceiling of the corridor, thereby enabling injection of liquidity at a single rate (*i.e.*, repo rate), while the floor continued to be the reverse repo rate. This signified a major change in the operating procedure and liquidity management operations by the Reserve Bank as it facilitated the transition from direct instruments to indirect (market-based) instruments of monetary management. Furthermore, it has also provided the necessary flexibility to the Reserve Bank in modulating liquidity (both supply of and demand for funds) on a daily basis through policy rate changes. This has ensured stability in the call money rates, which have generally remained within the corridor (Chart III.1)[9]. This, in turn, has promoted the stability of short-term interest rates in the money market.

3.85 Considering the importance of guiding monetary policy operations on a sound basis, the Annual Policy Statement of April 1999 underlined the need for developing a short-term operational model which takes into account the behavioural relationships among different segments of the financial system. Under the guidance of a group of eminent academic experts, a model was developed and made operational in 2002 for forecasting short-term liquidity conditions to facilitate daily liquidity management operations of the Reserve Bank.

[8] With effect from October 29, 2004, the nomenclature of repo and reverse repo has been interchanged as per international usages. Accordingly, repos now signify injection while reverse repos signify absorption of liquidity.

[9] Call rate hardened during the second half of March 2007 as liquidity conditions tightened due to advance tax outflows, year-end considerations, sustained credit demand and asymmetric distribution of government securities holdings across banks.

Box III.2
Liquidity Adjustment Facility

As part of financial sector reforms initiated in the early 1990s, India began to move away from direct instruments of monetary control to indirect ones, which, in turn, warranted a mechanism that can accord greater flexibility and effective liquidity management so as to maintain orderly conditions in the financial markets, particularly in the wake of surging volatile capital flows. As a corollary, pursuant to the recommendations of the Narasimham Committee (1998), the LAF was introduced in stages commensurate with the specific features of the Indian financial system, the level of market development and technological advances in the payment and settlement systems. In the process, the critical issue facing the Reserve Bank was to channelise the various sources of its liquidity through a single comprehensive window at a common price. Consequently, an interim liquidity adjustment facility (ILAF) was introduced in April 1999 which enabled the Reserve Bank to modulate market liquidity on a daily basis and also transmit interest rate signals to the market.

With the introduction of ILAF, the general refinance facility was replaced by a collateralised lending facility (CLF) up to 0.25 per cent of the fortnightly average of outstanding aggregate deposits in 1997-98 for two weeks at the Bank Rate and an additional collateralised lending facility (ACLF) for an equivalent amount of CLF at the Bank Rate *plus* 2 per cent. A penal rate of 2 per cent was stipulated for an additional two week period. However, export credit refinance for scheduled commercial banks was retained and continued to be provided at the Bank Rate. Simultaneously, a provision for liquidity support to PDs against collateral of government securities was also made available. The ILAF was intended to ensure that interest rates move within a reasonable range and promote stability in the money market. The transition from ILAF to a full-fledged LAF commenced in June 2000 and progressed gradually in three stages. The first stage began from June 5, 2000 when LAF was formally introduced with the replacement of ACLF and level II support to PDs by variable rate repo auctions with same day settlement.

The second stage commenced from May 2001, when CLF and level I liquidity support for banks and PDs was also replaced by variable rate repo auctions. However, some minimum liquidity support to PDs was retained but at an interest rate linked to variable rate in the daily repos auctions as determined by the Reserve Bank from time to time. Furthermore during April 2003, the multiplicity of rates at which liquidity was being injected was rationalised with the back-stop interest rate being fixed at the reverse repo cut-off rate of the regular LAF auctions on that day. Concomitantly, a back-stop rate was fixed at 2.0 percentage points above the repo cut-off rate in the event of no reverse repo in the LAF auctions. On days when no reverse repo/repo bids are received/accepted, back-stop rate was decided by the Reserve Bank on an *ad hoc* basis. Subsequently from March 29, 2004 the reverse repo rate was scaled down to 6.0 per cent and aligned with the Bank Rate under the revised LAF scheme. A single facility available at a single rate was introduced by merging normal facility and back stop facility together. Moreover in April 2004, fixed rate auctions were re-introduced. With effect from October 29, 2004, the nomenclature of repo and reverse repo was interchanged as per international usage. The repo now indicates injection of liquidity, while reverse repo stands for absorption of liquidity.

The full computerisation of Public Debt Office (PDO) of the Reserve Bank set the third stage of full-fledged LAF and onset of RTGS marked a major leap forward in this phase. Repo operations today are mainly through electronic transfers and the LAF can be operated at different times of the same day. Consequently, the Second LAF (SLAF) was introduced from November 28, 2005 providing the market participants a second window to fine-tune their management of liquidity. Unlike the past LAF operations, which were conducted in the forenoon between 9.30 am and 10.30 am, the SLAF is conducted by receiving bids between 3.00 pm and 3.45 pm. Although the salient features of SLAF and LAF are same, their settlements are conducted separately on a gross basis. Thus, the introduction of LAF has been a process and the Indian experience shows that phased rather than a big bang approach is required for reforms in the financial sector and in monetary management (Mohan, *op. cit*).

LAF has now emerged as the principal operating instrument of monetary policy. It has helped in stabilising the regular liquidity cycles and, subsequently, the volatility of call money rates by allowing banks to fine-tune their liquidity needs as per the averaging requirements of CRR over the reporting period. This smoothened the liquidity positions at the beginning and end of the month. Besides, it helped to modulate sudden liquidity shocks engendered by temporary mismatches induced by outflows/inflows on account of Government auctions/redemptions and advance tax payments. More importantly, the LAF has emerged as an effective instrument for maintaining orderly conditions in the financial markets in the face of volatile capital flows. Thus, the LAF has imparted a much-needed flexibility to the Reserve Bank in modulating the liquidity in the system and steering the desired trajectory of interest rates in response to evolving market conditions.

Chart III.1: LAF Corridor and the Call Rate

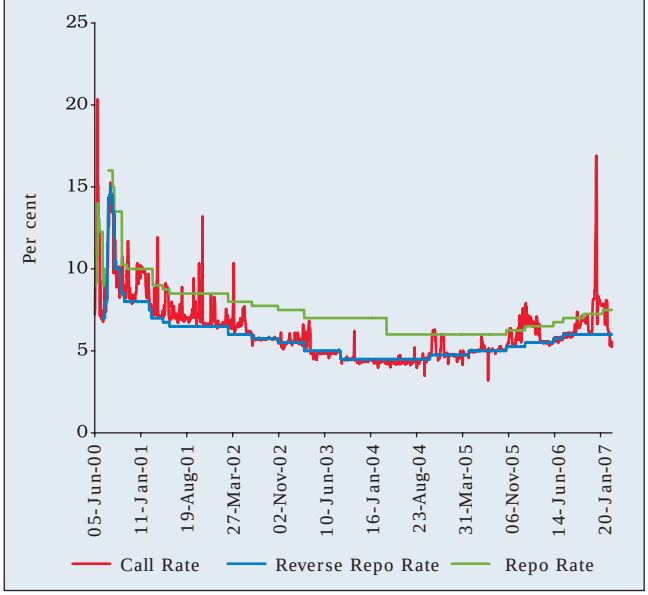
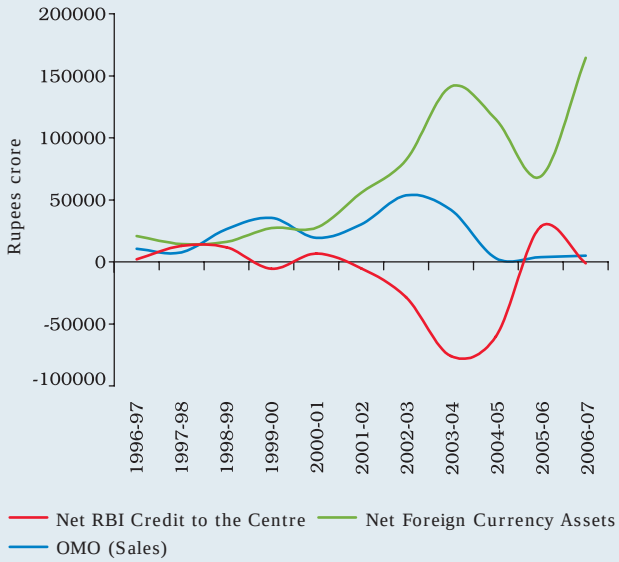


Chart III.2: Reserve Bank's Open Market Operations



3.86 The issue of managing large and persistent capital flows and synchronicity in monetary policy cycles across the globe has added another dimension to the issue of liquidity management in the Indian context in recent years. The period since mid-2002 has generally been characterised by surplus liquidity in the system in the wake of large capital inflows and current account surplus (till 2003-04). An enduring challenge to monetary policy has been to manage such surplus liquidity so as to keep the call money rates stable for overall stability in the market. Accordingly, in order to sterilise the impact of capital flows, the Reserve Bank had to operate simultaneously through the LAF and OMOs (outright transactions of dated securities and Treasury Bills).

3.87 The OMOs have been effectively used by the Reserve Bank since the mid-1990s for sterilising the monetary impact of capital flows by offloading the stock of government securities to the market (Chart III.2). The net open market sales increased from Rs.10,464 crore in 1996-97 to Rs.53,781 crore in 2002-03. However, repeated recourse to OMOs for sterilisation purposes during this period depleted the stock of government securities held by the Reserve Bank from Rs.52,546 crore at end-March 2003 to Rs.40,750 crore at end-March 2004, despite the conversion of the available stock of non-marketable special securities (of Rs.61,818 crore), created out of past *ad hoc* and Tap Treasury Bills, into tradable securities during the year. Accordingly, the burden of sterilisation shifted to the LAF, which was essentially designed as a tool of adjusting marginal liquidity. As a result, the open market sales by the Reserve Bank as a proportion of the accretion of securities to its gilt portfolio dropped to about 50 per cent during 2003-04 from an average of 90 per cent in the preceding five years following a switch to LAF operations (RBI, 2004b).

3.88 Given the finite stock of government securities in its portfolio and the legal restrictions on issuing its own paper, the Reserve Bank felt that instruments other than LAF were needed to fulfil the objective of absorbing liquidity of a more enduring nature. This resulted in the introduction of the market stabilisation scheme (MSS) in April 2004 as a special arrangement, following the recommendations of the Working Group on Instruments of Sterilisation, 2003 (Chairperson: Smt. Usha Thorat). Under this arrangement, the Government issued Treasury Bills and/or dated securities in addition to the normal borrowing requirements for absorbing excess liquidity from the system. The ceiling amount, which was initially fixed at Rs.60,000 crore was raised to Rs.80,000 crore on October 14, 2004 but reduced to Rs.70,000 crore on March 24, 2006 and again raised to Rs.80,000 crore for 2007-08. The MSS proceeds are held in a separate identifiable cash account by the Government (reflected as equivalent cash balances held by the Government with the Reserve Bank) and are appropriated only for the purpose of redemption and/or buyback of the Treasury Bills and/or dated securities issued under the MSS. Thus, while it provided another tool for liquidity management, it was designed in such a manner that it did not have

any fiscal impact except to the extent of interest payment on the outstanding amount under the MSS. The amount absorbed under the MSS, which had reached Rs.78,906 crore on September 2, 2005, declined to about Rs.32,000 crore in February 2006 due to unwinding of nearly Rs.47,000 crore in view of overall marginal liquidity which has transited from the surplus to the deficit mode. As part of unwinding, fresh issuances under the MSS were suspended between November 2005 and April 2006. In several subsequent auctions during 2006-07, only partial amounts were accepted under the MSS. Subsequently, the amount absorbed under the MSS increased again to Rs.62,974 crore in March 2007. The MSS has, thus, provided the Reserve Bank the necessary flexibility to not only absorb liquidity but also to ease liquidity through its unwinding, if necessary. With the introduction of the MSS, the pressure of sterilisation on LAF has declined considerably and LAF operations have been able to fine-tune liquidity on a daily basis more effectively (Table 3.1). Thus, the MSS empowered the Reserve Bank to undertake liquidity absorptions on a more enduring but still temporary basis and succeeded in restoring LAF to its intended function of daily liquidity management (Mohan, *op cit*).

3.89 Furthermore, the build up and volatility in Government's cash balances with the Reserve Bank in recent years have significantly impacted the liquidity conditions. The Working Group on Instruments of Sterilisation favoured revisiting the 1997 agreement so that Government's surpluses with the Reserve Bank are not automatically invested and can remain as interest free balances, thereby releasing government securities for further sterilisation operations. Accordingly, the arrangement of allowing the Central Government to invest the surplus funds in its own paper since 1997 (to give a notional return on such balances) was discontinued temporarily from April 8, 2004. However, following the introduction of the MSS, it was partially restored with a ceiling of Rs.10,000 crore in June 2004, which was further raised to Rs.20,000 crore in October 2004. While the Government's surplus cash balances may have enabled the Reserve Bank to sterilise the monetary impact of excess liquidity, at times, it has also resulted in sudden transition in liquidity conditions. The build up of large and unanticipated cash surpluses of the Government with the Reserve Bank and its depletion over a short period poses fresh challenges for liquidity management and maintenance of stable conditions in the money market.

3.90 The dynamics of surplus liquidity in the recent period shows that the total surplus liquidity (comprising MSS, LAF and Government surplus) in the system increased to over Rs.1,25,000 crore in August 2005. Reflecting such surplus conditions in the banking system, the call money rate hovered generally around the lower bound of the corridor (*i.e.*, the reverse repo rate), which (along with the repo rate) has emerged as the main instrument of policy in the short-run (see Chart III.1). The Bank Rate now serves

Table 3.1: Liquidity Absorptions

(Rupees crore)

Outstanding as on Last Friday of month	LAF	MSS	Centre's Surplus with the RBI @	Total (2 to 4)
1	2	3	4	5
2004				
April	73,075	22,851	0	95,926
May	72,845	30,701	0	1,03,546
June	61,365	37,812	0	99,177
July	53,280	46,206	0	99,486
August	40,640	51,635	7,943	1,00,218
September	19,245	52,255	21,896	93,396
October	7,455	55,087	18,381	80,923
November	5,825	51,872	26,518	84,215
December	2,420	52,608	26,517	81,545
2005				
January	14,760	54,499	17,274	86,533
February	26,575	60,835	15,357	1,02,767
March*	19,330	64,211	26,102	1,09,643
April	27,650	67,087	6,449	1,01,186
May	33,120	69,016	7,974	1,10,110
June	9,670	71,681	21,745	1,03,096
July	18,895	68,765	16,093	1,03,753
August	25,435	76,936	23,562	1,25,933
September	24,505	67,328	34,073	1,25,906
October	20,840	69,752	21,498	1,12,090
November	3,685	64,332	33,302	1,01,319
December	-27,755	46,112	45,855	64,212#
2006				
January	-20,555	37,280	39,080	55,805
February	-12,715	31,958	37,013	56,256
March*	7,250	29,062	48,828	85,140
April	47,805	24,276	5,611	77,692
May	57,245	27,817	0	85,062
June	42,565	33,295	8,621	84,481
July	44,155	38,995	8,770	91,920
August	23,985	42,364	26,791	93,140
September	1,915	42,064	34,821	78,800
October	12,270	40,091	25,868	78,229
November	15,995	37,917	31,305	85,217
December	-31,685	37,314	65,581	71,311
2007				
January	-11,445	39,375	42,494	70,424
February	6,940	42,807	53,115	1,02,862
March	-29,185	62,974	49,992	83,781

@ : Excludes minimum cash balances with the Reserve Bank.

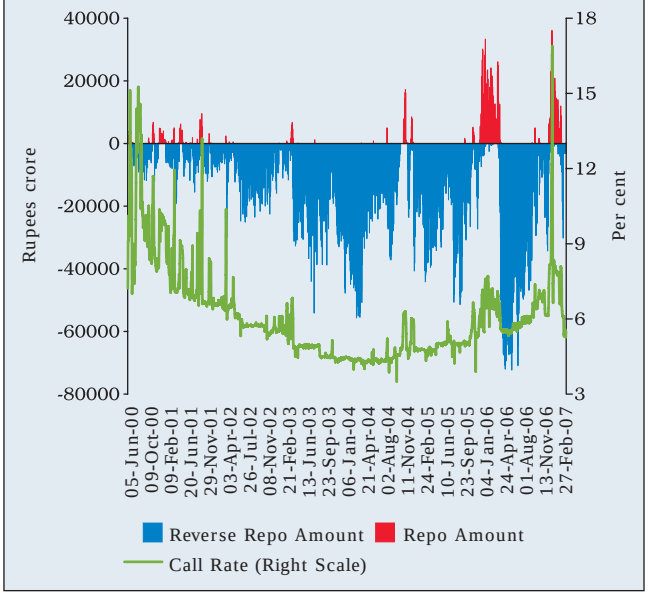
* : Data pertain to March 31**.** # Reflects IMD redemption of about Rs.32,000 crore.

Note : Negative sign in column 2 indicates injection of liquidity through LAF repo.

the role of a signalling instrument for the medium-term. Commensurate with these changes, the LAF has been further refined. Facilitated by the introduction of real time gross settlement (RTGS) system, it has now been possible to operate LAF at different times of the same day (Second LAF was introduced from November 28, 2005) providing market participants a second window to fine-tune the management of liquidity. The evidence so far suggests active transaction through the Second LAF during periods of easy liquidity (Table 3.2).

3.91 The surplus liquidity conditions, however, eased to about Rs.55,000 crore by January 2006 following the pressures from redemption of India Millennium Deposits (IMDs) (US $ 7.1 billion or about Rs.32,000 crore on December 28-29, 2005). The sustained pick-up in non-food credit (around 30 per cent witnessed since mid-2004), brought the liquidity position from the surplus mode to the deficit mode, leading to injections of liquidity through LAF repos during December 2005-February 2006 (Chart III.3). To meet their liquidity requirements, banks have been unwinding their excess SLR holdings (from about 13 per cent of NDTL at end-March 2005 to about 3 per cent by end-March 2007) above the prescribed minimum of 25 per cent. The depletion of SLR investments by banks has resulted in call rates firming up to the ceiling of the LAF corridor and beyond, even when reverse repo bids have been received under the LAF and funds have been absorbed from the system. This indicates that some banks overdrew both collateral and cash, thereby necessitating rollovers at the short-end of the market

Chart III.3: Liquidity Adjustment Facility and the Call Rate



spectrum leading to pressures on liquidity and interest rates. In this regard, the Government's decision in the Union Budget 2006-07 to convert the entire outstanding recapitalisation bonds/special securities issued to nationalised banks, amounting to Rs. 20,809 crore, into tradable, SLR eligible securities could reduce the pressure on banks seeking appropriate collaterals.

3.92 In the current phase of monetary tightening, the Reserve Bank has raised the reverse repo rates

Table 3.2: First and Second LAF

(Amount in Rupees crore)

Period	Average daily LAF Operations (net)	Average daily First LAF Operations (net)	Average daily Second LAF Operations (net)	Share of First LAF in Total LAF (per cent)	Share of Second LAF in Total LAF (per cent)
1	2	3	4	5	6
December 2005	-1,452	654	-2,106	64.6	35.4
January 2006	15,386	12,938	2,447	72.9	27.1
February 2006	13,532	10,850	2,682	74.9	25.1
March 2006@	6,319	5,520	799	54.1	45.9
April 2006	-46,088	-18,480	-27,608	41.1	58.9
May 2006	-59,505	-29,600	-29,905	49.7	50.3
June 2006	-48,611	-25,647	-22,964	52.8	47.2
July 2006	-48,027	-26,486	-21,541	55.2	44.8
August 2006	-36,326	-21,677	-14,649	59.7	40.3
September 2006	-25,862	-12,544	-13,318	47.8	52.2
October 2006	-12,262	-5,435	-6,827	44.4	55.6
November 2006	-9,937	-1,315	-8,622	13.2	86.8
December 2006	1,713	6,548	-4,836	41.6	58.4
January 2007	10,738	7,170	3,569	46.8	53.2
February 2007	-648	3,211	-3,859	36.4	63.6
March 2007	11,858	9,701	2,157	55.5	44.5

@ : Additional LAF conducted on March 31, 2006 has been shown under second LAF.
Note: (+) indicates injection of liquidity through LAF repos while (-) indicates absorption of liquidity through LAF reverse repos.

six times of 25 basis points each since October 2004, which along with the corresponding adjustments in the repo rate had narrowed down the corridor to 100 basis points by April 2005 (which subsequently increased to 175 basis points with the increase in repo rate by 25 basis points each on October 31, 2006, January 31, 2007 and March 30, 2007). The Reserve Bank has emphasised gradual changes in policy rates, as large changes in interest rates could be disruptive, particularly in the wake of increased openness of the economy and the current stage of development of financial markets. This approach has been successful in signalling the market about the need for such pre-emptive actions in order to stabilise inflation expectations. Various segments of the financial market have responded well to the policy signals (Box III.3).

Box III.3

The Interface between Monetary Policy Announcements and Financial Market Behaviour

The effectiveness of monetary policy hinges on the ability of the monetary authority to communicate with the public in a clear and transparent manner. In this regard, the signalling of policy assumes key importance as it conveys the stance of monetary policy. While the signalling mechanisms in developed countries are quite robust, they tend to be weak in emerging market economies, particularly in the wake of market segmentation and absence of a well-defined transmission mechanism.

Financial markets are typically characterised by asymmetric information, where some agents are better informed than others, that gets reflected in the problems of moral hazard and adverse selection. Seminal research on the economic theory of information has demonstrated that better-informed agents in a market could credibly "signal" (transmit) their information to less informed agents, so as to avoid some of the problems associated with adverse selection and improve the market outcome (Spence, 1973).

The effectiveness of monetary policy is strongly related to the signalling of policy, the reason being that important variables such as the exchange rate and long-term interest rates reflect expectations about future monetary policy. Central banks usually consider four different types of signalling channels, *viz.*, (a) speeches of executives, (b) views about future inflation, (c) changes in policy instruments and (d) publication of the minutes of policy meetings. In particular, the announcement of an inflation forecast or a monetary conditions index (MCI) is used to signal central bank's intentions.

In India, several measures have been initiated in the post-reform period to develop indirect instruments for transmitting policy signals. An important measure was the reactivation of the Bank Rate in April 1997 by initially linking it to all other rates, including Reserve Bank's refinance rates. The introduction of fixed rate reverse repo helped in creating an informal corridor in the money market with the reverse repo rate as the floor and the Bank Rate as the ceiling, which enabled the Reserve Bank to modulate the call rate within this informal corridor. Subsequently, the introduction of the Liquidity Adjustment Facility (LAF) from June 2000 facilitated the modulation of liquidity conditions and also short-term interest rates on a daily basis through the LAF window, while signalling the medium-term stance of policy through changes in the Bank Rate.

In the Indian context, some attempts have been made to empirically examine the interrelationship between monetary policy signals and financial market behaviour in a VAR framework (Bhattacharyya and Sensarma, 2005). Monetary policy signals are proxied by changes in the CRR, the Bank Rate and the LAF reverse repo rate. The impact of these signalling instruments of monetary policy is considered on four segments of the financial market, *viz*., money market (call money rate), stock market (BSE Sensex), foreign exchange market (3-month forward premia) and the government securities market (yield on 1-year G-sec).

Impulse response analysis is used to study the impact of a one standard error shock in each policy indicator on the various financial market segments. The study reveals that an increase in the CRR raises the call money rate instantly because of the news effect and also over time through the liquidity effect as more resources get impounded causing tightness in liquidity conditions. This is also the case for forward premia and yields on government securities. It has more of an instantaneous news impact in the stock market by depressing the market sentiment.

An increase in the Bank Rate, as the signalling mechanism of policy stance over the medium-term, appears to have an instantaneous effect on call, government securities and forward premia because of the news effect. The long-term impact, however, gets muted as refinance at the Bank Rate is formula driven and not adequate to have a liquidity impact. In the stock market, hardening of the Bank Rate is construed as restrictive monetary policy, which dampens the market sentiment.

An increase in the reverse repo rate, as the signalling mechanism of policy stance in the short-term, appears to have an instantaneous effect on call, government securities and forward premia because of the announcement effect and makes the term-structure steep at the short-end. Like the Bank Rate, repo rate hike also dampens the market sentiment.

The instantaneous impact of monetary policy signals on most financial market segments points towards increasing integration and sophistication of markets. Therefore, increasing reliance on indirect instruments, greater market integration and technological innovations *prima facie* have improved the channels of communication between the Reserve Bank and the financial market and facilitated the conduct of monetary policy.

3.93 Despite all these developments, the behaviour of call rates, which occasionally breached the corridor has called for a re-look at the market microstructure (Box III.4). Accordingly, as part of the

Box III.4
Market Microstructure: Issues in Money Market Liquidity

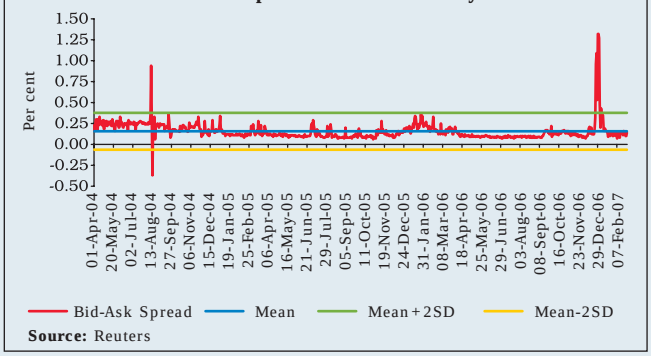
A liquid money market is an important pre-requisite for the effective transmission of monetary policy. In particular, a deep and liquid money market contributes towards a more effective propagation of the impulses of central bank policy intervention in financial markets. Besides, price determination is more efficient in a liquid money market and conveys important information to monetary authorities on market expectations. In this context, central banks modulate and fine-tune money market liquidity not only for monetary management but also in their quest for preserving financial stability.

Measures of money market liquidity are based on three dimensions, *viz.*, tightness, depth and resiliency. Tightness refers to how far transaction prices diverge from the average market price, *i.e.,* the general costs incurred irrespective of the level of market prices. Depth denotes either the volume of trades possible without affecting prevailing market prices, or the amount of orders in the order books of market makers at any time period. Finally, resiliency refers either to the speed with which price fluctuations resulting from the trade are dissipated, or the speed with which imbalances in order flows are adjusted. Other measures such as the number and volume of trades, trading frequency, turnover ratio, price volatility and the number of market participants are often regarded as readily available proxies for market liquidity.

As the buying and selling rates in any market transaction are commonly referred as bid and offer (ask) rates in financial market parlance, one of the most frequently used measures of tightness is the bid-ask spread. The bid-ask spread, *i.e.,* the differential between the lowest bid quote (the price at which a market participant is willing to borrow in the inter-bank market) and the highest ask quote (at which the agent is willing to lend) represents an operational measure of the price of the agents' services in the absence of other transaction costs. Depth is reflected by the maximum size of a trade for any given bid-ask spread. The turnover ratio, *i.e.,* the turnover in the money market as a percentage of total outstanding money market transactions, also provides an additional measure of the depth of the market. However, a more accurate measure of market depth would take into account advances of both actual and potential transactions arising out of portfolio adjustments. Finally, while there is no appropriate measure of resiliency, one approach is to examine the speed of the restoration of normal market conditions (such as the bid-ask spread and order volume) after transactions are completed. Thus, a relatively more liquid money market, *ceteris paribus*, requires less time to execute a transaction, operates on a narrower bid-ask spread, supports higher volumes for a given spread and requires relatively less time for the restoration of the "normal" bid-ask spread following a high value transaction.

On the basis of these criteria, the Indian money market appears to be a reasonably deep, vibrant and liquid market (based on overnight data on bid-ask spread from April 1, 2004 to February 28, 2007). During this period, the bid-ask spread has varied within a range of (-)0.37 to (+)1.32 basis points with an average of 16 basis points and standard deviation (SD) of 11 basis points (coefficient of variation is 0.69). Despite a higher degree of variation, the bid-ask spread remained within the 2-SD band around the average during most of the period (Chart). Considerable volatility above the average was witnessed up to December 2004. It eased up significantly during the major part of 2005 but increased subsequently during the early part of 2006. During 2006-07, while bid-ask spreads ruled below the average till August 2006, increase in spreads beyond the 2-SD band were noticed during end-December 2006 on account of tightness in liquidity due to the impact of the staggered hike of 0.5 percentage point in the CRR and the advance tax flows from the banking system. The bid-ask spread hardened significantly in March 2007, reflecting tight liquidity conditions on account of advance tax outflows, year-end considerations and sustained credit demand. However, events such as the blast of July 11, 2006 in Mumbai did not have any significant impact on the bid-ask spread in the call money market.

Chart: Bid Ask Spread in the Call Money Market



Source: Reuters

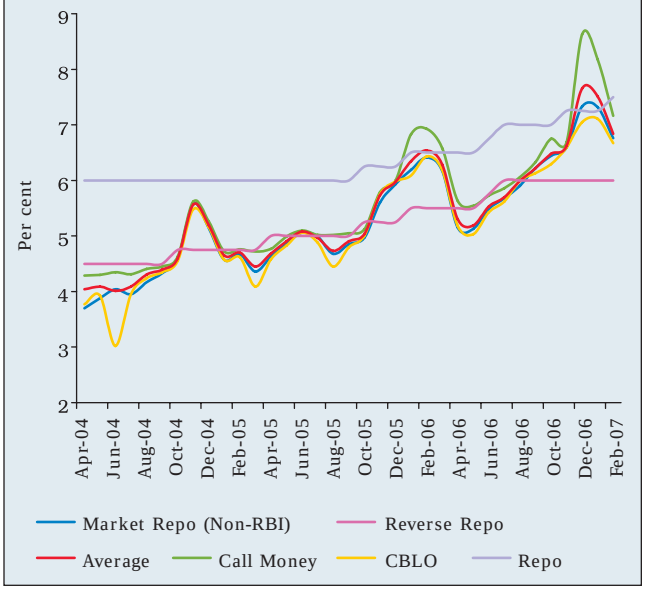
Differences in market microstructure can affect market liquidity considerably. In this regard, evolution of market structure is mostly driven by the rapid structural, technological and regulatory changes affecting global financial markets. In the Indian context, the gradual shift towards a collateralised market, phasing out of non-bank participants from call money market, reductions in statutory reserve requirements, introduction of new instruments such as CBLO, implementation of RTGS and facilitating the trading through NDS-CALL are some of the factors that have contributed to the development of a relatively vibrant and liquid money market.

policy strategy of focusing on market microstructure, the Reserve Bank took several initiatives for further deepening the money market along with other market segments in order to enhance the effectiveness of the rate channel of monetary transmission. A number of measures were taken by the Reserve Bank to enable the exit of non-bank participants from the call money market in a gradual manner. Instruments such as market repo (repo outside the Reserve Bank's LAF) and collateralised borrowing and lending obligation (CBLO) introduced in 2003, through the Clearing Corporation of India Limited (CCIL), enabled smooth migration of non-bank participants from the uncollateralised call money segment to the collateralised segments. The collateralised market is now the predominant segment of the money market with a share of around 70 per cent in total volume during 2006-07. This also provided an alternative avenue for banks to park their surplus funds beyond one day. Furthermore, this was facilitated by the standardisation of accounting practices, broad-basing of eligibility criteria in the collateralised markets, exemption of CBLO from the CRR requirements and anonymity provided by the order matching systems in the CBLO market. Moreover, minimum maturity period for CPs (October 2004) and CDs (April 2005) were shortened from 15 days to 7 days. These developments helped in the smooth transformation of the call money market into a pure inter-bank market in August 2005.

3.94 Availability of alternative avenues (such as the market repo and CBLO) for deploying short-term funds by market participants has also enabled the alignment of other money market rates with the informal interest rate corridor of reverse repo and repo rates under the LAF. Accordingly, although the call rate has at times breached the corridor, the weighted average overnight rate moved largely within the informal corridor set by LAF rates (Chart III.4).

3.95 To sum up, various 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.

Chart III.4: Overnight Interest Rates



V. MONEY MARKET DEVELOPMENTS – MID-1980s ONWARDS

3.96 As discussed earlier, the Vaghul Working Group (1987) recommended several measures for widening and deepening the money market. Some of the major recommendations, *inter alia*, included (i) activating existing instruments and introducing new instruments to suit the changing requirements of borrowers and lenders; (ii) freeing interest rates on money market instruments; and (iii) creating an active secondary market through establishing, wherever necessary, a new set of institutions to impart sufficient liquidity to the system. The Committee on the Financial System, 1991 (Chairman: Shri M. Narasimham) further recommended phased rationalisation of the CRR for the development of the money market. Second generation reforms in the money market commenced when the Committee on Banking Sector Reforms, 1998 (Chairman: Shri M. Narasimham) recommended measures to facilitate the emergence of a proper interest rate structure reflecting the differences in liquidity, maturity and risk.

3.97 In pursuance of the recommendations of the two committees, a comprehensive set of measures was undertaken by the Reserve Bank to develop the money market. These included (i) withdrawal of interest rate ceilings in the money market; (ii) introduction of auctions in Treasury Bills; (iii) abolition of *ad hoc* Treasury Bills; (iv) gradual move away from the cash credit system to a loan-based system; (v) relaxation in the issuance restrictions and subscription

Table 3.3: Activity in Money Market Segments

(Rupees crore)

Year	Average Daily Turnover #				Outstanding Amount	
	Call Money Market	Market Repo (Outside the LAF)	Collateralised Borrowing and Lending Obligation (CBLO)	Term Money Market	Commercial Paper	Certificates of Deposit
1	2	3	4	5	6	7
1997-98	22,709	–	–	–	2,806	9,349
1998-99	26,500	–	–	–	4,514	6,876
1999-00	23,161	6,895	–	–	7,014	1,908
2000-01	32,157	10,500	–	–	6,751	1,199
2001-02	35,144	30,161	–	195	7,927	949
2002-03	29,421	46,960	30	341	8,268	1,224
2003-04	17,191	10,435	515	519	7,835	3,212
2004-05	14,170	17,135	6,697	526	11,723	6,052
2005-06	17,979	21,183	20,039	833	17,285	27,298
2006-07	21,725	33,676	32,390	1,012	21,314	64,814

: Turnover is twice the single leg volumes in case of call money and CBLO to capture borrowing and lending both, and four times in case of market repo (outside LAF) to capture the borrowing and lending in the two legs of a repo.

norms in the case of many money market instruments; (vi) introduction of new financial instruments; (vii) widening of participation in the money market; and (viii) development of a secondary market. All these policy measures have helped in developing the money market significantly over the years as reflected in the volumes and turnover in various market segments (Table 3.3).

Call/Notice Money Market

3.98 Prior to the mid-1980s, as discussed earlier, the market participants heavily depended on the call money market for meeting their funding requirements. However, inherent volatility in the market impeded efficient price discovery, thereby hampering the conduct of monetary policy. Against this backdrop, the Chakravarty Committee (1985) recommended activation of the Treasury Bills market (with the discount rate being market related) to reduce dependence on the call money market and abolish ceilings on the call rate along with permitting more institutional participation to widen the market base. The Vaghul Committee, in view of the continued existence of an unaligned overall interest rate structure, recommended abolition of the ceiling interest rate on the call money market. However, it held the view that the call money market should continue to remain a strictly inter-bank market (barring LIC and the erstwhile UTI which could continue as lenders only) and recommended the setting up of a Finance House of India to impart liquidity to short-term money market instruments.

3.99 The reforms commenced with the setting up of an institution, *viz.*, the Discount and Finance House of India (DFHI) in 1988 as a money market institution to impart liquidity to money market instruments. Interest rate in the call money market was deregulated with the withdrawal of the ceiling rate with respect to DFHI from October 1988 and with respect to the call money market in May 1989. Although the Vaghul Committee had recommended that call/notice money should be restricted to banks only, the Reserve Bank favoured the widening of the call/notice money market. In the absence of adequate avenues for deployment of short-term surpluses by non-bank institutions, a large number of non-bank participants such as FIs, mutual funds, insurance companies and corporates were allowed to lend in the call/notice money market, although their operations were required to be routed through the PDs from March 1995[10]. In this context, PDs and banks were permitted to both lend and borrow in the market. The Reserve Bank exempted

[10] Satellite Dealers (SDs) were also allowed to operate in the call/notice money market until they were phased out from May 2002.

inter-bank liabilities from the maintenance of CRR/ SLR (except for the statutory minimum) effective April 1997 with a view to imparting stability to the call money market.

3.100 The Narsimham Committee (1998), however, noted that the money market continued to remain lopsided, thin and extremely volatile. While the non-bank participation was a source of comfort, it had not led to the development of a stable market with depth and liquidity. The non-bank participants, unlike banks, were not subjected to reserve requirements and the call/notice money market was characterised by predominant lenders and chronic borrowers causing heavy gyrations in the market. There was also over-reliance of banks in the call/notice money segment, thereby impeding the development of other segments of the money market. The Reserve Bank also did not have any effective presence in the market and operated with pre-determined lines of refinance. As interest rates in other money market segments move in tandem with the inter-bank call money rate, the volatility in the call segment inhibited proper risk management and pricing of instruments. Thus, freeing of interest rates did not result in a well-defined yield curve (Box III.5). Furthermore, banks' role in the money market was further impaired by the health of their own balance sheets, lack of integrated treasury management and sound asset-liability management.

3.101 The Narasimham Committee (1998) made several recommendations to further develop the money market. First, it reiterated the need to make the call/notice money market a strictly inter-bank market, with PDs being the sole exception, as they perform the key function of equilibrating the call money market and are formally treated as banks for the purpose of inter-bank transactions. Second, it recommended prudential limits beyond which banks should not be allowed to rely on the call money market. The access to the call money market should only be for meeting unforeseen fund mismatches rather than for regular financing needs. Third, the Reserve Bank's operations in the money market need to be market-based through LAF repos and reverse repo auctions, which would determine the corridor for the market. Fourth, non-bank participants could be provided free access to rediscounting of bills, CP, CDs, Treasury Bills and money market mutual funds.

3.102 Following the recommendations of the Reserve Bank's Internal Working Group (1997) and the Narasimham Committee (1998), steps were taken to reform the call money market by transforming it into a pure inter-bank market in a phased manner. The corporates, which were allowed to route their transactions through PDs, were phased out by end-June 2001. The non-banks' exit was implemented in four stages beginning May 2001 whereby limits on lending by non-banks were progressively reduced along with the operationalisation of negotiated dealing system (NDS) and CCIL until their complete withdrawal in August 2005. In order to create avenues for deployment of funds by non-banks following their phased exit from the call money market, several new instruments were created such as market repos and CBLO. Maturities of other existing instruments such as CPs and CDs were also gradually shortened in order to align the maturity structure to facilitate the emergence of a rupee yield curve. The Reserve Bank has been modulating liquidity conditions through OMOs (including LAF), MSS and refinance operations which, along with stipulations of minimum average daily reserve maintenance requirements, have imparted stability to the call money market.

3.103 Despite these reforms, however, the behaviour of banks in the call market has not been uniform. There are still some banks, such as foreign and new private sector banks, which are chronic borrowers and public sector banks, which are the lenders. Notwithstanding excessive dependence of some banks on the call money market, the short-term money markets are characterised by high degree of stability. The Reserve Bank has instituted a series of prudential measures and placed limits on borrowings and lendings of banks and PDs in the call/notice market to minimise the default risk and bring about a balanced development of various market segments. In order to improve transparency and strengthen efficiency in the money market, it was made mandatory for all NDS members to report all their call/notice money market transactions through NDS within 15 minutes of conclusion of the transaction. The Reserve Bank and the market participants have access to this information on a faster frequency and in a more classified manner, which has improved the transparency and the price discovery process. Furthermore, a screen-based negotiated quote-driven system for all dealings in the call/notice and the term money markets (NDS-CALL), developed by CCIL, was operationalised on September 18, 2006 to bring about increased transparency and better price discovery in these segments. Although the dealing on this platform is

Box III.5
Development of a Short-Term Yield Curve – Some Issues

The existence of a wide, deep and liquid money market is critical for the development of a smooth yield curve, which facilitates the conduct of monetary policy. As money market determines the cost of liquidity and anchors the short-end of the yield curve, the development of a deep and liquid money market is imperative for the emergence of a yield curve which would credibly transmit monetary policy signals. In this regard, the Reserve Bank has taken several measures since the mid-1990s to develop a short-term yield curve with deep liquidity. These are: (i) exempting inter-bank liabilities from the maintenance of CRR; (ii) operationalising the LAF whereby the reverse repo and repo rates are used as policy instruments to modulate liquidity conditions and stabilise call rates within the LAF corridor; (iii) transforming the call money market into a pure inter-bank market by phasing out the non-bank lenders; (iv) developing other market segments with adequate access for non-banks; (v) developing a relatively vibrant non-RBI repo market; and (vi) developing the CBLO market as yet another instrument of overnight borrowing/lending facility.

Notwithstanding these initiatives, a short-term yield curve which is readily amenable for policy purposes is yet to emerge. In this regard, the single largest impediment for the emergence of a short-term yield curve has been the non-existence of a vibrant and liquid term-money market, mainly due to the inability of market participants to build long-term interest rate expectations, skewed distribution of market liquidity, reduction in the minimum maturity period of term deposits of banks, and tendency on the part of banks to deploy their surplus funds in LAF auctions rather than in the term money market.

As a result, the yield curve has been flattening in recent years; it even remained inverted for a very brief period. For instance, the absorption of liquidity through sterilisation operations had led the call rates and the cut-off yield on 91-day Treasury Bills to edge above the yield of 364-day Treasury Bills, leading to an inversion of a segment of the yield curve for a few days in October 2003.

The prolonged flattening of the yield curve has, however, been influenced by structural factors such as considerable softening of yields due to dismantling of administered interest rate regime, favourable inflationary expectations and excess liquidity in the wake of capital flows. The moderation in yields has also been supported by rationalisation of small savings interest rates administered by the Government. The stickiness of the reverse repo/repo rate could also have contributed to the flattened yield curve. Maintaining the reverse repo/repo rate at the unchanged level for an extended period of time could have also led to distortions in the term structure of interest rates. This can be understood by the fact that while the 10-year gilt yield declined by 257 basis points during May 2002 to April 2004, the reverse repo rate declined by only 150 basis points while call money rates declined by 180 basis points during the same period. These structural factors appeared to have contributed to the flattening of the yield curve. Owing to these distortions, the Indian yield curve does not fully reflect the market expectations on inflation and growth prospects.

An important objective of money market reforms by the Reserve Bank in recent years has been to facilitate transparency in transactions in order to reduce transactions cost and improve price discovery. The Clearing Corporation of India Limited (CCIL), by providing for guaranteed settlement of all trades, ensures prevention of grid-lock in financial transactions. Furthermore, the introduction of CBLO by the CCIL in January 2003 and operationalisation of an order matching (OM) anonymous trading screen has made trading transparent and on a real time basis, thereby making the money market more efficient. In order to further enhance transparency in the money market, screen-based trading through the NDS-CALL was operationalised in September 2006. The full implementation of the real time gross settlement (RTGS) would further aid this process by contributing to systemic stability.

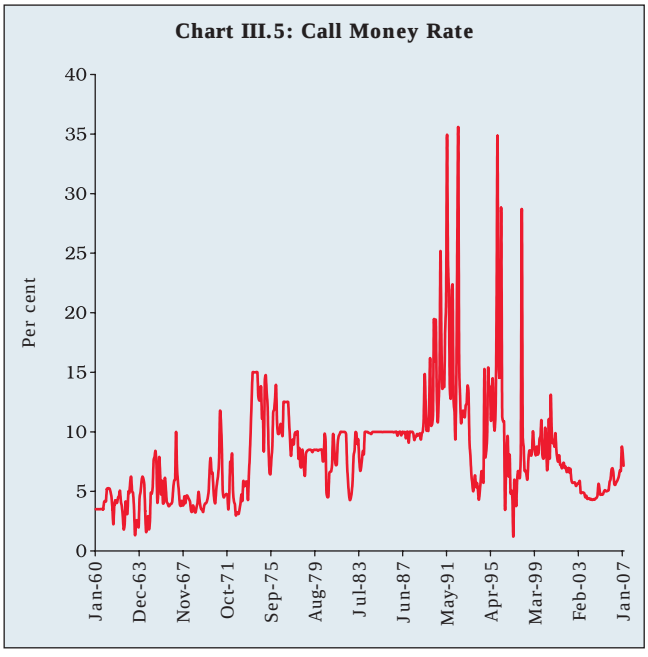
Notwithstanding considerable progress, a proper short-term yield curve, which facilitates the transmission of monetary policy signals and provides a benchmark for the pricing of other short-term debt instruments, is yet to emerge fully. In this regard, the constant interaction between the Reserve Bank and market participants through frequent meetings, speeches, interviews, press releases and publications is progressively expected to mute the surprise element of monetary policy and facilitate the process of formation of market expectations, which would increasingly get captured in the yield curve.

optional, 85 banks and 7 PDs have taken membership of NDS-CALL.

3.104 Various reform measures over the years have imparted stability to the call money market. It has witnessed orderly conditions (barring a few episodes of volatility) and provided the necessary platform for the Reserve Bank to conduct its monetary policy. The behaviour of call rates has, historically, been influenced by liquidity conditions in the market. Call rates touched a peak of about 35 per cent in May 1992, reflecting tight liquidity on account of high levels

of statutory pre-emptions and withdrawal of all refinance facilities, barring export credit refinance. After some softness, call rates again came under pressure to touch 35 per cent in November 1995, partly reflecting turbulence in the foreign exchange market. The Reserve Bank supplied liquidity through repos and enhanced refinance facilities while reducing the CRR to stabilise the market. After softening to a single digit level, the rate hardened again to touch 29 per cent in January 1998, reflecting mopping up of liquidity by the Reserve Bank to ease foreign exchange market pressure. Barring these episodes of volatility, call rates remained generally stable in the 1990s. After the adoption of the LAF in June 2000, the call rate eased significantly to a low of 4.5 per cent in September 2004, reflecting improved liquidity in the system following increased capital inflows. However, it came under some pressure in December 2005 on account of IMD redemptions and increased to about 7 per cent in February 2007, partly due to monetary tightening (Chart III.5)[11]. With the institution of LAF and consequent improvement in liquidity management by the Reserve Bank, the volatility in call rates has come down significantly compared to the earlier periods. The mean rate has almost halved from around 11 per cent during April 1993-March 1996 to about 6 per cent during April 2000-March 2007.

Chart III.5: Call Money Rate



Volatility, measured by coefficient of variation (CV) of call rates, also halved from 0.6 to 0.3 over the same period. Thus, while statutory pre-emptions like CRR and SLR, and reserve maintenance period were the main factors that influenced call rates in the pre-reform period, it is the developments in other market segments, mainly the foreign exchange and the government securities market along with the Reserve Bank's liquidity management operations that have been the main driver of call rates in the post-reform period. This signifies increased market integration and improved liquidity management by the Reserve Bank.

3.105 With the transformation of the call money market into a pure inter-bank market, the turnover in the call/notice money market has declined significantly. The activity has migrated to other overnight collateralised market segments such as market repo and CBLO. The daily average turnover in the call money market, which was Rs.35,144 crore in 2001-02, declined to Rs.14,170 crore in 2004-05 before increasing again to Rs.21,725 crore during 2006-07. The recent rise in call money market turnover reflects the general tendency of heightened market activity following the imbalance between growth in bank credit and bank deposits in recent years against the backdrop of sustained pick-up in non-food credit.

Term Money Market

3.106 The term money market is another segment of the uncollateralised money market. The maturity period in this segment ranges from 15 days to one year. The term money market has been somewhat dormant in India. It was also a strictly regulated market up to the late 1980s with the ceiling rates of interest (10.5-11.5 per cent) across the various maturity buckets. Historically, statutory pre-emptions on inter-bank liabilities, regulated interest rate structure, cash credit system of financing, high degree of volatility in the call money rates, availability of sector-specific refinance, inadequate asset liability management (ALM) discipline among banks and scarcity of money market instruments of varying maturities were cited as the main factors that inhibited the development of the term money market.

3.107 In order to activate the term money market, several policy measures were taken by the Reserve

[11] Call money rate hardened during the second half of March 2007 (averaging about 20 per cent), reflecting tight liquidity conditions on account of advance tax outflows, year-end considerations, sustained credit demand and asymmetric distribution of government securities holdings across banks.

Bank. In pursuance of the Vaghul Working Group's recommendations, the administered interest rate system in this market was dismantled in 1989. In order to promote this segment, the participation was widened by allowing select financial institutions in 1993 to borrow from the term money market for a maturity period of 3-6 months. Term money of original maturity between 15 days and 1 year was exempted from the CRR in August 2001. Furthermore, no limits were stipulated for transactions in the term money market, unlike under the call/notice money market.

3.108 Despite various reforms, the average daily turnover in this segment continues to be quite low. It increased moderately from Rs.195 crore in 2001-02 to Rs.1,012 crore during 2006-07. The factors still hindering the development of this segment of the money market include: (i) the inability of participants to build interest rate expectations over the medium-term due to which there is a tendency on their part to lock themselves in the short-term; (ii) the distribution of liquidity is also skewed with public sector banks often having surplus funds and foreign banks being in deficit in respect of short-term resources. Since the deficit banks depend heavily on call/notice money, more often, surplus banks exhaust their exposure limits to them; (iii) corporates' overwhelming preference for 'cash credit' system rather than 'loan' generally forces banks to deploy a large amount in the call/notice money market rather than in the term money market to meet sudden demand from corporates; (iv) the steady reduction in the minimum maturity period of term deposits offered by banks; and (v) the tendency on the part of banks to deploy their surplus funds in LAF auctions rather than in the term money market, reflecting risk-averse behaviour.

3.109 It is widely accepted that the banking sector needs a deep and liquid term money market for managing its liquidity as also a smoother rupee yield curve. The recent reform measures such as the phasing out of non-banks from the call/notice money market and institution of prudential call/notice money exposure limits for banks and PDs are expected to switch market participants to other market segments. The development of an efficient repo market could provide benchmarks to all fixed income segments, including the term money market. In order to improve transparency, strengthen efficiency and facilitate a better price discovery process in the term money market, the Technical Group on Money Market recommended that term money transactions should also be conducted on a screen-based negotiated quote driven platform.

Market Repos

3.110 Repo (Repurchase Agreement) instruments enable collateralised short-term borrowing through the selling of debt instruments. Under a repo transaction, the security is sold with an agreement to repurchase it at a pre-determined date and rate. Reverse repo is a mirror image of repo and represents the acquisition of a security with a simultaneous commitment to resell.

3.111 In developed financial markets, repurchase agreements (repos) are recognised as a very useful money market instrument enabling smooth adjustment of short-term liquidity among varied categories of market participants such as banks, financial institutions, securities and investment firms. Compared with pure call/notice/term money transaction, which is non-collateralised, repo is fully collateralised by securities, thereby offering greater flexibility and minimising default risk. Furthermore, repo has several advantages over other collateralised instruments also. One, while obtaining titles to securities in other collateralised lending instruments is a time-consuming and uncertain process, repo entails instantaneous legal transfer of ownership of the eligible securities. Two, it helps to promote greater integration between the money and the government securities markets, thereby creating a more continuous yield curve. Additionally, repo can also be used to facilitate Government's cash management (Gray, 1998). Central banks all over the world also use repo as a very powerful and flexible money market instrument for modulating market liquidity. Since it is a market-based instrument, it serves the purpose of an indirect instrument of monetary policy at the short-end of the yield curve.

3.112 Since forward trading in securities was generally prohibited in India, repos were permitted under regulated conditions in terms of participants and instruments. Reforms in this market have encompassed both institutions and instruments. Both banks and non-banks were allowed in the market. All government securities and PSU bonds were eligible for repos till April 1988. Between April 1988 and mid-June 1992, only inter-bank repos were allowed in all government securities. Double ready forward transactions were part of the repos market throughout this period. Subsequent to the irregularities in securities transactions that surfaced in April 1992, repos were banned in all securities, except Treasury Bills, while double ready forward transactions were prohibited altogether. Repos were permitted only among banks and PDs. In order to reactivate the repos

market, the Reserve Bank gradually extended repos facility to all Central Government dated securities, Treasury Bills and State Government securities. It is mandatory to actually hold the securities in the portfolio before undertaking repo operations. In order to activate the repo market and promote transparency, the Reserve Bank introduced regulatory safeguards such as delivery *versus* payments (D*v*P) system during 1995-96. The Reserve Bank allowed all non-bank entities maintaining subsidiary general ledger (SGL) account to participate in this money market segment. Furthermore, non-bank financial companies, mutual funds, housing finance companies and insurance companies not holding SGL accounts were also allowed by the Reserve Bank to undertake repo transactions from March 2003, through their "gilt accounts" maintained with custodians. With the increasing use of repos in the wake of phased exit of non-banks from the call money market, the Reserve Bank issued comprehensive uniform accounting guidelines as well as documentation policy in March 2003. Moreover, the D*v*P III mode of settlement in government securities (which involves settlement of securities and funds on a net basis) in April 2004 facilitated the introduction of rollover of repo transactions in government securities and provided flexibility to market participants in managing their collaterals.

3.113 The operationalisation of the Negotiated Dealing System (NDS) and the Clearing Corporation of India Ltd. (CCIL) combined with prudential limits on borrowing and lending in the call/notice market for banks also helped in the development of market repos. Reflecting this, the average daily turnover of repo transactions (other than the Reserve Bank) increased sharply from Rs.11,311 crore during April 2001 to Rs. 42,252 crore in June 2006 in line with the phasing out of non-banks from the call/notice money market - a process which was completed by August 2005. Subsequently, the turnover in this segment became subdued. In this segment, mutual funds and some foreign banks are the major providers of funds, while some foreign banks, private sector banks and primary dealers are the major borrowers.

Collateralised Borrowing and Lending Obligations (CBLO)

3.114 The CBLOs were operationalised as a money market instrument by the CCIL on January 20, 2003. The product was introduced with the objective of providing an alternative avenue for managing short-term liquidity to the market participants who were restricted and/or phased out of the call money market. The market was quick to reap the benefits of anonymous trading system. Mutual funds and cooperative banks were the main beneficiaries of this scheme. The anonymous, order-driven and online matching system was a milestone in the Indian debt market.

3.115 With the transformation of the call money market into a pure inter-bank market (with PDs) since August 2005 and imposition of prudential limits on borrowing/lending by banks and PDs in the call money market, the activity has migrated to the CBLO segment as it enables market participants to manage their short-term liquidity. Accordingly, the average daily turnover in the CBLO segment increased from Rs.515 crore in 2003-04 to Rs.32,390 crore during 2006-07. The increase in turnover could be attributed partly to the increase in the number of participants from 30 in July 2003 to 153 by March 2007. The composition of market participants has undergone changes with mutual funds and insurance companies emerging as the major lenders in the CBLO market, while nationalised banks, PDs and non-financial companies as the major borrowers during 2006-07. Thus, the CBLO and the market repo (the collateralised segment) have now emerged as the predominant money market segments with a combined share of nearly 70 per cent of the total turnover in 2006-07.

3.116 As borrowings in the CBLO segment are fully collateralised, the rates in this segment are expected to be comparable with the repo rates. The movements in the daily average rates in the overnight call, the repo and the CBLO markets for the period from January 2003 to March 2007 show that CBLO rates moved between the call and the repo rates up to November 2003 due to a limited number of participants. From November 2003, the CBLO rates have aligned with the repo rates on account of increase in the number of participants. The transparent nature and real time basis of deals in the CBLO segment have helped in enhancing efficiency of the money market.

Treasury Bills

3.117 In India, prior to the institution of reforms, the 91-day Treasury Bills were sold on tap at an administered rate of discount, which was fixed at 4.6 per cent from July 1974. They, however, could not emerge as a useful money market instrument due to the administered nature of interest rates, which reflected the perspective of the issuer rather than the buyer. A reform process in this segment started with the introduction of 182-day Treasury Bills from November 1986. This was followed by the phasing

out of tap Treasury Bills and an introduction of auctioning system in 91-day Treasury Bills. The institution of DFHI as a money market institution along with other steps taken to develop the market created the ground for the emergence of 91-day Treasury Bills as an important market segment. Treasury Bills with 364-day maturity were introduced in April 1992 and tendered through auction-determined rates of discount. Subsequently, 91-day Treasury Bills were introduced on an auction basis in January 1993. There was also a system of 91-day *ad hoc* Treasury Bills, which were issued by the Central Government to the Reserve Bank with a *de jure* objective of bridging temporary mismatches. *De facto*, however, they turned out to be a permanent source of meeting Central Government's resource requirement through monetisation of fiscal deficit. A major reform occurred in April 1997, when the system of *ad hoc* Treasury Bills was abolished and 14-day intermediate Treasury Bills and auction bills were introduced to enable better cash management by the Government and to provide alternative avenues of investments to the State Governments and some foreign central banks. Thus, Treasury Bills of different tenors were introduced to consolidate the market for imparting liquidity, while yields were made market determined through auctions for their use as a benchmark for other short-term market instruments.

3.118 The Reserve Bank now auctions 91-day Treasury Bills on a weekly basis and 182-day Treasury Bills (re-introduced in April 2005) and 364-day Treasury Bills on a fortnightly basis on behalf of the Central Government. Treasury Bills market being at the heart of money market development, the Reserve Bank has been paying special attention to this market segment. The amounts earmarked for auctions are pre-announced and bids received from non-competitive bidders have been kept outside the notified amount since April 1998. The dates of payment are synchronised on the following Friday after the auctions with a view to providing fungible stock of varying maturities and to activate the secondary market in Treasury Bills. To impart liquidity to Treasury Bills and also to enable investors to acquire these bills in between the auctions, primary dealers (PDs) quote their bid daily and offer discount rates.

3.119 In view of the limited stock of government securities with the Reserve Bank, which constrained outright OMOs for sterilisation purposes, Treasury Bills were made eligible for issuance under the MSS. The notified amount of Treasury Bills issued under the MSS has varied during the year keeping in view the prevailing liquidity conditions. The primary market yields of Treasury Bills edged higher during 2005-06 mirroring the liquidity conditions as well as movements in LAF rates. The hardening of primary yields since September 2005 mainly reflects liquidity tightening due to festival demand for cash, quarterly advance tax outflows and IMD redemption on December 29, 2005 and strong credit demand (Chart III.6). Thus, Treasury Bills have not only served the Government in their cash management, but have also been effectively used for sterilisation purposes under the MSS. The persistent use of these instruments for sterilisation, however, could undermine their role as benchmarks for other money market instruments.

3.120 The Reserve Bank has been modifying the notified amounts for auctioning of Treasury Bills in tune with the evolving liquidity conditions. Reflecting the relatively tight liquidity conditions during 2006-07, the bid-cover ratios have generally declined, especially in respect of 91-day and 182-day Treasury Bills (Table 3.4).

Commercial Paper

3.121 Commercial Paper (CP) is issued in the form of a promissory note sold directly by the issuers to investors, or else placed by the borrowers through agents such as merchant banks and security houses. When it is issued by corporate borrowers directly to investors in the money market and by the process of securitisation, the intermediation function of the bank is obviated. CP was introduced in India in January

Chart III.6: Yields on Treasury Bills

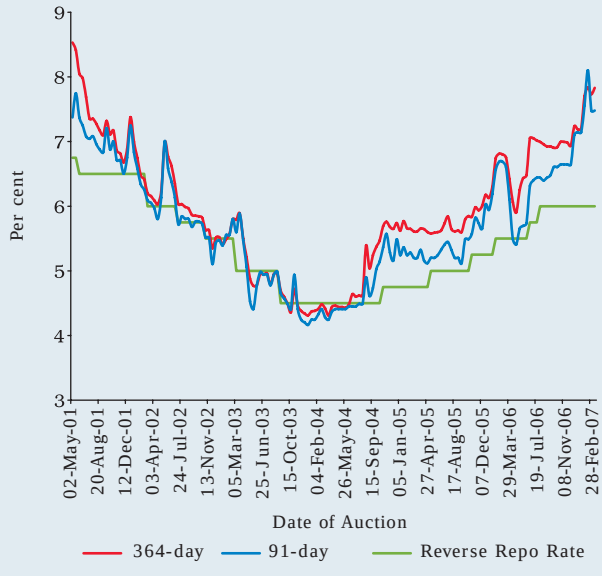


Table 3.4: Treasury Bills – Primary Market

Month	Notified Amount (Rupees crore)	Average Implicit Yield at Minimum Cut-off Price (Per cent)			Average Bid-Cover Ratio*		
		91-day	182-day	364-day	91-day	182-day	364-day
1	2	3	4	5	6	7	8
2005-06							
April	19,000	5.17	5.36	5.62	4.03	4.48	2.54
May	15,000	5.19	5.35	5.58	3.30	3.37	2.29
June	18,500	5.29	5.37	5.61	1.54	2.42	1.81
July	11,500	5.46	5.67	5.81	1.21	1.79	1.68
August	21,000	5.23	5.42	5.63	3.07	2.68	2.54
September	23,000	5.24	5.37	5.70	1.52	1.45	1.61
October	15,000	5.50	5.71	5.84	1.69	1.53	3.44
November	11,000	5.76	5.85	5.96	2.12	1.92	2.30
December	5,000	5.89	6.00	6.09	3.07	2.97	2.36
January	5,000	6.25	6.22	6.21	2.86	2.83	2.72
February	5,000	6.63	6.74	6.78	3.04	2.07	2.71
March	6,500	6.51	6.66	6.66	4.17	3.43	3.36
2006-07							
April	5,000	5.52	5.87	5.98	5.57	4.96	2.02
May	18,500	5.70	6.07	6.34	1.88	1.84	1.69
June	15,000	6.14	6.64	6.77	1.63	1.35	2.11
July	16,500	6.42	6.75	7.03	1.82	1.55	3.12
August	19,000	6.41	6.70	6.96	2.03	2.71	3.48
September	15,000	6.51	6.76	6.91	1.35	1.80	2.92
October	15,000	6.63	6.84	6.95	1.31	1.20	2.02
November	18,500	6.65	6.92	6.99	1.33	1.22	2.49
December	15,000	7.01	7.27	7.09	1.19	1.29	3.34
January	19,000	7.28	7.45	7.39	1.02	1.35	1.74
February	15,000	7.72	7.67	7.79	2.48	2.56	3.16
March	15,000	7.68	7.98	7.90	2.08	2.15	3.87

* : Ratio of competitive bids amount received (BR) to notified amount (NA).
Note : 1. 182-day Treasury Bills were re-introduced with effect from April 6, 2005.
2. Notified amount is inclusive of issuances under the MSS.

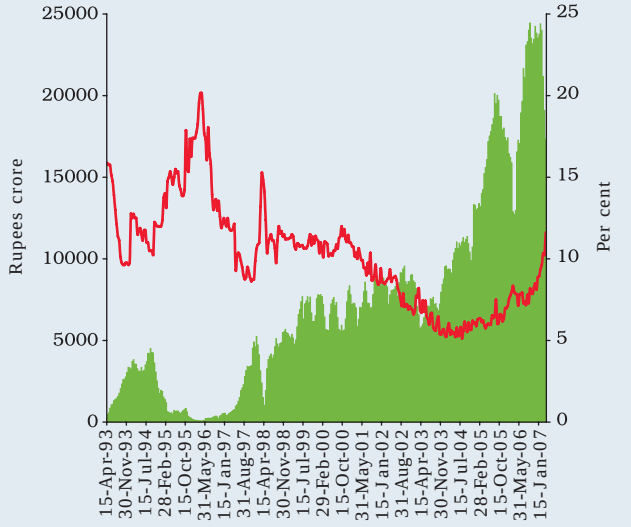
1990, in pursuance of the Vaghul Committee's recommendations, in order to enable highly rated non-bank corporate borrowers to diversify their sources of short-term borrowings and also provide an additional instrument to investors. CP could carry an interest rate coupon but is generally sold at a discount. Since CP is freely transferable, banks, financial institutions, insurance companies and others are able to invest their short-term surplus funds in a highly liquid instrument at attractive rates of return.

3.122 The terms and conditions relating to issuing CPs such as eligibility, maturity periods and modes of issue have been gradually relaxed over the years by the Reserve Bank. The minimum tenor has been brought down to seven days (by October 2004) in stages and the minimum size of individual issue as well as individual investment has also been reduced to Rs. 5 lakh with a view to aligning it with other money market instruments. The limit of CP issuance was first carved out of the maximum permissible bank finance (MPBF) limit and subsequently only to its cash credit portion. A major reform to impart a measure of independence to the CP market took place when the "stand-by" facility of the restoration of the cash credit limit and guaranteeing funds to the issuer on maturity of the paper was withdrawn in October 1994. As the reduction in the cash credit portion of the MPBF impeded the development of the CP market, the issuance of CP was delinked from the cash credit limit in October 1997. It was converted into a "stand alone" product from October 2000 so as to enable the issuers of the services sector to meet short-term working capital requirements. Banks were allowed to fix working capital limits after taking into account the resource pattern of the companies' finances, including CPs. Corporates, PDs and all-India financial institutions (FIs) under specified stipulations have been permitted to raise short-term resources by the Reserve Bank through the issue of CPs. There is no

lock-in period for CPs. Furthermore, guidelines were issued permitting investments in CPs only in dematerialised form effective June 30, 2001 which has enabled a reduction in the transaction cost. In order to rationalise and standardise, wherever possible, various aspects of processing, settlement and documentation of CP issuance, several measures were undertaken with a view to achieving the settlement on a T+1 basis. For further deepening the market, the Reserve Bank issued draft guidelines on securitisation of standard assets on April 4, 2005. Accordingly, the reporting of CP issuance by issuing and paying agents (IPAs) on NDS platform commenced effective April 16, 2005. The FCAC observed that CPs being short-term instruments, any unlimited opening up of issuance could have implications for short-term debt flows. It, therefore, recommended for prudential limits even under full convertibility.

3.123 The issuance of CP has generally been observed to be inversely related to call money rates. Activity in the CP market reflects the state of market liquidity as its issuances tend to rise amidst ample liquidity conditions when companies can raise funds through CPs at an effective rate of discount lower than the lending rate of banks. Banks also prefer investing in CPs during credit downswing as the CP rate works out higher than the call rate. Thus, the average outstanding amount of CPs declined from Rs.2,280 crore during 1993-94 to Rs.442 crore during 1995-96 amidst tight liquidity but moved up to Rs.17,285 crore during 2005-06. It increased further to Rs.21,314 crore during 2006-07. Leasing and finance companies continue to be the predominant issuers of CPs. Discount rates on CPs have firmed up in line with the increases in policy rates during 2005-06 and 2006-07 (Chart III.7).

Chart III.7: Commercial Paper

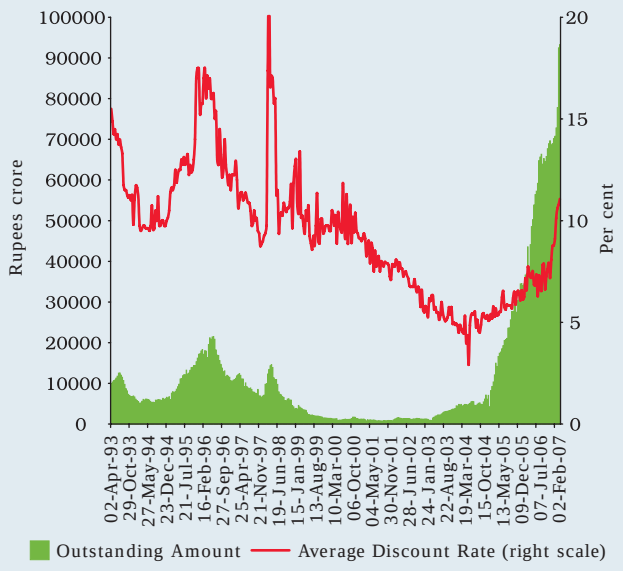


Certificates of Deposit

3.124 In order to widen the range of money market instruments and provide greater flexibility to investors for deploying their short-term surplus funds, certificates of deposit (CDs) were introduced in June 1989. They are essentially securitised short-term time deposits issued by banks and all-India financial institutions during periods of tight liquidity, at relatively higher discount rates as compared to term deposits. The guidelines concerning CDs have also been relaxed over time. These include (i) freeing of CDs from interest rate regulation in 1992; (ii) lowering the minimum maturity period of CDs issued by banks to 7 days (April 2005) with a view to aligning the minimum tenor for CPs and CDs as recommended by the Narasimham Committee (1998); (iii) permitting select all-India financial institutions to issue CDs for a maturity period of 1 to 3 years; (iv) abolishing limits to CD issuances as a certain proportion of average fortnightly outstanding aggregate deposits effective October 16, 1993 with a view to enabling it as a market determined instrument; (v) reducing the minimum issuance size from Rs. 1 crore in 1989 to Rs. 1 lakh in June 2002; (vi) withdrawal of restriction on minimum period for transferability with a view to providing flexibility and depth to the secondary market activity; (vii) requiring banks and FIs to issue CDs only in dematerialised form, effective June 30, 2002, in order to impart more transparency and encourage secondary market; and (viii) permitting banks in October 2002 to issue floating rate CDs as a coupon bearing instrument so as to promote flexible pricing in this instrument. The FCAC Committee recommended for prudential limits on opening up CDs even under full convertibility.

3.125 Activity in the CD market also mirrors liquidity conditions but unlike CPs, the CD issuances by banks and FIs pick up during periods of tight liquidity. For instance, the average outstanding amount of CDs rose from Rs.8,266 crore during 1992-93 to Rs.14,045 crore during 1995-96. It further increased to Rs.21,503 crore in June 1996 reflecting the credit pick-up. Another phase of tight liquidity during the East Asian crisis led to increased market activity in this segment.

Chart III.8: Certificates of Deposit



Subsequently, the outstanding amount declined to Rs.949 crore during 2001-02, reflecting the state of easy liquidity on account of large capital inflows. The average outstanding amount of CDs increased again to Rs.64,814 crore during 2006-07 as banks continued to supplement their efforts at deposit mobilisation in order to support the sustained credit demand. Interest rates on CDs softened in recent years in line with other money market instruments, although there was some hardening during 2006-07 (Chart III.8).

Volatility in Money Market Segments

3.126 An analysis of the trends in interest rates across the various instruments in the money market brings out the following salient features. First, since the introduction of reforms, all money market rates have witnessed considerable softening commensurate with the progressive reduction in inflation, reflecting lower inflation expectations. Softening of interest rates has also been on account of several other factors such as the deepening of the market through establishment of appropriate market intermediaries, increase in the number of participants, prevalence of comfortable liquidity conditions arising out of large capital inflows and a distinct policy preference for a softer interest rate regime. The volatility in call money rates has reduced after the introduction of LAF and the setting up of an informal corridor of reverse repo and repo rates (Table 3.5). The stability in the overnight money market was further facilitated by introduction of new instruments such as market repo and CBLO. Increased stability in

Table 3.5: Volatility in Money Market Rates

Item	April 1993-March 1996	April 1996-March 2000	April 2000-March 2007
1	2	3	4
Call Money			
Average (Per cent)	11.1	8.0	6.3
SD	6.7	3.7	1.9
CV	0.6	0.5	0.3
Commercial Paper			
Average (Per cent)	13.4	11.7	7.8
SD	2.6	2.2	1.8
CV	0.2	0.2	0.2
Certificates of Deposit			
Average (Per cent)	12.2	11.6	6.9
SD	2.2	2.4	1.7
CV	0.2	0.2	0.2
Term Money @			
Average (Per cent)	–	–	6.5
SD	–	–	1.4
CV	–	–	0.2
Market Repo*			
Average (Per cent)	–	–	5.4
SD	–	–	1.1
CV	–	–	0.2
CBLO*			
Average (Per cent)	–	–	5.3
SD	–	–	1.1
CV	–	–	0.2

@ : For the period May 2001 to March 2007.
* : For the period April 2004-March 2007.
SD : Standard Deviation. CV : Coefficient of Variation.
Note: Calculated on monthly average data.

call rates and various other reforms have also imparted a degree of stability to other market instruments such as CPs and CDs. The lower volatility is in consonance with the Reserve Bank's emphasis on financial stability as a key consideration of monetary policy.

Interest Rate Derivatives

3.127 Interest rate deregulation has made financial market operations relatively efficient and cost effective but has also exposed market participants to various risks. This necessitated introduction of derivative instruments to manage these risks through unbundling of risks. The derivative contracts can be traded either over-the-counter (OTC) or in stock exchanges (exchange-traded). OTC contracts are traded directly between two eligible parties, with or without the use of an intermediary and without going through the stock exchanges. On the other hand, exchange-traded (ET) derivatives are transacted in stock exchanges as standardised products through screen-based trading.

3.128 Derivative trading in India witnessed some activity from July 1999 when the Reserve Bank allowed scheduled commercial banks (excluding Regional Rural Banks), PDs and all-India financial institutions to undertake Forward Rate Agreements (FRA)/Interest Rate Swaps (IRS) for managing interest rate risks in their balance sheets. In order to widen the market, mutual funds were allowed to participate for the purpose of hedging their own balance sheet risks from November 1999. The use of 'interest rate implied in the foreign exchange forward market' as a benchmark, in addition to the domestic money and debt market rates, was permitted from April 2000. The activity gathered momentum after exchange-traded derivatives by way of futures were introduced in Mumbai Stock Exchange (BSE) and National Stock Exchange (NSE) from June 2000.

3.129 Initially, banks/PDs/FIs were permitted to undertake different kinds of plain vanilla products such as FRAs/IRS with tenors ranging from one month to one year. The Foreign Exchange Management Act (FEMA), 2000 permitted banks to provide risk management tools such as swaps, options, caps, collars and FRAs to clients to hedge interest rate risk arising out of foreign currency liabilities. Even though the derivative transactions have grown significantly in recent years, the market is essentially one of vanilla products. Active participants in the market are also limited, mainly some foreign and private sector banks, PDs and all-India financial institutions. The Reserve Bank allowed banks and PDs to transact in exchange traded interest rate futures (IRFs) from June 2003 to hedge their interest rate risk effectively. While PDs were allowed to hold trading as well as hedging positions in IRFs, banks were allowed only to hedge their underlying government securities [in available for sale (AFS) /held for trading (HFT) category portfolios] through IRFs. The National Stock Exchange (NSE) introduced futures on a notional 10-year government security, a 3-month Treasury Bill rate and a 10-year government zero coupon in June 2003. Activity in the IRF market has, however, not picked up because of valuation problems as also because banks have been allowed only to hedge but not to trade.

3.130 Innovations in OTC derivatives have been limited due to several structural shortcomings, including lack of clear accounting and disclosure standards, lack of adequate knowledge of uses and risks inherent in derivative transactions, particularly those involving complex structures, legal uncertainties surrounding the use of OTC derivatives and uncertainties about regulations with regard to certain complex products. To address these issues, the Reserve Bank constituted a number of working groups.

3.131 The Working Group on Rupee Derivatives (Chairman: Shri Jaspal Bindra), which submitted its Report in January 2003, was set up to suggest the modalities for introducing derivatives having explicit option features such as caps/collars/floors in the rupee derivative segment and also the norms for capital adequacy, exposure limits, swap position, asset liability management, internal control and other risk management methods for these derivatives. Recognising the ambiguity regarding the legality of the OTC derivative contracts as the main factor inhibiting their growth, the Group proposed appropriate amendments in the Reserve Bank of India Act, 1934 to provide legality to OTC derivatives. Accordingly, the Union Budget, 2005-06 proposed to take measures to provide clear legal validity to such contracts. The Reserve Bank of India Act, 1934 has since been amended, which now provides legal sanctity to OTC derivatives if at least one of the parties to the transaction is the Reserve Bank or any agency falling under its regulatory purview.

3.132 The Internal Working Group on Rupee Interest Rate Derivatives (Chairman: Shri G. Padmanabhan) recommended the harmonisation of regulations between OTC interest rate derivatives and ET interest rate derivatives. It also recommended that banks that have adequate internal risk management and control systems and a robust operational framework be permitted to hold trading positions in the interest rate futures (IRF) market. The Securities and Exchange Board of India (SEBI) revisited the issue pertaining to introduction of new futures contracts in consultation with the Fixed Income Money Market and Derivatives Association of India (FIMMDA) and permitted trading of interest rate futures contract on an underlying 10-year coupon-bearing notional bond from January 5, 2004. The Reserve Bank released comprehensive draft guidelines in December 2006 on derivatives covering broad generic principles for undertaking derivative transactions, management of risk and sound corporate governance requirements.

3.133 Reflecting these measures, the rupee derivative market has grown significantly. FRAs/IRS transactions, in terms of outstanding notional principal amount, rose from Rs.4,249 crore in March 2000 to Rs.21,94,637 crore at end-March 2006.

(ii) Interest Rate Swaps

3.134 In the interest rate swap market, apart from increase in volumes, the market also witnessed emergence of interest rate benchmarks such as Mumbai Inter-Bank Offered Rate (MIBOR), the Mumbai Inter-Bank Forward Offered Rate (MIFOR) (which is a combination of the MIBOR and forward premium) and other multiple benchmarks, which essentially have linkages to the movement in overseas interest rates. MIBOR linked short-term paper up to 365 days, with/without daily call/put options, has emerged as an important instrument which enables top rated corporates to raise funds from non-bank entities, particularly from mutual funds.

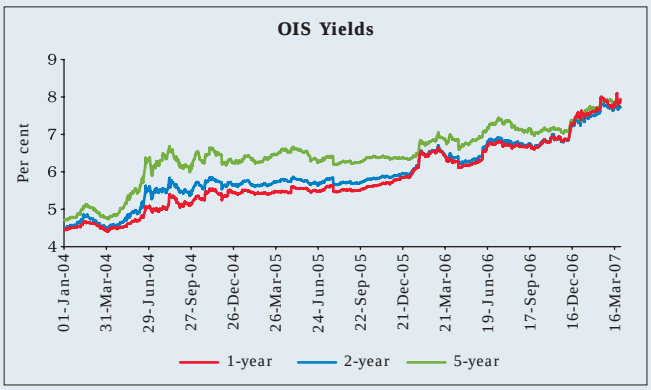
3.135 Overnight Index Swaps (OIS) help in managing interest rate risk by converting fixed rate receivables to floating and *vice versa* without taking credit risk as this tool is built on a notional principal. Banks can use this instrument to effectively manage their liquidity by converting their fixed term deposits into floating rate. This instrument is also used for asset liability management and as a positioning tool for putting on carry trades. MIFOR swaps, on the other hand, are used to hedge interest rate risk as well as currency risk by an entity which has exposure to foreign currency borrowing by taking an opposite position in MIFOR swap.

3.136 The 5-year OIS yields rose considerably from around 4.70 per cent in the beginning of January 2004 to about 7.90 per cent on March 28, 2007. The OIS curve steepened during the period from January 2004 to October 2004 with spreads between 1 year and 5 year tenors increasing from 26 basis points (bps) to 140 bps, but later flattened to reach 22 bps by December 8, 2006. Inversion of the curve was observed with the spread turning negative intermittently between the last week of December 2006 to third week of March 2007. OIS yields are positively correlated to the government securities (G-Sec) yields. For most part of 2004, OIS curve was above the G-sec curve as it priced in expectations of a turnaround in interest rate cycle. In the absence of short selling, G-Sec markets were unable to price these expectations effectively. Subsequently, as G-Sec markets reacted to the rising interest rate scenario, the G-Sec yields edged above the OIS curve (Chart III.9). The OIS curve remaining below the G-Sec curve for a sustained period of time was probably a reflection of the liquidity conditions as swap curves normally stay above the Treasury curve. Thus, during situations of tight liquidity, the OIS - G-Sec spread tends to be narrow.

MIFOR (Mumbai Inter-Bank Forward Offered Rate) Swaps

3.137 The yields on MIFOR swaps have risen during the last three years in line with the general increase in interest rates. The 5-year MIFOR swap rate increased from 3.85 per cent at the beginning of January 2004 to 8.16 per cent on March 28, 2007. The MIFOR curve flattened with the 1-year to 5-year spreads steadily declining from a high of 200 bps in the beginning of January 2004 before turning negative from December 2006 to March 2007, it touched (-) 119 bps on March 28, 2007. The MIFOR curve has remained consistently below the G-Sec curve during last three years except from June to August 2004. This was mainly for the reason that MIFOR curve is influenced largely by the implied rupee interest rates in the forward premia, which, in the absence of covered interest parity, tend to diverge from interest rate differential. Between mid-November 2006 and the third week of March 2007, the MIFOR curve was above the G-Sec curve. Five-year MIFOR was above

Chart III.9: OIS and G-Sec Yields



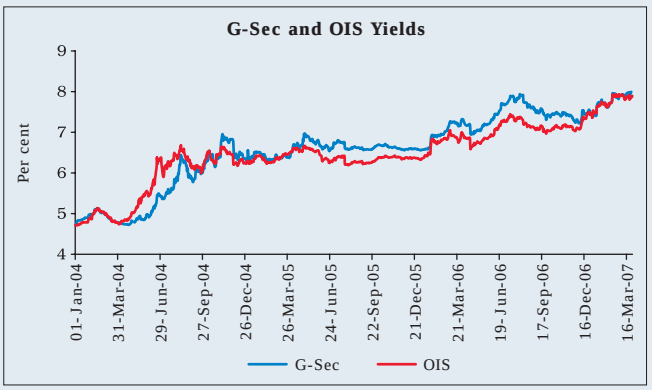
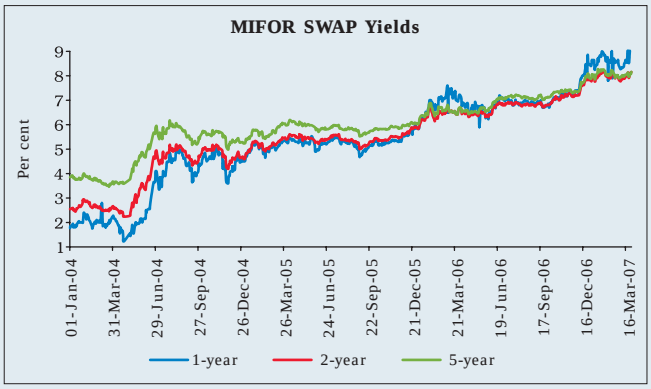
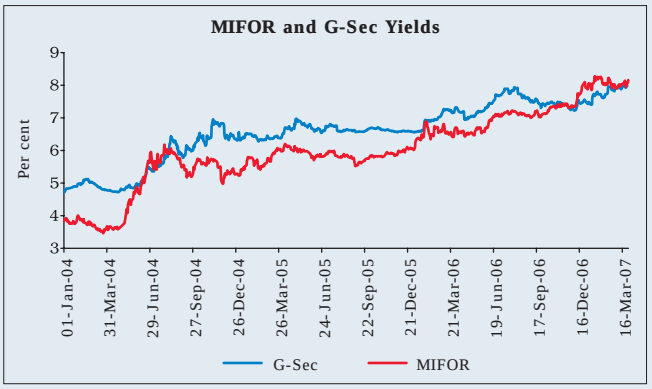


Chart III.10: MIFOR SWAP and G-Sec Yields



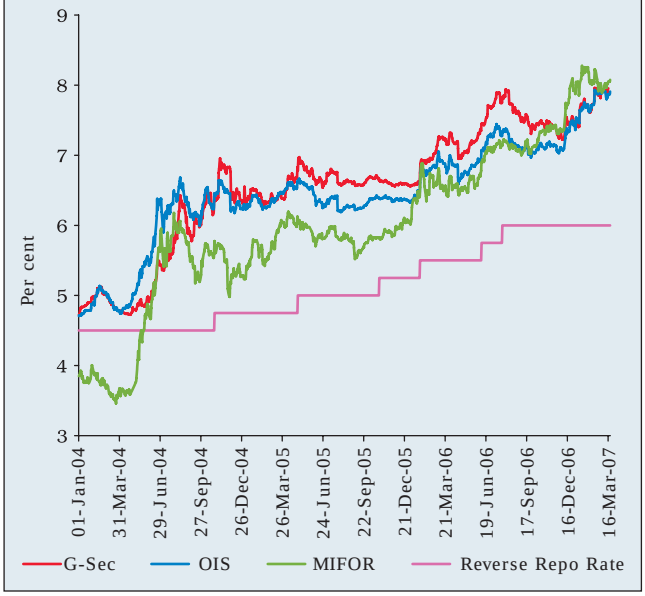


G-Sec of corresponding tenor by 53 bps as on January 29, 2007 and 28 bps as on February 12, 2007, as forward premia moved up sharply during this period (Chart III.10).

Monetary Policy and Swap Rates

3.138 Swap rates generally move in tandem with G-sec yields. Accordingly, whenever there was a hike in the policy rate, all swap rates, *viz.,* OIS and MIFOR generally reacted similarly (Chart III.11). The only exception was on October 25, 2005, when swap rates did not react to the hike in reverse repo rate by 25 bps to 5.25 per cent. This was mainly due to market participants refraining from taking firm positions since the Bank Rate was left unchanged. Furthermore, the market did not perceive the hike in the repo rate by 25 bps on October 31, 2006 as tightening of monetary policy stance as the reverse repo rate was left unchanged.

Chart III.11: Monetary Policy and Swap Rates



3.139 While the introduction of new instruments, including derivatives, has deepened the money market, the market is still not mature enough for complex products. With fuller capital account convertibility the market participants would be exposed to certain risks. Therefore, the further development of hedging instruments such as interest rate futures assumes critical importance. Effective risk management by market participants also calls for access initially to a liquid IRF market and eventually to an interest rate options market, which, in turn, would increase liquidity in the government securities market. As demand for complex derivate products grows over time, there would be a need for banks to lay down appropriate policies for marketing such products to their clients and put in place a mechanism for close monitoring and stricter regulations.

Other Money Market Segments

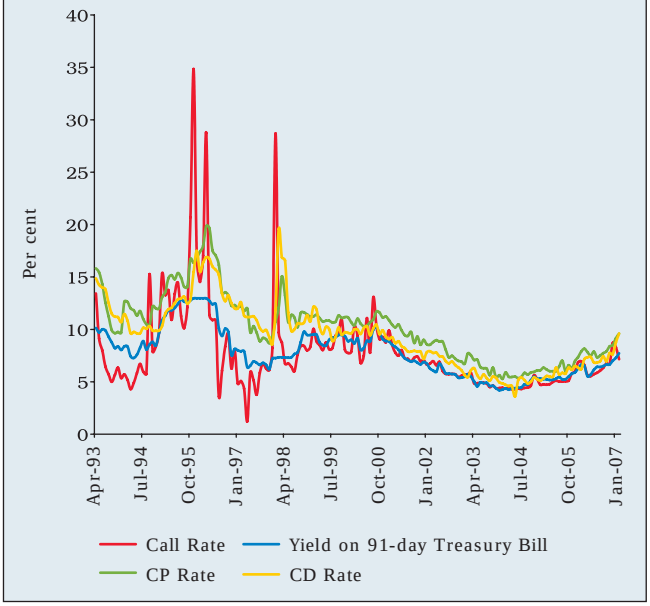
(a) Inter-Bank Participation Certificates (IBPCs)

3.140 As an additional instrument for modulating short-term liquidity within the banking system, it was decided, in principle, to introduce two types of participation certificates (PCs) in October 1988 - one on risk sharing basis and the other without risk sharing. These were made strictly inter-bank instruments confined to scheduled commercial banks, excluding regional rural banks. PCs, however, have not been used widely so far. These instruments are used only to obviate short-term liquidity problems by some banks by parting with standard assets. At times, these assets are also used to equilibrate priority sector norms by banks.

(b) Money Market Mutual Funds (MMMFs)

3.141 Money market mutual funds were introduced in India in April 1991 to provide an additional short-term avenue to investors and to bring money market instruments within the reach of individuals. A detailed scheme of MMMFs was announced by the Reserve Bank in April 1992. The portfolio of MMMFs consists of short-term money market instruments. Investments in such funds provide an opportunity to investors to obtain a yield close to short-term money market rates coupled with adequate liquidity. The Reserve Bank has made several modifications in the scheme to make it more flexible and attractive to banks and financial institutions. In October 1997, MMMFs were permitted to invest in rated corporate bonds and debentures with a residual maturity of up to one year, within the ceiling existing for CPs. The minimum lock-in period was also reduced gradually to 15 days, making the scheme more attractive to investors.

Chart III.12: Money Market Rates



Market Integration

3.142 The success of monetary policy depends on the speed of adjustment in money market rates in response to changes in the policy rates for effective transmission of monetary policy impulses to the economy. This, in turn, depends on the development and integration of various market segments. In line with the progress of financial sector reforms in India, various segments of the money market are getting increasingly integrated as reflected in the close co-movement of rates in various segments. The structure of returns across markets has shown greater convergence after the introduction of LAF, differentiated by maturity, liquidity and risk of instruments (Chart III.12).

3.143 Strengthening of linkages amongst market segments suggests greater operational efficiency of markets as well as the conduct of monetary policy. On the flip side, however, increased integration has resulted in increased contagion as turbulence originating in one market segment is swiftly transmitted across all segments. Recent experience of financial market operations in various countries suggests that market integration tends to strengthen during episodes of volatility, pointing to a swifter transmission of market pressures from one segment to another. This imposes additional constraints on the management of market conditions necessitating simultaneous policy actions in various market segments to limit contagion in the presence of asymmetric integration of markets. The monetary policy reaction has been in terms of a combination of instruments, including regulatory action, to ensure the rapid restoration of stability in financial markets. In this regard, the Reserve Bank has been able to maintain orderly market conditions in recent years amidst heightened volatility in international financial markets (see also Chapter VIII).

Risk Management

3.144 The money market is characterised by various risks, *viz.*, default risk, interest rate risk, exchange rate risk and settlement risk. Given the increasing market orientation of monetary policy in India, greater flexibility provided to banks and the focus on interest rates as the main policy instrument, sound risk management is critical for orderly market behaviour and overall financial stability. Accordingly, the Reserve Bank has been laying greater emphasis on developing efficient risk management practices by market participants.

3.145 A potential source of default risk in the money market emanates from the uncollateralised nature of the call money market. In this market, transactions are traditionally undertaken over the counter through telephonic deals, which lack standardisation and guarantee of settlement against default. This problem has been addressed by mandatory reporting of the deals by the participants in an electronic platform. Moreover, a screen based quote driven system (NDS-CALL) has been developed by the CCIL on behalf of the Reserve Bank for greater transparency and price

discovery in the call/notice and the term money markets. Furthermore, as large recourse to the uncollateralised money market segment carries a potential risk of systemic instability arising out of defaults, prudential limits have been placed on call money exposures of banks and PDs. Moreover, non-bank participants with a distinctly different maturity profile of sources and uses of funds have been allowed to migrate from the call money segment to the collateralised segments (market repos and CBLOs). The shifting of non-banks to the collateralised segment has enhanced financial stability by reducing systemic risks. Besides, it has also promoted better asset-liability management on the part of banks. Cumulatively, these measures have resulted in the dominance of the collateralised segment in the overnight money market.

3.146 In view of the growing inter-linkages between the money and the foreign exchange markets on the one hand, and greater integration of the domestic market with global markets on the other, it is necessary that the market participants appropriately hedge the risks in their balance sheets emanating from movements in both international interest rates and exchange rates. In this regard, the Reserve Bank has introduced derivative instruments such as FRAs/ IRS/IRFs for hedging exposures. Although derivatives facilitate risk management, they, being highly leveraged, are more volatile than the underlying assets. This calls for monitoring and regulation of speculative derivative positions. The Reserve Bank, therefore, has been emphasising monitoring and regulation of derivative transactions.

3.147 The institutionalisation of a central counterparty in the form of Clearing Corporation of India (CCIL) from 2002, which guarantees settlement of transactions, has facilitated the mitigation of settlement risks and prevention of gridlock in the financial system arising out of bunching of transactions. The introduction of RTGS has further mitigated the settlement risk and the occurrence of gridlock.

VI. THE WAY FORWARD

3.148 Wide-ranging reforms have been undertaken to develop the money market and strengthen its role in the transmission mechanism of monetary policy. Three major considerations that have guided rationalisation of the structure in the money market are: (i) ensuring balanced development of various constituents of the money market, especially the growth of the collateralised market *vis-a-vis* the uncollateralised market; (ii) preserving integrity and transparency of the money market by ensuring better disclosure of information; and (iii) rationalising various classes of participants across different market segments in order to strengthen the efficacy of the LAF of the Reserve Bank. As a result of various reform measures, the money market in India has undergone significant transformation in terms of volume, number of instruments and participants, and adoption of risk management practices. There are, however, still a number of concerns as well as issues that need to be addressed to enable it to play a more effective role, especially in the wake of move towards fuller capital account convertibility. These issues broadly relate to market development and liquidity management.

Market Development

Greater Flexibility for Participants in the Call Money Market

3.149 In view of the transformation of the call money market into a pure inter-bank market, there is a need to consider greater flexibility to banks and PDs to borrow or lend in this market, provided they have put in place appropriate risk management systems which would address the asset-liability mismatches in their balance sheets. In this context, banks have already started operating in an environment that requires greater harmonisation between sources and deployment of funds for asset-liability management (ALM) purposes. Direct regulation in the form of prudential limits on borrowing and lending eventually would need to graduate to a system, where such limits are taken care of by banks' own internal systems of ALM framework. This would correct large mismatches between sources and uses of funds by banks and thereby help the Reserve Bank in the proper assessment of market conditions for the conduct of its liquidity management operations. There is also, at the same time, a greater need for closely monitoring the movements of call money rates.

Extension of the Repo Market

3.150 It has been the endeavour of the Reserve Bank to develop the repo market not only for easing pressure from the uncollateralised call money market but also to facilitate the emergence of a short-term rupee yield curve for pricing fixed income securities. At present, only Central and State Governments securities are eligible for market repo. However, State Government securities do not have wider acceptability as there are hardly any repo operations based on them. As the fixed income money market has been overwhelmingly dependent upon Central Government

securities, there is a need to consider broad-basing the pool of eligible securities. In this context, fully dematerialised corporate bonds with internationally accepted accounting practices could eventually be considered as eligible collaterals. The development of a proper settlement system for such instruments would be a prior necessity for progress in this process. There is also a need to exercise caution to ensure that only highly rated instruments qualify for such a facility. This is critical from the point of view of preserving market integrity. In future, the growth of market repo will be driven by the "short selling" activity in the government securities market as a repoed security can now be delivered up to five days in view of the recent changes in the regulations governing short sales.

Development of a Vibrant Term Money Market

3.151 The term money market has not developed for several reasons, as discussed in detail earlier. One of the major reasons for this is that market participants have been unable to take a long-term view of interest rates despite availability of Treasury Bills of varying maturities and a reasonably developed swap market. In order to enable market participants to take a long-term view on interest rates, it is imperative that the ALM framework is strengthened and greater flexibility is allowed to the personnel managing treasury operations in banks. The skewness in liquidity in the money market in terms of chronic lenders and borrowers would get corrected as banks develop better ALM systems. The development of the term money market is vital for strengthening proper linkages between the foreign exchange market and the domestic currency market, which, in turn, would provide an impetus to the derivative segment.

Relook at Inter-Bank Participation Certificates

3.152 Inter-Bank Participation Certificates, which can be used for evening out short-term liquidity mismatches by banks, were introduced in October 1988 in order to infuse greater degree of flexibility in their credit portfolios. In view of rapid credit growth in recent years, interest in IBPCs has again arisen. In this context, since considerable time has elapsed since the guidelines on the scheme of IBPCs were issued, the IBPC scheme with respect to duration, quantum in terms of the proportion to the loan amount, eligible participants and transferability of IBPCs needs a thorough review. Depending on the results of such a review, extending the use of this instrument could also facilitate the asset liability management by banks, improve day-to-day liquidity management and help develop a market for credit risk transfer instruments between banks.

Issues Pertaining to CP

3.153 Despite the de-linking of issuance from fund-based working capital limits and complete dematerialisation of CP issuances, the CP market continues to lack the desired level of activity. In terms of extant guidelines, only companies rated P-1 or P-2 by CRISIL or such equivalent rating by other agencies, can issue CP. As the market attains a reasonable level of maturity while the rating criterion may continue, the requirement of rating for issuing CP could be made more flexible so that a more structured market is available to investors depending on their risk appetite.

Futures on Policy Linked Interest Rates

3.154 Going forward, an Indian variant of the Federal Funds Futures on interest rates linked to the Reserve Bank's key policy rates may emerge. Trading in the futures market would reveal important information about market expectation on the future course of monetary policy. For instance, the trading of the Federal Funds Futures provides key information to the Federal Open Market Committee (FOMC) in the US in formulating its monetary policy.

Promoting Financial Stability

3.155 Default risk in the money market has the potential to create a contagion in the financial markets and, therefore, needs to be mitigated. In this regard, experiences of developed economies show that generally the self-regulatory organisations (SROs) regulate activities of participants in the money market in terms of their capital adequacy and conduct of business. Also, default resolution in most of these markets is undertaken through the Contract Law and the Bankruptcy Law. In view of international experience, there may be a case for empowering a suitable self-regulatory organisation appropriately to act as a catalyst for the development of market microstructure.

3.156 One of the fundamental forces that could contribute to more organic integration across various segments of the financial market is the technological upgradation of the payment and settlement system. The accomplishment of virtual Public Debt Office (PDO) and Deposit Accounts Department (DAD) at the Reserve Bank, coupled with the operationalisation of the centralised funds management system (CFMS)

in a relatively low CRR regime should foster greater integration of various segments of the domestic market. While these developments could enhance the efficiency of the financial market, there is also the risk of faster transmission of contagion. Therefore, risk containment in the new environment would be a major challenge for the Reserve Bank and it would have to remain flexible in the deployment of its instruments while simultaneously intervening in various market segments in order to strengthen financial stability.

Liquidity Management

3.157 Although significant progress has been made in refining the liquidity management practices in India, several new challenges have emerged. First, during periods of abundant liquidity, the LAF window becomes a first resort for parking surplus funds by banks. Second, the Reserve Bank has developed the MSS as a sterilisation mechanism for arresting the liquidity impact of foreign exchange inflows of a more enduring nature, while the LAF continues to be used for managing liquidity at the margin. There is, however, no way of knowing *ex-ante* whether the liquidity situation is temporary or permanent. Furthermore, the MSS remains immobilised for the entire period of its maturity. There is, therefore, a need to explore further instruments/options to undertake liquidity management, particularly in the context of a move to fuller capital account convertibility. Third, the Reserve Bank may not be in a position to conduct sterilisation operations indefinitely as its inventory of Government paper is limited. There is also a limit on MSS issuances. Furthermore, the Reserve Bank has withdrawn from primary market auctions of Government paper from April 1, 2006 in terms of provisions of the Fiscal Responsibility and Budget Management (FRBM) Act, 2003. Fourth, the absence of a vibrant corporate debt market continues to impede further refinements in liquidity management in terms of eligible instruments as collaterals. In this context, it may be noted that State Development Loans, which are treated as eligible securities for collaterals under LAF operations effective April 3, 2007, have widened the collateral base for LAF. Fifth, as many banks are now operating close to the prescribed levels of SLR securities, in case of liquidity tightness, banks may find it difficult to approach the LAF window in the absence of sufficient collateral securities. Sixth, while the Reserve Bank now holds LAF auctions twice on each working day to facilitate intra-day liquidity, a moral hazard issue arises as some market participants may not be actively managing their own liquidity in the wake of the Reserve Bank's market operations.

3.158 The above issues need to be addressed, especially in the wake of a progressive move to fuller capital account convertibility. First, there is a need to further refine the system of assessing liquidity conditions, which calls for an improved framework of liquidity forecasting. The short span within which liquidity conditions have been changing by a large amount has posed a major challenge for targeting short-term interest rates. The understanding of the fiscal position and the Government's cash balances as also the timing and extent of capital inflows assumes added significance. In this context, there may be a need to consider the regular release of information on Government cash balances held with the Reserve Bank. Second, progressively more weightage needs to be given to movements in international interest rates in view of increased capital mobility. Third, destabilising large and sudden capital flows call for more flexible and swift monetary policy responses through small and gradual changes in policy rates, as has been practised in recent years, as large changes can be disruptive. Fourth, open market operations (OMOs), apart from being used for modulating liquidity conditions, could also be used to correct any serious distortions in the yield curve. Finally, while the Reserve Bank has progressively deemphasised the use of reserve requirements as an instrument of monetary policy, given the present state of market development, it is necessary to retain the flexibility of using reserve requirements, as and when necessary[12].

VII. SUMMING UP

3.159 Since the early 1990s, the 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. The transformation has been facilitated by the Reserve Bank's policy initiatives as also by a shift in the monetary policy operating procedures from administered and direct to indirect market-based

[12] The provisions of Section 3 of the Reserve Bank of India (Amendment) Act, 2006 came into force effective April 1, 2007, which provide the necessary flexibility to the Reserve Bank in the use of the CRR.

instruments of monetary management. The changes in the money market structure and monetary policy operating procedures in India have been broadly in step with the international experience and best practices.

3.160 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. The increasing financial innovations in the wake of greater openness of the economy necessitated the transition from monetary targeting to a multiple indicator approach with greater emphasis on rate channels for monetary policy formulation. Accordingly, short-term interest rates have emerged as a key instrument of monetary policy since the introduction of LAF, which has become the principal mechanism of modulating liquidity conditions on a daily basis.

3.161 In line with the shifts in policy emphasis, various segments of the money market have been developed. The call money market was transformed into a pure inter-bank market, while other money market instruments such as market repo and CBLO were developed to provide avenues to non-banks for managing their short-term liquidity mismatches. Furthermore, issuance norms and maturity profiles of other money market instruments such as CPs and CDs were aligned for effective transmission of policy intent across various segments. The abolition of *ad hoc* Treasury Bills and introduction of Treasury Bills auction have led to the emergence of a risk free rate, which acts as a benchmark for pricing other money market instruments. The increased market orientation of monetary policy and greater integration of domestic markets with global financial markets, however, have necessitated the development of an institutional framework for appropriate risk management practices. Accordingly, the Reserve Bank's emphasis has been on encouraging migration towards the collateralised segments and developing derivatives for hedging market risks. This has been complemented by the institutionalisation of CCIL as a central counterparty to mitigate the settlement risk. The upgradation of payment technologies has further enabled market participants to improve their asset liability management. Cumulatively, these measures have helped in containing volatility in the money market, thereby improving the signalling mechanism of monetary policy while ensuring financial stability.

3.162 Notwithstanding the considerable progress made so far, there is a need to develop the money market further, particularly in the context of a move towards fuller capital account convertibility. Further development of the money market calls for better ALM practices by banks and other market participants, which would enable banks to evolve appropriate prudential limits on their call money exposures from their internal control systems. In order to develop the term money market, participants need to take a long-term view on interest rates. Furthermore, there is a need to expand the eligible set of underlying collateral securities for repo transactions. This would not only facilitate liquidity management but also promote the development of underlying debt instruments. Finally, liquidity forecasting techniques need to be further refined for proper assessment of liquidity conditions by the Reserve Bank. This would facilitate finer changes in the operating procedures of liquidity management and enable the Reserve Bank to flexibly meet the emerging challenges. As these developments take place, it needs to be understood that monetary management in India will continue to be conducted in an intermediate regime that will have to respond creatively and carefully to the emerging and evolving monetary and macroeconomic conditions, both domestic and global.

ANNEX III.1: Operating Procedures of Liquidity Management in Developed Countries

Country	Objective	Intermediate / Operating Target	Key Policy Indicators	Key Instruments of Discretionary Liquidity					Frequency of Market Operations	Eligible Counterparties	Eligible Collateral
				CRR	OMO	Repo	Standing Facilities	Others			
1	2	3	4	5	6	7	8	9	10	11	12
USA	To promote maximum sustainable output, employment & stable prices	Federal funds rate	Multiple indicators of current & prospective economic developments.	Yes	Yes	Yes	Yes		Daily	Primary dealers	Direct obligations of the Govt. or those fully guranteed by Federal Govt. agencies & corporate bonds.
UK	Price stability	Overnight market interest rate consistent with Bank Rate	Monetary and credit aggregates, developments in interest rates, *etc.*	Yes*	Yes	Yes	Yes		One per week *plus* one per month (long-term repos)	Eligible UK banks, building societies & securities dealers.	UK and EEA Govt. & major international organisations' bonds (Sterling and Euro).
ECB	Price stability, high level of employment, balanced & sustainable development	No official operating target@	Money & broad assessment of outlook for price developments & the risks to price stability using financial & other economic indicators.	Yes	Yes	Yes	Yes		One per week *plus* one per month on a regular basis	Credit institutions meeting certain operational requirements, mutual funds, corporations, insurance companies & other institutional investors.	Both marketable & non-marketable private & public instruments.
Japan	Price stability & to contribute to the sound development of national economy	Overnight call money rate	Overall economic & financial indicators- wholesale prices, corporate service prices & money stock.	Yes	Yes	Yes	Yes		More than one per day	Major players: domestically licensed banks, foreign banks and securities companies & money market brokers.	Both public debts such as JGBs & private debts such as CPs & bank loans.
Australia	Mainly price stability besides, maintenance of full employment, economic prosperity & welfare	Cash rate	Inflation & growth prospects, money & credit conditions.		Yes	Yes	Yes		Daily	Any member of Reserve Bank Information & Transfer System- large domestic banks, few large non- bank financial institutions & local branches of some global banks.	Commonwealth govt. securities, domestic debt securities & discount instruments issued by State & territorial Govt., bank bills & CDs issued by select banks, securities of supranational & foreign Govt. agencies having Govt. gurantee.
New Zealand	Price stability	Official cash rate	GDP, output gap, business cycle indicators.		Yes	Yes	Yes		Daily	Those parties who have entered Master Repurchase Agreement with the Reserve Bank.	Govt. securities
Canada	Low and stable inflation	Overnight rate	Output gap & wide range of indicators in various markets.			Yes	Yes		Twice a day	Primary dealers	Securities issued & guaranteed by the Govt. of Canada & the provincial Govt., bankers' acceptances, promissory notes, CPs, short-term muncipal paper, corporate & muncipal bonds with minimum issuer credit ratings.

* : Voluntary reserves averaging scheme with reserves remunerated at the Bank Rate provided on average they fall within + or - 1% of targets set by scheme.

@ : The ECB sets three key interest rates for the euro area, which determine the stance of the ECB's monetary policy. These include interest rates on the main refinancing operations, the marginal lending facility and the deposit facility.

Source: Websites of respective central banks and Hawkins. J (2005).

ANNEX III.2: Operating Procedures of Liquidity Management in Emerging Market Economies

Country	Objective	Intermediate / Operating Target	Key Policy Indicators	Key Instruments of Discretionary Liquidity					Frequency of Market Operations	Eligible Counterparties	Eligible Collateral
				CRR	OMO	Repo	Standing Facilities	Others			
1	2	3	4	5	6	7	8	9	10	11	12
Russia	Stability of currency & settlement system	Monetary base		Yes	Yes	Yes		Bank of Russia Bonds & currency swaps	Daily & weekly	For loans: financially sound credit institutions complying with the regulatory requirements and having accounts in 22 Bank of Russia regional branches. For deposits: banks, settlement non-bank credit institutions conducting deposit and lending operations.	Bank of Russia Lombard List of Securities, promissory notes and rights of claim under loan agreements, Federal & Regional Govt. bonds, Bank of Russia & credit institutions' bonds, mortgage backed bonds, resident corporate bonds, bonds of international financial organisations.
South Africa	Price stability	Repurchase rate	Multiple indicators- money, credit, international interest rates, yield curve, output gap, asset prices, BOP position, exchange rate, *etc.*	Yes	Yes	Yes	Yes	Foreign currency swaps	Daily	Banking institutions, which have signed ISDA/ISMA agreement.	All Central govt. securities, Reserve Bank Bills & land bank bills.
Mexico	Price stability	Bank reserves	Money & monetary base, inflation indicators, employment, exchange rate & Balance of Payments.	Yes	Yes	Yes	Yes		Daily		
China	Stability of the currency & thereby promote economic growth	Money supply/ excess reserves		Yes	Yes	Yes	Yes	Policy oriented financial bonds & central bank bonds	1 or 2 per week	21 commercial banks & bills finance companies.	Eligible bills, bankers' acceptances, trade acceptances & promisory notes collateralised against T-bills.
India	**Growth, price and financial stability**	**Overnight rate**	**Multiple indicators: broad money, interest rates, data on currency, credit, fiscal position, trade, capital flows, inflation rate, exchange rate, ouput data, *etc.***	**Yes**	**Yes**	**Yes#**	**Yes**	**Market Stabilisation Scheme**	**Twice a day-Repo**	**LAF: banks and primary dealers MSS: banks, primary dealers, all-India financial institutions & others.**	**Central Govt. Securities & State Development Loans.**
Thailand	Price stability	Repurchase rate (14-day)		Yes	Yes	Yes	Yes	Issuance of Bank of Thailand Bonds & foreign currency swaps	Daily	Primary dealers, commercial banks, finance companies, finance & securities companies & specialised financial institutions.	Public debt securities - Govt. bonds, T-bills, FIDF bonds & Govt. guaranteed State enterprise bonds & BOT bonds.
Indonesia	Price stability	Bank Indonesia Rate	Forecasts for inflation, economic growth, monetary aggregates & developments in economic & financial sector.	Yes	Yes	Yes	Yes	Bank of Indonesia Certificates	Daily		
Malaysia	Monetary & financial stability for growth	Overnight interest rate	Real interest rates, inflation & inflation indicators, asset prices, credit, money & potential output.	Yes	Yes	Yes	Yes	Bank Negara Bills	Twice a day	Primary dealers	Govt. securities for repo
Korea*	Price stability	Overnight call rate	Indicators of future inflation.	Yes	Yes	Yes	Yes	Liquidity adjustment loans and intra-day overdrafts	Weekly	Banks, merchant banks, investment trust and securities companies.	Credit securities (including bills eligible for discount), Treasury bonds, Govt. guaranteed bonds, market stablisation bonds & land development bonds.
Singapore	Price stability as a sound basis for sustainable economic growth	Weighted exchange rate	Interest rates & forward forex rates.	Yes	Yes	Yes	Yes	Forex swaps & reverse swaps	Twice a day	Primary dealers, secondary dealers - banks, merchant banks & stock broking firms (in the case of repo only PDs).	Singapore govt. securities - T-bills, bonds and non-marketable SGS bonds.

* : Position reported as of 2003. # : Repo/reverse repo under Liquidity Adjustment Facility.

Source: Websites of respective Central banks and Hawkins. J (2005).

ANNEX III.3: Structure of Money Markets

Country	Instruments	Tenor	Major Participants
1	2	3	4
USA	Federal Funds	Mostly overnight (there are also long-term for few weeks)	Banks & other depository institutions.
	Discount window	Usually overnight	Banks & other depository institutions*
	Certificates of Deposit	Mostly 1-12 months (some have 5 years or more)	Banks (money centre banks & large regional banks)*
	Negotiable Certificates of Deposit	1-12 months	Well capitalised banks.
	Eurodollar CDs	Mostly 3-6 months (some have long-term)	Banks (foreign branches of US banks or foreign banks located abroad)*. These are sold to brokers, investment banks, institutional investors, & large corporations.
	Eurodollar Time Deposits	Overnight, 1-week, 1-6 months & longer	Banks*
	Repurchase Agreements	Short-term: overnight or a few days Longer-term: 1, 2, 3-weeks & 1, 2, 3, 6-months.	Banks, securities dealers, non-financial corporations & Governments (principal participants).
	Treasury Bills	4, 13 & 26-weeks (52-weeks bill suspended in 2001)	US Government & primary dealers.
	Municipal Notes	30-days to 1-year	State/ Local Governments.
	Commercial Paper	Mostly 270-days Average 30-days	Non-financial & financial businesses (corporations & foreign Governments)*.
	Bankers' Acceptances	Up to 270-days.	Non-financial & financial businesses (firms involved in imports & exports)*.
	Government-Sponsored Enterprise Securities · Discount Notes · Bonds	 30 to 360-days More than 1-year	Farm Credit System, Federal Home Loan Bank System & Federal National Mortgage Association*.
	Shares in Money Market Instruments · Money market mutual funds · Local Government Investment Pools	 Less than 90-days Average: 318-days (1-1044 days)	Money market mutual funds & Local Government Investment Pools.
	Futures Contracts	3-months	Dealers & banks*
	Options	Exercise at strike price on or before pre-arranged expiration date.	Dealers, banks & non-banks
	Interest Rate Swaps	Exchange of interest streames over the lives of underlying debt issues.	Dealers, banks & non-banks

* Principal borrower.

ANNEX III.3: Structure of Money Markets *(Contd.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
UK	Reserves Averaging	1-month between MPC decision dates	43 banks & building societies
	Standing Lending & Deposit Facilities	Overnight	More than 60 UK banks & building societies
	OMOs: Repurchase Agreements (Gilts, HM Government non-sterling marketable debt, Sterling Treasury Bills, Bank of England Euro Bills & Euro notes, eligible bank & local authority bills, Sterling denominated securities issued by European Economic Area, Central Governments & International institutions).	1-week at Bank Rate; 3, 6, 9, 12-months at market rates	43 UK banks, building societies & securities dealers.
	Treasury Bills		Issued by the Government.
	Bills of Exchange.		Issued by banks.
	Certificates of Deposit	Upto 1-year (Some have maturity over 1-year)	Issued by building societies & traded by banks & discount houses.
	Commercial Paper · Bank Acceptance · Trade Paper		Issued by Industry Traders
ECB@	Main refinancing operations	1-week	Counterparties: eligible credit institutions.
	Long-term refinancing operations (Tier-1 & Tier-2 assets)	3-months	
	Fine-tuning/structural reverse transactions (Tier-1 & Tier-2 assets)	Non-standardised	Eligible credit institutions.
	Fine-tuning/structural outright purchase (Only Tier-1 assets)	Non-standardised	
	Fine-tuning foreign exchange swap	Non-standardised	Eligible credit institutions.
	Marginal lending facility(Tier-1 & Tier-2 assets)	Overnight	Eligible credit institutions.
	Structural issuance of debt securities	Less than 12-months	Eligible credit institutions.
	Deposit facility	Overnight	Eligible credit institutions.
Japan	Call money market Short-term securities: · Commercial Paper · Certificates of Deposit · Treasury Bills		

@ Source : Blenck D, *et al*. (2001).

ANNEX III.3: Structure of Money Markets *(Contd.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
	Repurchase Agreements (Eligible collateral: Government bonds/ bills, Government guranteed bonds, municipal bonds, & foreign Government bonds, commercial bills, corporate bonds & asset backed securities)	1-week to 6-months	Counterparties: Banks, securities companies, securities finance companies, money market brokers (Tanshi companies).
	Non-collateralised market		City banks (borrowers), regional banks (lenders), investment trusts, trust banks, regional banks, *Keito*, life insurance companies, specialised money market brokers.
Australia	Outright transactions Government Securities: · Treasury Notes · Treasury Bonds · Treasury Indexed Bonds	 Of less than 18-months Of less than 18-months	 Issued by Commonwealth Governments.
	Semi-Government Securities: · Semi-Government Promissory Notes · Semi-Government Bonds · Semi-Government Indexed Bonds	 Of less than 18-months Of less than 18-months Of less than 18-months	Issued by State Government & Territory Central Borrowing Authorities.
	Repurchase Agreements Government Securities: · Treasury Notes · Treasury Bonds · Treasury Indexed Bonds		Issued by Commonwealth Governments.
	Semi-Government securities: · Semi-Government Promissory Notes · Semi-Government Bonds · Semi-Government Indexed Bonds		Issued by State Government & Territory Central Borrowing Authorities
	Domestic Securities		Issued by the foreign Sovereigns, Supranationals & Government Agency Securities.
	Accepted Bills of Exchange		Issued by eligible banks.
	Negotiable Certificates of Deposit		Issued by eligible banks.
Canada	Treasury Bills	1-month to 1-year	Issued by the Government of Canada.
	Money Market Strips	Up to 18-months	Issued by the Government of Canada.
	Government Guaranteed Commercial Paper	1-month to 1-year	Issued by the Crown Corporations such as Canadian Wheat Board, Federal Business Development Bank, *etc*.
	Treasury Bills & Promissory Notes	1-month to 1-year	Issued by the Provincial Governments
	Bankers' Acceptances	1-month to 1-year	Issued by the corporations (with an unconditional guarantee of a major Canadian chartered bank)
	Commercial Paper	1-month to 1-year	Major corporations.

ANNEX III.3: Structure of Money Markets *(Contd.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
Russia	Refinancing Mechanisms:		
	· Intra-day loans		Financially sound credit institutions complying with the regulatory requirements.
	· Overnight loans	1-working day	
	· Lombard loans	7 or 14-days	
	· Loans against collateral (Promissory Notes) & guarantees	Up to 180-days	Credit institutions having account in 22 Bank of Russia regional branches
	Repo operations:		
	· Government Bonds	Overnight, 3 & 6-months	
	· Federal Government Bills	6-months	
	· Bank of Russia Bonds	3 to 6-months	
	Securities accepted as Collateral for Bank of Russia loans:		
	· Regional Government Bonds		
	· Credit institutions' bonds		
	· Mortgage backed bonds		
	· Resident corporate bonds		
	· Bonds of international financial institutions		
	Currency swaps.		
	Deposit operations:		
	· Deposit operations at fixed rates	Daily (with overnight & 1-week)	Banks, settlement non-bank credit institutions & non bank credit institutions conducting deposit & lending operations.
	· Deposit operations at auction rates	Weekly (4-weeks & 3-months)	
China	Inter-bank lending instruments:	1, 7, 20, 30, 60, 90 & 120-days.	
	Repurchase Agreements or outright basis (OMOs) :		Participants in OMOs: Central Bank, large domestic commercial banks & other financial institutions approved by PBC.
	· Government Securities		
	· Negotiable Certificates of Deposit		
	· Commercial Paper		
	Discount Window		Participants in inter-bank market: All authorised commercial banks, trust & investment corporations, financial leasing companies, finance companies of business conglomerates, urban credit co-operatives, & rural credit co-operatives, securities companies, insurance companies, & financing intermediaries.
	Eligible bills:		
	· Bankers' Acceptances		
	· Trade Acceptances		
	· Promissory Notes		
India #	Call Money	Overnight	Scheduled commercial banks (excluding RRBs), co-operative banks, primary dealers (PDs), & till August 5, 2005 select all-India FIs, insurance companies & mutual funds.
	Notice Money	2 to 14-days	
	Term Money	15-days to 1-year	Banks, all-India financial institutions & PDs.

: Year in parentheses denote the year of introduction of the instrument.

ANNEX III.3: Structure of Money Markets *(Contd.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
	Certificates of Deposit (1989)	Minimum 7-days	Scheduled commercial banks (excluding RRBs & Local Area Banks) & select all-India financial institutions.
	Commercial Paper (1990)	Minimum 7-days	Corporates, all-India financial institutions & PDs.
	Forward Rate Agreements/ Interest Rate Swaps (1999)	Contracts are available for maturities upto 10-years.	Scheduled commercial banks, PDs & all-India financial institutions.
	Bills Rediscounting		Banks, PDs, select all-India financial institutions, insurance companies & mutual funds.
	Repurchase Agreements (1992)		
	· Market Repo	1-day to 1-year	Banks, PDs, all-India financial institutions, insurance companies, mutual funds & listed corporates.
	· RBI Repo (LAF)	1-day*	Banks and PDs.
	Treasury Bills	91, 182 & 364-days	Banks, PDs, financial institutions & other non-bank entities.
	Inter-bank Participation Certificates (1988)	91 to 180-days	Scheduled commercial banks.
	CBLO (2003)	1-day to 1-year	Scheduled commercial banks, Co-operative banks, PDs, select all-India financial institutions, insurance companies, mutual funds & other corporates.
Thailand	Repurchase Operations: · Government Bonds · Treasury Bills · Financial Institution Development Fund (FIDF) Bonds · Government Guaranteed State Enterprises' Bonds	1, 7, 14-days, 1, 2, 3 & 6-months	60 members: commercial banks, finance companies, finance & securities companies, & specialised financial institutions, FIDF.
	Bilateral Repurchase Operations	14-day	Bilateral primary dealers.
	Bank of Thailand (BOT) Bonds	12-months or less.	Commercial banks, specialised financial institutions, finance companies, finance & securities companies, Government pension fund, provident funds, mutual funds, social security office, life & non-life insurance companies & other institutions having current account at BOT.
	Foreign Exchange Swaps	Overnight up to 1-year (Typically concentrated on the short ends-up to 3-month)	Both onshore & offshore commercial banks.

* : The Reserve Bank retains the option to conduct longer term repo under the LAF depending on market conditions and other relevant factors.

ANNEX III.3: Structure of Money Markets *(Contd.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
	End-of-day Liquidity Window	Overnight	Commercial banks, finance companies, finance & securities companies & specialised financial institutions.
Indonesia	Bank of Indonesia Certificates (SBI)	1- month & 3-months	
	Fasilitas Bank Indonesia (FASBI) deposit facility.	1 to 14-days	Banks
	SBI Repurchase Agreements-phased out in Aug, 2005 & replaced by Fine-Tune Expansion (FTE)	1 to 14-days	
	SWBI or Wadiah Certificate (SBI using *Sharia* principles)		
Malaysia	Malaysian Government Securities		Security institutions, banking system & the employees' provident fund.
	Treasury Bills	91, 182, 364-days	Commercial banks, discount houses, principal dealers & finance companies.
	Repurchase Agreements (Repos) (The securities normally used in repo transactions are Malaysian Government Securities, Bankers' Acceptances & Negotiable Certificates of Deposits, Treasury Bills, Cagamas Bonds, Central Bank Certificates, other trade bills, *etc*.)	Overnight to a few months	Commercial banks, merchant banks, finance companies & discount houses.
	Bank Negara Bills	1-year	
	Bank Negara Monetary Notes	Up to 3-years	
	Direct borrowing	Up to 6-months (average: 20-30 days)	
	Negotiable Certificates of Deposit	In multiples of 3-months, up to 5-years	Business enterprises, banks, discount houses, statutory authorities, savings & pension funds, the Government & individuals.
	Bankers' Acceptances	30 to 200-days	Commercial banks & merchant banks
Korea	Call money	Overnight, 3, 5, 7, 9, 11& 15-days loans.	Commercial banks, specialised banks, regional banks, investment & finance companies, merchant banking corporations, investment trust companies, insurance companies, the Korea Securities Finance Corporation, the Credit Insurance Fund & foreign bank branches in Korea.
	Repo (Securities eligible for OMOs: Government Bond, Government Guaranteed Bonds & land development bonds)	15 to 91-days.	Select financial institutions.

ANNEX III.3: Structure of Money Markets *(Concld.)*

Country	Instruments	Tenor	Major Participants
1	2	3	4
	Treasury Bills	364-days	
	Market Stablisation Bonds.	14-2 years & 546-days	Select financial institutions.
	Liquidity adjustment loans.	Not more than 1-month	Applicant banks
	Intraday overdrafts.	Close of business day.	Select commercial banks, special banks, local banks & foreign banks.
	Negotiable Certificates of Deposit		Banks.
	Commercial Paper.		Eligible non-finance companies, investment & finance companies & merchant banking corporations.
South Africa	Treasury Bills	91-days & 182-days.	Primary dealers.
	Negotiable Certificates of Deposit.	Up to 3-years.	Banks, mining houses, pension funds, insurance companies, commercial companies, municipal authorities, public corporations & individuals
	Bankers' Acceptances.	Up to 3-months & in some cases longer.	Merchant banks & commercial banks.
	Repurchase Agreements.	1 to 7-days.	Reserve Bank & other financial institutions.
	Reserve Bank Debentures.	28 to 56-days.	Banks.
	Foreign Currency Swaps.		
Singapore	Repos/reverse repos		Primary dealers, secondary dealers covering banks, merchant banks, & stock broking firms, finance companies, insurance companies, corporations & individuals. (In the case of the repo, only PDs).
	Singapore Government Securities.	3-month to 15 years with 3-month & 1-year benchmarks for T-Bills & 2, 5, 7, 10 & 15-year benchmark for bonds.	
	End-of-day Liquidity Facility.	Overnight.	Banks.
	Forex Swaps & Reverse swaps.		

Source: Websites of respective central banks.