Payment, clearing and settlement systems in India

Contents

List of abbreviations

ATM	automated teller machine
BOISL	Bank of India Shareholding Ltd
BSE	Bombay Stock Exchange
CBLO	collateralised borrowing and lending obligation
CCIL	Clearing Corporation of India Limited
CCP	central counterparty
CDSL	Central Depository Services Ltd
CFMS	Centralised Funds Management System
CRR	cash reserve ratio
CSGL	constituent subsidiary general ledger
ECS	Electronic Clearing Service
EFT	Electronic Funds Transfer
FEDAI	Foreign Exchange Dealers Association of India
ICSE	Inter-Connected Stock Exchange
IDL	intraday liquidity
IDRBT	Institute for Development and Research in Banking Technology
IFTP	interbank funds transfer processor
INFINET	Indian Financial Network
INR	Indian rupees
IPO	initial public offer
IVR	interactive voice response
LAF	liquidity adjustment facility
MICR	magnetic ink character recognition
NDC	net debit cap
NDS/SSS	Negotiated Dealing System/Securities Settlement System
NEAT	National Exchange for Automated Trading
NECS	National Electronic Clearing Service
NFS	National Financial Switch
NDS-OM	Negotiated Dealing System – Order-Matching (RBI-NDS-GILTS-Order Matching Segment)
NPC	National Payments Council
NSCCL	National Securities Clearing Corporation of India Ltd
NSDL	National Securities Depository Limited
NSE	National Stock Exchange
OECLOB	open electronic consolidated limit order book
OTC	over-the-counter

OTCEI	Over The Counter Exchange of India
PFRDA	Pension Fund Regulatory Development Authority of India
PI	participant interface
RBI	Reserve Bank of India
RTGS	real-time gross settlement
SCRA	Securities Contracts (Regulation) Act, 1956
SEBI	Securities and Exchange Board of India
SGF	settlement guarantee fund
SGL	subsidiary general ledger
SLR	statutory liquidity ratio
SSS	securities settlement system

Introduction

The financial sector in India has undergone significant reforms during the last two decades. The reforms were initiated in 1992, with increased emphasis on deregulation, competition, and adoption of international best practices. At the same time, banks and financial institutions were encouraged to play an effective role in strengthening economic growth. The major initiatives undertaken by the Reserve Bank of India (RBI), the central bank, included deregulation, improved prudential measures and risk management, as well as measures to develop financial markets. Recognising that payment and settlement systems should conform to international standards, the RBI set out its objectives in a 1998 monograph on *Payment Systems in India*. The subsequent *Payment System Vision Document for 2001–04* provided a roadmap for the consolidation, development and integration of the country's payment systems. The resulting progress in the payment and settlement systems was detailed in the *Vision Document for 2005–08* published in May 2005. For its part, the *Vision Document 2009–12*[1] reflects the changes after the enactment of the Payment and Settlement Systems Act, 2007, and sets out the objective of ensuring "that all the payment and settlement systems operating in the country are safe, secure, sound, efficient, accessible and authorised".

The RBI plays a pivotal role in the development of India's payment and settlement systems for both large-value and retail payments. The central bank played a pioneering role in automating the paper-based clearing system in the 1980s. It introduced an electronic funds transfer system and electronic clearing services (ECS Credit and Debit) in the 1990s. The special electronic fund transfer (SEFT) system was introduced in April 2003 (subsequently discontinued in March 2006, after the implementation of the National Electronic Fund Transfer (NEFT) system in November 2005) and the real-time gross settlement (RTGS) system in March 2004. The RBI operates the RTGS, which has replaced the paper-based interbank clearing system and settles a sizeable volume of large-value and time-critical customer transactions. RBI also manages the clearing houses (for paper-based and electronic clearing) in 17 large cities while operating the clearing houses at four major locations. It is the settlement banker in these cities. The RBI introduced the NEFT system in November 2005. Together with ECS, this forms the electronic retail payment infrastructure. The National Electronic Clearing Services (NECS) system, which aims to centralise the Electronic Clearing Service (ECS) operation and bring uniformity and efficiency to the system, was implemented in September 2008. At present, the NECS settles only credit transfers. To improve efficiency in the paper-based clearing system, the central bank introduced cheque truncation in the National Capital Region of New Delhi in February 2008. Efforts are currently underway to implement cheque truncation in Chennai. The RBI continues to be involved in the mechanisation of paper-based clearing in smaller cities and towns.

The central bank played an instrumental role in setting up the Clearing Corporation of India Limited (CCIL), a central counterparty (CCP) for the settlement of trades in government securities and foreign exchange. The RBI serves as the custodian and central securities depository (CSD) for Government of India securities. To facilitate faster settlement of trades in government securities in dematerialised form, the RBI introduced in February 2002 an electronic negotiation-based trading and reporting platform called the Negotiated Dealing System (NDS). Further, to enhance the trading infrastructure in the government securities market, the RBI introduced in August 2005 an electronic order-matching system called the RBI-NDS-GILTS-Order Matching or NDS-OM in short. The NDS and NDS-OM are both part of the securities settlement system (SSS) known as the Negotiated Dealing

[1] The Vision Document is available at http://rbi.org.in/scripts/PublicationVisionDocuments.aspx.

System/Securities Settlement System (NDS/SSS).[2] The NDS/SSS provides final settlement for government securities transactions that are settled in the books of the RBI, the CSD. The NDS/SSS facilitates monetary operations of the central bank. The liquidity adjustment facility (LAF), also administered by the RBI through the NDS/SSS, transmits interest rate signals to Indian money markets. All secondary operations in government securities where CCIL acts as the central counterparty (CCP) are also settled in the NDS/SSS, on the DVP3 model,[3] with the funds being settled through the RTGS system.

The debt segment of the equities and securities market in India is dominated by bonds and treasury bills issued by the government. Though physical issue of government securities is permitted by law, institutional investors mostly hold their investment in dematerialised form. The RBI is the depository (CSD) for government securities. For other securities, equities and corporate bonds, the two central depositories are the National Securities Depository Limited (NSDL) and the Central Depository Services Limited (CDSL), which hold the securities issued and traded through the stock exchanges in dematerialised form.

There are at present 19 stock exchanges in the country; all have screen-based trading. The National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), Mumbai, are the two leading exchanges for equities, debt and derivatives. Trades are independently cleared and settled at the clearing houses[4] that both exchanges have set up for the purpose. Settlement takes place on a T+2 basis. Funds settlement takes place in commercial bank money.

1. Institutional aspects

1.1 The institutional framework

The financial sector has been significantly liberalised over the last two decades, and is now more integrated with the global financial system. Simultaneously, new institutions have been created and existing institutions strengthened so as to build an efficient regulatory framework. Legislation has also been considerably improved to support the regulatory framework and improvements in market infrastructures.

1.1.1 Regulatory institutions

In India, there are three major regulators for the financial system. The Reserve Bank of India (RBI), established under the Reserve Bank of India Act, 1934 (RBI Act), is the central bank of the country, which pursues the objectives of economic growth, price and financial stability. The Securities and Exchange Board of India (SEBI), established under the Securities and Exchange Board of India Act, 1992, is the regulator of the capital market. The Insurance Regulatory and Development Authority (IRDA), established under the Insurance Regulatory

---

2 The Negotiated Dealing System (NDS) and the Negotiated Dealing System – Order-Matching (NDS-OM) are the trading and reporting components of the SSS. The NDS-OM, though managed by CCIL, is owned by the RBI.

3 See Committee on Payment and Settlement Systems, *Delivery versus payment in securities settlement systems*, Basel, 1992, p 4.

4 The National Securities Clearing Corporation Ltd (NSCCL), a wholly owned subsidiary of NSE, was incorporated in August 1995 and started operations in April 1996. It was the first clearing corporation in the country to provide a novation/settlement guarantee mechanism. Bank of India Shareholding Ltd (BOISL) is an independent clearing house jointly promoted by BSE (49%) and Bank of India (51%) and which undertakes clearing and settlement of funds and securities on behalf of BSE.

and Development Authority Act 1999, is an independent supervisor of the insurance sector with licensing authority. Given the rising importance of pension funds and their operations, the government recently set up the Pension Fund Regulatory Development Authority of India (PFRDA) to facilitate orderly growth in this sector. Though many regulatory powers have been delegated to the regulators, as above, certain powers are still exercised by the government. For instance, the Department of Economic Affairs (for public debt management, functioning of capital markets etc), the Ministry of Corporate Affairs (administering the Competition Act, 2002, and supervising accounting bodies), and the Registrars of Cooperative Societies (controlling of cooperatives, namely, state cooperative banks, district cooperative banks etc) have powers to regulate the activities of certain types of financial intermediaries.

The RBI's mandate, under the RBI Act, is "to regulate the issue of Bank notes and the keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage". The RBI has adopted a multiple indicator approach in order to achieve the desired level of economic growth while preserving price and financial system stability. The RBI's key functions include:

- issuing currency;
- acting as the monetary authority;
- regulation and supervision of banks and other financial market participants;
- regulation of payment and settlement systems;
- management of foreign exchange reserves;
- developmental functions; and
- other conventional central banking functions.[5]

As part of the regulation and supervision of payment systems, the RBI oversees clearing house operations. To ensure the smooth operation of clearing houses, the RBI has issued model Uniform Regulations and Rules for Bankers' Clearing Houses (URRBCH) for adoption by clearing house members.[6] The RBI uses its regulatory and supervisory powers to ensure that these regulations are followed.

The Payment and Settlement Systems Act, 2007, empowers the RBI to regulate and oversee all payment and settlement systems in the country and also to provide settlement finality[7] and a sound legal basis for netting. The Act came into effect on 12 August 2008. The RBI has constituted the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS) as a committee of its Central Board.[8] The BPSS became operational with effect from 7 March 2005. It formulates policies for the regulation and supervision of all types of payment and settlement systems, sets standards for existing and future systems, authorises payment and settlement systems, determines criteria for membership to these systems and decides on continuation, termination and rejection of membership. The BPSS was reconstituted after the Payment and Settlement Systems Act came into effect.

---

[5] Such as lender of last resort; banker to banks; banker to the government etc.

[6] Clearing houses are associations of member banks. Banks participate as members of clearing houses.

[7] Section 23 of the Payment and Settlement Systems Act, 2007, defines settlement finality with respect to all transactions undertaken in money, securities, foreign exchange and derivatives.

[8] Central Board is the nomenclature used in the RBI Act 1934. The Central Board consists of the Governor, Deputy Governors, 14 directors nominated by the central government under Section 8 (1) b, c and d.

1.1.2 Legal framework

The different segments of the financial system and the activities of financial intermediaries are governed and regulated by various statutes that indirectly affect the payment and settlement systems. Some of the enabling legal framework is in the form of rules and regulations that, though not legally codified, are enforceable due to their contractual nature. Some of these laws and regulations are briefly explained below.

Under the provisions of the RBI Act, the RBI, as the central bank of the country, is the sole authority for the issue of currency notes. The act also empowers the central bank to frame regulations for clearing houses. Through an amendment to this act, the RBI was empowered to make regulations in respect of fund transfers through electronic means between banks or between banks and other financial institutions.

The Foreign Exchange Management Act 1999 (FEMA) was enacted to promote the orderly development and maintenance of India's foreign exchange market. FEMA confers powers on the RBI to regulate, inter alia, foreign currency payments into and out of India.

The Banking Regulation Act, 1949, provides the legal basis for all the activities that can be undertaken by banks in India. It is applicable to all institutions that receive deposits repayable on demand or otherwise, for lending or investment. The Act confers powers on the RBI to regulate the banks in the country and thus the clearing houses managed by banks, to inspect the books and accounts of banks and to call for periodical financial reports and data from the banks. Non-bank institutions accepting deposits and other financial institutions are also governed and regulated under the RBI Act, 1934.

The Negotiable Instruments Act, 1881 (NI Act), defines promissory notes, bills of exchange and cheques. After the enactment of the Information Technology Act, 2000, amendments were made to the NI Act to provide for electronic cheques and cheque truncation.

The Information Technology Act, 2000, provides the legal basis for activities related to electronic transaction processing. It also stipulates the security features that are necessary to maintain the confidentiality, integrity and authenticity of such transactions. It provides legality for digital signatures and encryption of data and enables electronically stored information to be equivalent to documentary evidence in a court of law.

The Indian Contract Act, 1872, sets forth the principles of contracts in India. Agreements entered into by parties, including their mutual rights and obligations, are governed by the Indian Contract Act.

Clearing systems are governed by the Uniform Regulations and Rules for Bankers' Clearing Houses (URRBCH). The URRBCH cover all aspects related to the function and operation of clearing houses, such as membership criteria, suspension from or termination of membership and the procedures related to clearing and settling claims among members. Individual clearing systems, such as the cheque clearing system, electronic clearing service and electronic funds transfer system, operate under the governing covenants of these regulations and rules as adopted by each clearing house. Originally, the URRBCH and each system's local procedural guidelines were contractually agreed between the clearing house and its members. This is no longer the case with the URRBCH, as these contracts now have legal recognition under the Payment and Settlement Systems Regulations, 2008.

These regulations, together with the Payment and Settlement Systems (PSS) Act, 2007, came into effect in August 2008. The PSS Act specifies that no person, other than the RBI, shall operate a payment system except with an authorisation issued by the RBI (unless specifically exempted by the terms of the PSS Act). The Act provides for netting and settlement finality and vests formal oversight powers over all payment and settlement systems with the RBI. In summary, the Act:

- designates the RBI as the authority that regulates payment and settlement systems;
- makes it mandatory to obtain RBI authorisation to operate a payment system;[9]
- empowers the RBI to regulate and supervise payment systems by determining standards and calling for information, regular reports, documents etc;
- empowers the RBI to audit and conduct on- and off-site inspections of payment systems;
- empowers the RBI to issue directives; and
- provides for netting and settlement to be final and irrevocable.

In addition to the Payment and Settlement Systems Act, 2007, five other laws have an important influence on securities markets and securities settlement systems. The Securities and Exchange Board of India Act, 1992, provides for the establishment of a board (the SEBI) to protect the interests of investors in securities and promote the development of securities markets. It also confers powers on the SEBI to regulate the securities market by registering and regulating all market entities such as stock exchanges and depositories, to conduct enquiries, audits and inspections of such entities and to adjudicate offences under the act.

Sections 20 and 21A of the RBI Act mandate the RBI to act as a debt manager to the central and state governments. Earlier, the Public Debt Act, 1944, provided the framework for regulating transactions in the government securities market. This act was superseded by the Government Securities Act, 2006 (GS Act 2006), from 1 December 2007. Some of the significant changes brought about by the GS Act 2006 are legal recognition to lien, pledge and hypothecation of government securities; simpler procedural formalities with regard to transfer of title in the event of the death of the title-holder; and legal recognition for Constituent Subsidiary General Ledger (CSGL) accounts.

Section 45W of the RBI Act empowers the RBI to regulate, determine policy and give directions to all or any agencies dealing in securities, money market instruments, foreign exchange, derivatives or other such instruments as the RBI may specify.

The Securities Contract Regulations Act, 1956 (SCRA), confers powers on the government of India to regulate and supervise all stock exchanges and securities transactions. This act also applies to government securities. The central government has delegated its powers under the act to the RBI. These powers relate to contracts in government securities, money market securities, gold-related securities and derivatives, as well as repurchase agreements in bonds, debentures, debenture stock, securitised debt and other debt securities. All other segments of the securities market are regulated by the SEBI through powers conferred on it by the Securities and Exchange Board of India Act and the SCRA and through powers delegated to it by the central government under the SCRA.

The Depositories Act, 1996, paved the way for the establishment of securities depositories that support the electronic maintenance and transfer of ownership of securities in a dematerialised form, facilitating faster settlement in the securities market.[10]

---

[9] Section 2 (1) (i) of the Payment and Settlement Systems Act, 2007, defines a payment system as "a system that enables that payment to be effected between a payer and a beneficiary, involving clearing, payment or settlement service or all of them, but does not include a stock exchange".

[10] Prior to the enactment of the Act, the securities were held in physical form with the beneficial owners.

The Companies Act, 1956, sets out the code of conduct for the corporate sector in relation to the issue, allotment and transfer of equity. It also regulates underwriting, the use of premiums and discounts on issues, rights and bonus issues, the payment of interest and dividends, and the publication of annual reports and disclosure of other information.

1.2 The role of the central bank

The responsibilities of the RBI include issuing notes, providing payment services, acting as banker to the government and to banks, supervising and regulating banking institutions, conducting monetary policy, maintaining the external value of the rupee and acting as the custodian for the country's foreign exchange reserves. Direction and oversight of the RBI's affairs are vested in its Central Board of Directors.

1.2.1 Note issuance

The responsibilities of note and coin issuance and currency management entrusted to the RBI under the RBI Act are fulfilled by the RBI through 19 of its regional offices, eight sub-offices/currency chests and (as of June 2010) a network of 4,302 currency chests.[11] Under the Act the RBI is the sole authority for the issue of currency notes and coins. The RBI's currency management function focuses on ensuring the adequate availability of notes and coins and on improving the quality of notes in circulation and enhancing the security features of banknotes. A recent priority has been to mechanise the processing and destruction of notes. Banknotes are printed by four security presses, of which two are owned by the government and two by an RBI subsidiary. The RBI issues notes in denominations of INR[12] 5, 10, 20, 50, 100, 500 and 1,000. The government is responsible for minting and supplying coins to the RBI, which acts as the agent of the government in issuing and distributing coins, as well as withdrawing and remitting them to the government.

1.2.2 Payment and settlement services

The RBI plays a major operational role in the payment and settlement system. It established and also manages the RTGS system used for settling large-value and time-critical retail payments above INR 200,000, as well as transactions related to the securities settlement system (SSS). The SSS facilitates electronic trading and settlement of government securities. Its introduction eliminated the manual processing of securities transactions and centralised all the investments of market participants at the Mumbai office of the RBI. In the retail payments area, the RBI operates and manages clearing houses (for both paper-based and electronic transactions) in four metropolitan cities, namely, Chennai, Mumbai, Kolkata and New Delhi. The central bank also functions as the settlement bank for retail payments in these four cities and 13 other large cities.

Provision of settlement (and credit) facilities

The RBI of India plays a direct role in providing settlement and credit facilities. Central bank money is the asset used for settlement. To facilitate this, the RBI requires participants in the various payment systems to maintain accounts with the central bank.

---

[11] A currency chest is a repository of notes and coins of the RBI under the custody of a commercial bank.

[12] The USD-INR year-end reference rate as on 31 December 2009 was USD 1 = INR 46.68.

- *Current account*

Banks in India maintain current accounts with the RBI not only because it is their banker and lender of the last resort, but also for statutory reasons. Under the provisions of the RBI Act, 1934, and the Banking Regulation Act, 1949, banks are required to maintain statutory cash reserves with the RBI. For this purpose they maintain a current account with the RBI designated as the principal current account, where their cash reserve balances are maintained and monitored. To facilitate the settlement of interbank payments, banks need additional accounts: a secondary account, held at the same RBI office as their principal account, and a subsidiary account, held at other RBI offices, depending upon their operations and requirements.

Banks must meet certain minimum balance requirements in each of these accounts. The funds in these current accounts are used for the settlement of interbank and government payments, and the net settlement obligations arising from cheque-based clearing or the electronic retail payment system, and for funding the RTGS settlement account. Banks can transfer funds between accounts they hold at different RBI offices. Overdrafts are not allowed in these accounts and will result in penal action, as will balances that fall below the minimum requirement. For smooth operation of the payment systems, the RBI provides liquidity support to banks and primary dealers facing temporary liquidity problems against collateral consisting of Indian sovereign/guaranteed securities.

To promote the development of the government securities market, the current account facility has been extended to non-bank entities such as primary dealers in government securities. Similarly, other non-bank entities such as non-banking financial institutions and insurance companies have been allowed to open current accounts with the RBI to facilitate the settlement of their money market operations (as they are not clearing house members). At present, institutions allowed to open current accounts at the RBI include banks, primary dealers, central and state governments, local bodies, quasi-government institutions, foreign central banks, foreign governments, international organisations, financial institutions, insurance companies and securities depositories.

Participants in the RTGS system must have an RTGS settlement account. Current account balances can be used to fund this account at the start of the RTGS business day. Throughout the day, participants can transfer funds between their RTGS settlement account and their current account. At the end of the day, the RTGS settlement account balance is transferred to the respective current account.

- *Subsidiary general ledger (SGL) account*

Under the Banking Regulation Act, 1949, banks in India must maintain reserves of cash, gold or unencumbered approved securities as a statutory requirement. The banks maintain statutory reserves and their investments in government securities in dematerialised form in an account called the subsidiary general ledger (SGL) account, which is held with the RBI.

The RBI's Public Debt Office (PDO) acts as the depository for all central and state government securities. These securities are issued in physical and dematerialised form. Subsequent to the introduction of delivery versus payment (DVP) for the settlement of government securities transactions in 1995, it was required that these securities be held as far as possible in dematerialised form. For this purpose, all investors were required to open SGL accounts, for the record-keeping of securities as book entries. Later the provision of SGL accounts was rationalised, so that the PDO now offers SGL accounts only to banks and entities that have a current account with the RBI. Institutions regulated by the RBI are required to hold securities only in dematerialised form. In the past, banks could hold multiple SGL accounts at various RBI offices, based on their operational requirements. However, with the introduction of the NDS/SSS, their SGL accounts have been centralised at the PDO of the RBI's Mumbai office to facilitate centralised settlement of government securities transactions.

SGL account holders may transact in securities through primary market operations as well as secondary market trading. Under the DVP mechanism, trades in government securities are settled by debiting or crediting participants' SGL accounts. Securities held in their SGL accounts can also be used as collateral for loans and advances obtained from the RBI (under the provisions of the RBI Act). Besides holding securities in their own investment portfolios, banks may open separate accounts for investment in government securities on behalf of their customers. These are called constituent SGL (CSGL) accounts. Securities held in SGL and CSGL accounts are kept strictly segregated.

Banks must open a separate SGL account (an IDL-SGL account) to obtain collateralised intra-day liquidity (IDL) for settling transactions in the RTGS system. This IDL-SGL account is used for depositing or transferring collateral to the intraday liquidity (IDL) facility related to the RTGS system. Participants can move securities freely between their IDL-SGL and regular SGL accounts. The use of the IDL facility is reversed and the securities are automatically released by the RBI into the IDL-SGL accounts when funds become available on banks' RTGS settlement accounts. RTGS members can view their SGL and IDL-SGL account balances in real time and transfer securities from one account to another electronically.

Participants also use the securities in their SGL account to provide collateral and contributions to the settlement guarantee fund maintained by CCIL[13] (to facilitate the guaranteed settlement of government securities transactions). To facilitate faster movement of collateral between CCIL and its members, members may make online transfers of securities from their SGL account with the RBI to the SGL account that CCIL holds at the RBI. This is considered a value-free transfer and not a DVP transaction as it involves only a securities transfer and no funds transfer is involved.

The two securities depositories, National Securities Depository Limited (NSDL) and Central Depository Services Limited (CDSL), also maintain SGL accounts with the RBI to facilitate the dematerialised settlement of government securities traded in the retail debt segment of the NSE and BSE.

Monetary policy and payment systems

Under the provisions of the RBI Act, 1934, and the Banking Regulation Act, 1949, banks must maintain a statutory minimum of cash reserves in a current account with the RBI.[14] These reserves are defined as a percentage of banks' demand and time liabilities. Similarly, under the provisions of the Banking Regulation Act, 1949, banks are required to maintain a certain percentage of their total demand and time liabilities in India in the form of cash, gold or approved securities (the statutory liquidity ratio or SLR).[15]

As part of its monetary policy operations, the RBI has traditionally used direct instruments such as reserve requirements, increasing or decreasing the cash reserve ratio (CRR) and SLR to influence the level of liquidity in the system and thus achieve its monetary policy objectives. However, with the development of the country's financial markets, monetary policy objectives are now increasingly being met with indirect instruments such as open market operations (OMOs), the Liquidity Adjustment Facility (LAF) and the Market Stabilisation Scheme (MSS).

---

[13] This fund is used for CCP-related risk management. If a member defaults, its contribution to the fund is utilised.

[14] Non-scheduled banks maintain cash reserves by holding physical cash or by maintaining a balance in the current account with the Reserve Bank or by way of a net balance in current accounts with the State Bank of India and its associate banks or public sector banks, or in one or more of these options.

[15] The stipulated requirement is announced by the RBI in its periodic monetary policy reviews based on the factors affecting liquidity in the system.

Through OMOs, the RBI sells or purchases government securities on an outright basis when it wants to permanently decrease or increase the liquidity available in the economy.

However, to address temporary mismatches in liquidity on a day-to-day basis, the LAF is the preferred option. The LAF consists of interventions at the shorter end of the money market through the use of repurchase agreements (repos) and reverse repos.[16] These are conducted as hold-in-custody operations, whereby the securities are held in custody by the RBI. The duration of these repos and reverse repos is usually overnight, though longer durations of 14 or 28 days have also existed. These auctions are conducted on a fixed rate basis, although there have also been variable rate auctions. The LAF has emerged as the RBI's prime instrument for influencing liquidity and transmitting interest rate signals to the market.

The MSS was introduced in April 2004. Its objective is to provide more flexibility to the RBI in its monetary management. Under the MSS, the RBI can issue government securities to sterilise excess liquidity that might arise from long-term capital flows. Under the scheme, the RBI issues treasury bills or dated securities up to a pre-agreed ceiling; the interest cost is borne by the government, while the proceeds are retained by the RBI until the redemption of the MSS securities.

The RBI's lender of last resort/emergency liquidity assistance function is primarily intended to deal with systemic crises. Lender of last resort assistance is provided under exceptional circumstances to any entity solely for the purpose of regulating credit in the interests of Indian trade, commerce, industry and agriculture, repayable on demand or on the expiry of a fixed period not exceeding 90 days, against any bill of exchange or promissory note. Section 18 of the RBI Act empowers the RBI to provide such support to any entity on such terms and conditions as found suitable by the RBI for a period not exceeding 90 days.

Public debt office

The RBI is the central security depository (CSD) for government securities. As such, the settlement of government securities trades in the secondary market, as well as acquisitions of such securities by investors in primary issues (through flotation or auctions), is reflected in the books of the RBI (in electronic bookkeeping form). Other related services are also provided by the RBI to investors – for instance, transfers, nominations, interest payments and redemptions. These services are provided by the RBI's Public Debt Office (PDO). In February 2002, the RBI set up an electronic trading and reporting platform for OTC government securities transactions called the Negotiated Dealing System (NDS). The OTC trades reported over the NDS are accepted for clearing by CCIL which acts as the CCP for government securities trades that are finally settled in the SSS.

The RBI aims to facilitate straight through processing of clearing and settlement of trades related to government securities for which the PDO discharges the functions of a CSD. To this end, it seeks to improve the facilities for trading and settlement in the government securities market. For that reason the RBI introduced an electronic order-matching trade module for government securities on its Negotiated Dealing System (RBI-NDS-GILTS-Order Matching Segment, NDS-OM) on 1 August 2005. The system is anonymous and purely order-driven, with all orders being matched by strict price/time priority and the executed trades then flowing directly to CCIL, which becomes the CCP to each trade on the system.

In its first phase, only regulated entities, that is, banks and primary dealers, were permitted to access NDS-OM. Subsequently, insurance companies gained access. Those without a current account with the RBI were allowed to open special current accounts (the current

[16] Repos are a purchase of securities to temporarily inject liquidity in the system, while reverse repos are the sale of securities to temporarily absorb excess liquidity in the system.

account facility has since been withdrawn and these entities, together with mutual funds, now have a current account with designated commercial banks). Access to NDS-OM has now been extended to all qualified mutual funds, provident funds and pension funds. Larger institutions can have direct access to the system, while smaller players access it through a principal member (via a CSGL account).

1.2.3 Oversight

The Payment and Settlement Systems Act 2007 (PS Act) mandates the RBI to regulate and supervise payment systems. Chapter III of the Act lays down that "no person … shall commence or operate a payment system except under and in accordance with an authorisation issued by the RBI under the provisions of this Act". The regulation and supervision of payment systems is provided for in Chapter IV.[17]

The aims and scope of the oversight are outlined in *Payment Systems in India Vision 2009–12*. The document states that the aim is "to ensure that all payment and settlement systems operating in the country are safe, secure, sound, efficient, accessible and authorised".

Before the PSS Act was enacted, the MICR cheque clearing houses were assessed with regard to (i) URRBCH; (ii) minimum standards for operational efficiency for MICR clearing; (iii) MICR procedural guidelines and (iv) various circulars issued by the RBI. Other electronic retail payment systems were assessed on their individual procedural guidelines and benchmarks or best practice indicators for operational efficiency.

Under the PSS Act, oversight is more structured, and comprises the three major activities of monitoring, assessment and inducing change.

Monitoring: "planned" systems are monitored through the authorisation process, which comprises submission of the following:

- an application by the entity with the notified fee amount;
- Memorandum of Association;
- the entity's financial statements;[18]
- details of Board of Directors and the CEO;
- a clear process flow;
- proposed business plan;
- gross/net/hybrid settlement mode;
- risk mitigation mechanism;
- ensuring Know Your Customer (KYC) norms; and
- mechanism for redressal of customer grievances.

Assessment: systems are assessed through a process of off-site surveillance and needs-based on-site inspections. Off-site surveillance is conducted through a combination of annual

---

[17] The powers to regulate and supervise comprise: Section 10: Power to determine standards; Section 11: Notice of change in the Payment System; Section 12: Power to call for returns, documents or other information; Section 13: Access to information; Section 14: Power to enter and inspect; Section 16: Power to carry out audit and inspection; Section 17: Power to issue directions; Section 18: Power of RBI to give directions generally; Section 19: Directions of RBI to be generally complied with.

[18] Different capital requirements are specified by the RBI for entities based on the type of payment system they propose to operate.

self-assessment by the payment system operator and the information it furnishes. Annual self-assessments are carried out by the payment system operators according to an assessment template prepared by the RBI. Various risk assessment templates corresponding to different retail (electronic and paper) payment systems and large-value payment systems form part of the assessment framework. The assessment templates for retail (electronic and paper-based) are based on a subset of the Core Principles.[19] With respect to financial market infrastructures (FMIs), the assessment template is based on standards such as the Core Principles, Recommendations for Securities Settlement Systems and Recommendations for Central Counterparties.

On-site inspections are based on the risk profile of the entity derived from the annual self-assessment, information provided by the entity concerned, and market intelligence.

Currently, all payment systems provide turnover data (volume and value) to the RBI. In future, information on a variety of risk parameters will be collected in a more detailed format.

A system of alerts for proactively managing the smooth and efficient functioning of payment systems in the country is also planned. The alerts will track various risks such as credit, liquidity, counterparty, settlement and operational exposures.

Inducing change: a variety of tools exists, starting with the URRBCH and the procedural guidelines for various products, Minimum standards for operational efficiency for select retail payment systems, RTGS business rules and membership criteria, as well as statutory powers conferred by the PSS Act, are available for inducing change. In addition, meetings where stakeholders can air their views can pave the way for changes in policy. Moral suasion continues to be an important tool for effecting change.

To sum up, the oversight process relies on off-site surveillance and needs-based on-site inspection, data and information collection, compilation and analysis, and a system of alerts complemented by market intelligence.

1.2.4 Cooperation with other institutions

The RBI liaises with all stakeholders including the Indian Banks Association and participants as part of its consultative process on all major policy initiatives. The RBI is a member of the South Asian Association for Regional Cooperation (SAARC) Payments Council. Under this initiative, technical assistance has been provided to a SAARC member nation which is modernising its payment system. The RBI also cooperates with the Federal Reserve for the USD-INR net settlement system for which the Clearing Corporation of India Ltd acts as a central counterparty. In association with the CPSS, the RBI also conducts seminars on payment systems for countries in the region. In addition, some African nations have requested and received technical assistance to improve their payment system infrastructure.

Indo-Nepal remittances

Given the large number of Nepalese people who work in India and send money to relatives in Nepal, the need was felt for an affordable payment facility for remittances from India to Nepal. Agreed between the Nepal Rastra Bank (the central bank of Nepal) and the RBI, the scheme commenced operation on 15 May 2008. Its main features are:

(i) One-way remittances are sent from India to Nepal using the banking system with a ceiling of INR 50,000 per remittance and a maximum of 12 remittances per person per year.

---

[19] Core Principle (CP) I, CP–II, CP–V, CP–VII, CP–IX and CP–X.

(ii) The remittance facility is extended to non-customers as well as customers of the banks.[20]

(iii) All NEFT-enabled bank branches in India participate in this cross-border remittance scheme.

(iv) Remittances are distributed to the beneficiaries in Nepal through the branches of Nepal State Bank Ltd and its approved agents.

1.3 The role of other private and public sector bodies

Financial intermediaries in India are categorised into four groups:

- commercial banks
- cooperative banks
- financial institutions
- non-bank financial companies

Commercial banks can be divided into distinct categories depending on their method of establishment and pattern of ownership. These are public sector banks (PSBs, in which the government holds an equity stake), private sector banks, foreign banks and regional rural banks (RRBs). Commercial and cooperative banks are allowed to engage in a wide range of banking and financial services. Financial institutions and non-bank finance companies are not allowed to accept deposits with a cheque issuance facility. Non-bank entities now under the PSS Act are permitted to provide certain payment services after due authorisation from the RBI under the PSS Act subject to adherence to the norms prescribed for the service provided.[21]

Banks must be licenced by the RBI. In addition to the licence, banks that fulfil certain conditions[22] are considered for inclusion in the Second Schedule to the RBI Act. Banks that do not fulfil these conditions are treated as non-scheduled banks.

At the end of March 2010, there were 169 commercial banks, 1,674 urban cooperative banks (UCBs), 31 state cooperative banks, 370 district central cooperative banks, four development financial institutions and 12,630 (June 2010) non-bank finance companies in India. The commercial banks comprise 27 PSBs, 22 private sector banks, 34 foreign banks and 82 RRBs and four local area banks. The cooperative banking system forms an integral part of the Indian financial system, where UCBs play an important role as financial intermediaries in urban and semi-urban areas, catering to the needs of the non-agricultural sector, particularly small borrowers. The RRBs, owned by the commercial banks and the central and state governments, were formed under the Regional Rural Bank Act, 1976. They play a key role in rural institutional financing, in terms of geographical and client coverage, business

[20] Remittances can be initiated by passing cash over the counter or by a credit transfer from the senders' bank account.

[21] An entity which is licensed by the RBI as a bank can accept deposits from the public and provide a cheque issuance facility. Entities which are not banks cannot issue cheques and cannot participate in the payment system. The only exception is the Post Office.

[22] It should (i) be a state cooperative bank or a company under the Companies Act or any institution notified by the central government for the purpose of inclusion in the Second Schedule of the RBI Act, or any corporation or a company which is formed by or under any law in any place outside India; (ii) have paid-up capital and reserves of an aggregate value of not less than INR 500,000; and (iii) satisfy the RBI that its affairs are not being conducted in a manner detrimental to the interests of its depositors.

volume and contribution to the development of the rural economy. The public sector banking institutions with their nationwide branch network dominate the banking sector.

1.3.1 The Indian Banks' Association

The Indian Banks' Association (IBA), formed in 1946, is a self-regulatory body with 159 members comprising public sector banks, private sector banks, foreign banks with offices in India, urban cooperative banks, developmental financial institutions, federations, merchant banks, mutual funds and housing finance corporations. The IBA facilitates promotion of sound and progressive banking principles and practices, cooperation and coordination on procedural, legal, technical, administrative and professional matters, and the pooling of expertise for common purposes, such as reducing costs, increasing efficiency or improving systems, procedures and banking practices. The IBA coordinates issues in the area of payment, clearing and settlement systems in the committees that are formed for this purpose. Moreover, it coordinates with financial sector regulators in all relevant areas. The IBA represents the banking sector's interests in the areas of charges for payment products, ATM usage etc, and interacts with the RBI on these issues. IBA also plays a major role in the implementation of cheque standardisation, including the selection of printers of blank cheque forms.

1.3.2 The Clearing Corporation of India Limited

The Clearing Corporation of India Limited (CCIL) was set up in 2001 under the Indian Companies Act. Within a decade, CCIL has come to occupy a significant position in the country's payment system. Various banks and financial institutions contribute to its share capital. CCIL was established with the aim of providing a safe institutional framework for the clearing and settlement of trades in government securities, forex, money and debt markets, so as to bring efficiency to the transaction settlement process and protect participants from counterparty risks. CCIL acts as the CCP through novation and guarantees settlement for transactions in the government securities and foreign exchange markets. CCIL has also developed a money market product, the collateralised borrowing and lending obligation (CBLO)[23] and guarantees its settlement. Participants in these markets must become members of CCIL for each segment separately and contribute to CCIL's settlement guarantee fund.[24]

CCIL offers a platform for the settlement of foreign exchange trades through CLS Bank using the third-party services of a settlement bank.

CCIL also provides non-guaranteed settlement facilities for transactions routed via the National Financial Switch (NFS), which is the main switch for ATM transactions in India. In this case, CCIL neither acts as a CCP nor does it provide guaranteed settlement. The settlement file is routed through CCIL to the RBI where the final settlement takes place in central bank money.

In June 2003, CCIL set up a wholly owned subsidiary, Clearcorp Dealing Systems (India) Ltd to provide dealing systems/platforms for CBLOs, repos and money market instruments of any kind, as well as for foreign exchange.

---

[23] The "Collateralised Borrowing and Lending Obligation (CBLO)", a money market instrument, is a product for entities who are either excluded from the interbank call money market or whose access to it is restricted by a ceiling on call borrowing and lending transactions, and who do not have access to the call money market. The CBLO is a discounted instrument in electronic book entry form with a maturity ranging from one day to ninety days (and up to one year under RBI guidelines) that allows market participants to borrow and lend funds.

[24] The settlement guarantee fund is made up of initial margins collected by members. In the event of a default, the defaulting member's contribution is used.

1.3.3 India Post

India Post has a large network of post offices across the country. In addition to mail and parcel services, post offices offer savings accounts and insurance products. Several new services such as Western Union money transfers, electronic money orders and distribution of mutual funds have been added to India Post's range of services in the past decade. Post offices are clearing house members even though they are not banks. They can also issue cheques to their savings account holders.

1.3.4 The Institute for Development and Research in Banking Technology

The Institute for Development and Research in Banking Technology (IDRBT) was established by the RBI in 1996 as an autonomous centre for development and research in banking technology, with a view to implementing a variety of payment applications and fostering the development of a reliable communication network. The Governing Council of the IDRBT includes the Deputy Governor and an Executive Director of the RBI, in addition to members from the IBA and from leading academic institutions (in the area of science and technology).

The IDRBT concentrates its research efforts on financial network architecture, security policy, security systems, payment and settlement systems and data warehousing. Through its education, training and e-learning programmes and initiatives, the IDRBT contributes to the education of technology professionals from India's banking sector. The IDRBT operates and manages the Indian Financial Network (INFINET), a closed user group communication backbone for the Indian financial sector that hosts intrabank and interbank applications. The IDRBT is also the certifying authority for the Indian financial sector under the Information Technology Act, 2000.

To support straight through processing for payment system applications, the IDRBT developed the Structured Financial Messaging Solution (SFMS), which is akin to SWIFT for message exchange within India. The National Electronic Funds Transfer (NEFT) system was developed on an SFMS platform by the IDRBT.

1.3.5 National Payments Corporation of India

With banks as its shareholders, the National Payments Corporation of India (NPCI) is an umbrella organisation for retail payment systems. It is incorporated as a company under Section 25 of the Companies Act (which does not pay dividends to its shareholders and applies its profits or other income to promoting its objectives). Its aims are the optimal use of resources through consolidation of existing infrastructure; the construction of new nationwide payments infrastructure; and the provision of a robust and affordable technology platform for retail payment services. NPCI has since taken over the operations of the National Financial Switch from IDRBT.

1.3.6 Foreign Exchange Dealer's Association of India

Foreign Exchange Dealer's Association of India (FEDAI) was set up in 1958 as an association of banks dealing in foreign exchange in India. (Such banks are known as Authorised Dealers or ADs). It is a self-regulatory body incorporated under Section 25 of the Companies Act. FEDAI's major activities include the framing of rules for the interbank foreign exchange business, and liaison with the RBI on reforms and the development of the forex market. FEDAI aims for the smooth functioning of the markets through close coordination with the RBI and other organisations such as the Fixed Income Money Market and Derivatives Association of India (FIMMDA), the Forex Association of India and various market participants.

1.3.7 Fixed Income Money Market and Derivatives Association of India

The Fixed Income Money Market and Derivatives Association of India (FIMMDA) is an association of scheduled commercial banks, public financial institutions, primary dealers and insurance companies. Incorporated as a company under Section 25 of the Companies Act in 1998, it is a voluntary market body for the bond, money and derivatives markets. FIMMDA has members representing all major institutional segments of the market.

Its objectives are to:

- liaise with regulators on various issues that impact the functioning of these markets;
- undertake developmental activities, such as introduction of benchmark rates and new derivatives instruments;
- provide training and support for dealers and staff at member institutions;
- adopt and develop international standard practices and a code of conduct;
- devise standard best market practices;
- arbitrate in disputes between member institutions;
- develop standardised documentation; and
- facilitate smooth and orderly market functioning.

FIMMDA seeks to achieve these objectives by establishing specific working groups. FIMMDA is represented in the RBI's Technical Advisory Committees (TACs) on Government Securities and Money Market and on the Foreign Exchange Markets. FIMMDA also runs seminars, training programmes and symposiums.

1.3.8 The stock exchanges

There are 19 stock exchanges in the country that are recognised under the Securities Contract Regulations Act, 1956 (SCRA). Most are regional exchanges. Their area of operation is specified at the time of their recognition under the SCRA. Companies wishing to list their securities on stock exchanges are obliged to do so on the regional stock exchange nearest to their registered office in order to facilitate investments and trade in securities. All of these exchanges have settlement guarantee funds, offer screen-based trading, and clear and settle trades independently. Companies can seek listing on other exchanges as well.

The SEBI has recently allowed all exchanges to set up trading terminals anywhere in the country. Three exchanges, the Over-the-Counter Exchange of India (OTCEI), the National Stock Exchange (NSE) and the Inter-Connected Stock Exchange of India (ICSE), were permitted to have nationwide trading facilities from their inception. The NSE has emerged as the country's leading stock exchange. Chapter 4 includes a detailed description of the two leading stock exchanges, the NSE and the Bombay Stock Exchange (BSE), which together account for more than 99% of India's stock market trading in terms of both volume and value.

Trades executed on the NSE are cleared and settled by the National Securities Clearing Corporation of India Limited (NSCCL), acting as a central counterparty. In the case of the BSE, an independent company, the Bank of India Shareholding Ltd (BOISL), handles clearing and settlement on behalf of the exchange.

1.3.9 Securities depositories

The National Securities Depository Limited (NSDL) was established in November 1996 after the enactment of the Depositories Act in August of that year. The NSDL is promoted by the Industrial Development Bank of India (IDBI), formerly the largest development bank in India (now merged with the IDBI Bank), the Unit Trust of India (UTI, then the largest mutual fund) and the NSE. The other shareholders of the NSDL include some large public sector, private sector and foreign banks.

Central Depository Services Limited (CDSL) was established in February 1999 and is promoted by the BSE, along with public, private and foreign banks in the country.

These depositories also extend their services to securities traded on other stock exchanges in the country.

The depository services for equities and debt instruments are extended through depository participants (DP), which can be banks, non-bank financial institutions, custodians, brokers, or any entity eligible under the SEBI (Depositories and Participants) Regulations, 1996. Currently, 758 DPs are registered with the two depositories, offering their services in many cities in the country. Investors must open an account with a DP in either of the two depositories in order to conduct transactions in dematerialised securities.

The two depositories have direct interfaces with the clearing houses of stock exchanges, issuing companies and their registrars, share transfer agents and depository participants. This facilitates dematerialisation of securities. However, the depositories can reconvert the securities to physical form at the request of the holder.

2. Payment media used by non-banks

2.1 Cash payments

In India, cash continues to be the most widely used medium of exchange. Cash is readily accessible through the growing number of ATMs that banks have deployed across the country in recent years. The RBI makes periodic changes to the design of banknotes as well as their production, distribution and withdrawal; old and unusable banknotes are destroyed and replaced with new ones. Currency notes are legal tender everywhere in India for payment or for deposit on account without any limit. The ratio of currency to broad money (M3: currency held by the public, demand and time deposits at banks and other deposits held at the RBI) was 14.3% at end-March 2010. The ratio of currency to GDP was 11.21%.

2.2 Non-cash payments

In India, non-cash payments through banking channels are effected by means of cheques (64.7% of the volume and 11.7% of the total value of cashless payment transactions at end-March 2010), credit transfers (9.3% and 44.8% of the total volume and value respectively for transactions relating to ECS (credit, EFT/NEFT, and RTGS), payment obligations arising out of FX transactions, Government securities transactions and CBLO operated by CCIL (0.1% and 43.4% respectively), and direct debits and credit and debit cards (26.0% and 0.2% respectively).

2.2.1 Cheques

The predominant medium for non-cash payments in India is the paper-based cheque. Other paper instruments include banker’s cheques and payment orders. At end-March 2010, 64.7% of the total number and 11.7% of the total value of cashless transactions were by cheque. Cheque volumes have risen substantially over the last three decades, owing to the expansion of banking branch networks and banking services. The share of cheque payments in the total value of cashless payments has, however, declined since 2004–05,[25] as large-value interbank and some customer transactions are now settled through the RTGS system.

Under the Negotiable Instrument Act, 1881, cheques must be presented physically to the bank branch on which they are drawn. The resulting delayed payment cycles have prompted a shift from manual processing to more efficient electronic systems for the exchange and settlement of cheques. Automated cheque processing was introduced from the mid-1980s when the first MICR cheque processing centres (CPCs) were set up. Inter-city clearing started in the early 1990s (but was discontinued in November 2009). From the mid-1990s, the Magnetic Media-Based Clearing System has also helped to substantially reduce clearing and settlement times. (MMBCS provides for electronic settlement based on electronically submitted settlement data, although processing is manual.) The NI Act was amended in 2001 to allow scanned cheque images, paving the way for the cheque truncation initiative that went live in February 2008 in the New Delhi region. Another cheque truncation project is planned for Chennai in south India. Growth in cheque volumes is expected to slow in the medium term, as electronic payments gain ground.

2.2.2 Credit transfers

While credit transfers represented 44.8% of all cashless payments in terms of value at end-March 2010, in terms of volume they only represented 9.3%. This indicates that large-value payments are now increasingly carried out as electronic credit transfers. The settlement of government securities, foreign exchange and CBLO transactions (through CCIL) are settled electronically on a net basis.

The Electronic Clearing Service (ECS), which clears retail electronic transfers, comprises a credit and a debit system. The ECS system is used mainly for one-to-many transfers. In the ECS Credit system, each single debit transaction triggers a large number of credit entries. In the ECS Debit system a large number of debits result in a single credit entry. The ECS Debit system is presented in Section 2.2.3.

The National Electronic Funds Transfer (NEFT) system came into operation in November 2005. It facilitates electronic retail transfers between bank branches using SFMS and secured by PKI (public key infrastructure) technology. The Electronic Funds Transfer (EFT) system that was previously in use has been discontinued.

The RTGS system, which is used mainly for large-value payments, settles both interbank and customer transactions. A threshold value[26] has been prescribed for customer transactions in RTGS, while there is no such limit under NEFT. Customers can choose to make payments through either RTGS (if they are above the threshold limit) or NEFT. The RTGS system accounts for a large percentage of the total value of funds transfers in the country. The details of the RTGS system are presented in Section 3.2.

2.2.3 Direct debit

The ECS Debit scheme is the only direct debit scheme in India for payments to electricity, telephone, insurance or credit card companies, or payments of loan instalments etc. ECS Debit aggregates a large number of debits into a single credit to the beneficiary. The system works on the principle of preauthorised debits, which is a signed paper mandate obtained from the customers by the utility company with a copy of the signed mandate being maintained at the bank. The account holder's account is debited on the agreed date and the

[25] Financial year from April 2004 to March 2005.

[26] At present the threshold value for customer payment orders in RTGS is INR 200,000.

amounts are credited to the beneficiary. The customer can set a ceiling on the amount that can be debited from his account for any particular type of payment. Prior to the value date, the utility company informs the customer of the debit amount and, if the debit amount is incorrect, the customer can instruct his bank to stop payment. Final settlement takes place both in central bank money and in commercial bank money (in those centres where the RBI does not have an office). In Mumbai, the settlement takes place in RTGS.

The volume of ECS Debit transactions increased from 36.0 million as at end-March 2006 to 150.2 million as at end-March 2010, with the value of transactions rising from INR 129.9 billion to INR 698.2 billion.

2.2.4 Payment cards

Card-based transactions are registering phenomenal growth in India. Cards, especially debit cards, are becoming the preferred electronic payment mode for both consumers and retailers.

Credit cards

Credit cards were introduced in India in the late 1980s and have since gained large-scale acceptance. Under the PSS Act, American Express Banking Corp, USA; Diners Club International Ltd, USA; MasterCard International Inc, USA; and Visa Worldwide Pte Ltd, Singapore, have been authorised to issue credit cards in India.[27] At end-March 2010, 24.1 million credit cards had been issued by banks in India.

Debit cards

In recent years, debit card issuance and usage have grown much faster than those of credit cards. Banks in India also offer combined ATM and debit cards. Under the PSS Act, American Express Banking Corp, USA; MasterCard International Inc, USA; Visa Worldwide Pte Ltd, Singapore, have been authorised to issue debit cards in India.[28] At end-March 2010, banks in India had issued 143.0 million debit cards.

Prepaid payment Instruments

Prepaid payment instruments are payment instruments with value stored on smart cards, magnetic strips cards, internet accounts, internet wallets, mobile accounts, mobile wallets, paper vouchers and stored value internet payment services. Prepaid instruments are a convenient cashless payment method and facilitate e-payment for goods or services purchased via the internet or mobile phone. The RBI issued guidelines in April 2009 and August 2009 on prepaid payment instruments. Issuers of prepaid payment instruments must be authorised by the RBI under the PSS Act. Authorisation by the RBI is required for the following types of instrument:

- semi-closed system payment instruments: these are payment instruments that are redeemable at a group of clearly identified merchant locations/ establishments, which contract specifically with the issuer to accept the payment instruments. These instruments do not permit cash withdrawal or redemption by the holder.
- open system payment instruments: these are payment instruments that can be used for purchase of goods and services at any card-accepting merchant locations (point of sale terminals) and which also permit cash withdrawal from ATMs.

[27] At the moment there are no domestic credit card brands in India.

[28] At the moment there are no domestic debit card brands in India.

Only banks can issue open system payment instruments. For schemes operated by banks, the outstanding balance forms part of the “net demand and time liabilities” for the purpose of maintaining reserve requirements. This position is computed on the basis of the balances appearing in the books of the bank as on the date of reporting. Other non-bank persons issuing payment instruments are required to maintain their outstanding balance in an escrow account with any scheduled commercial bank and the amount so maintained is to be used only for making payments to the participating merchant establishments. The maximum limit for issuance of prepaid payment instrument is INR 50,000.

2.2.5 Point of sale (POS) infrastructure

The total number of POS terminals in the country as of September 2010 was 524,038. All the POS terminals are interoperable with the exception of the terminals belonging to American Express. Transactions undertaken at POS terminals with debit or credit cards are settled as normal card transactions, with the acquiring bank routing these transactions to the VISA switch for settlement through Bank of America in the case of VISA-branded cards. For MasterCard-branded cards, transactions are routed to the MasterCard switch and settled through Bank of India. Settlement in both cases is on a T+1 basis.

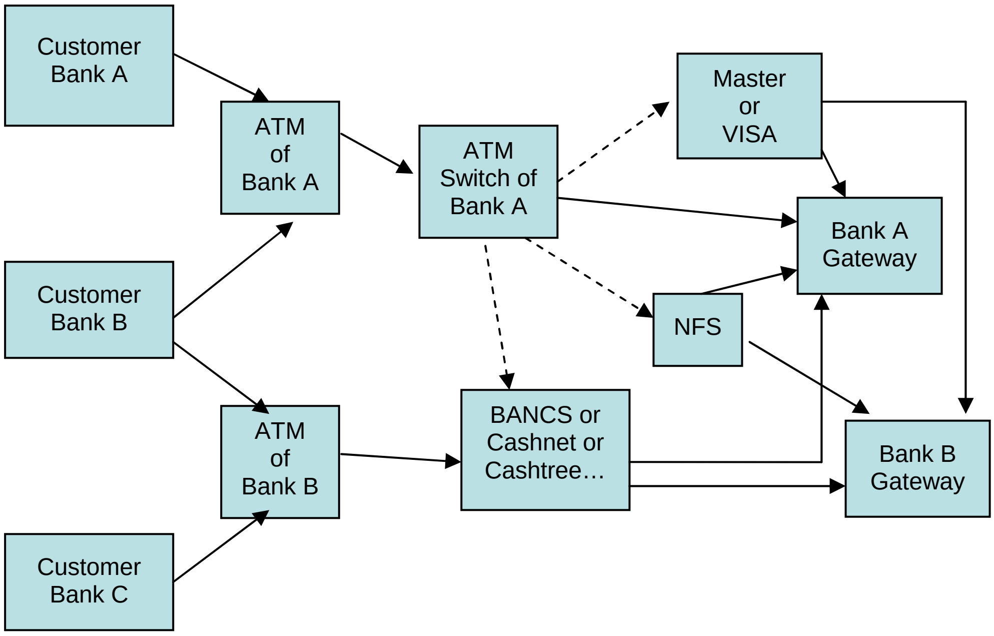
The use of debit cards at point of sale (POS) terminals has been increasing. Cash withdrawals at POS terminals have been permitted from July 2010, with this facility available on all debit cards issued in India, with a limit of INR 1000 per day. Cash withdrawals are available whether or not the cardholder makes a purchase. Banks offering this facility have been advised to put in place a proper customer redress mechanism. Earlier, the cash withdrawal facility using plastic cards was available only at automatic teller machines (ATMs).

2.2.6 ATM infrastructure and services

The total number of ATMs in the country as of September 2010 was 64,965. The major ATM networks in India are National Financial Switch (NFS), CashTree, BANCS, Cashnet, and the SBI Group network. In addition, most ATM switches are also linked to VISA or MasterCard gateways (for cards affiliated to VISA and MasterCard). The NFS is the largest of these networks.

National Financial Switch (NFS): The National Financial Switch (NFS) was established by IDRBT to facilitate connectivity among the ATM switches of all banks, addressing the limitations of other ATM networks and creating a reliable national infrastructure. Banks can connect to NFS either from their own switches or through the switch of their group. The NFS is now operated by the National Payments Corporation of India (NPCI). The Clearing Corporation of India (CCIL) is the settlement agency for all transactions routed through NFS. Forty-six banks participate in this service, covering a network of 62,842 ATMs as at end-September 2010.

ATM networks operate in clusters or other cooperative arrangements. A stylised transaction flow in an ATM network is shown below:



1. Where the issuing bank and acquiring bank are the same: when customer A uses its own bank ATM, the transaction is switched by the bank's ATM switch to its own gateway.
2. Where the issuing bank and the acquiring bank are different: customer B (of issuing Bank B) uses the ATM of Bank A (the acquiring bank), the transaction is routed to Bank A's switch. The Bank A switch has the option to route the transaction to one of the networks (shown with dotted lines):
   (a) If Bank A and B are members of the same closed user group ATM Network (eg Cashnet, CashTree etc), the transaction is routed to the issuing bank from the network switch.
   (b) If Banks A and B are not members of the same group, they exercise the option of routing the transactions to NFS (if Bank B is a member of NFS) or the VISA or MasterCard switch for transmission to the issuing bank.

ATMs are used mainly for cash withdrawals and balance enquiries. Savings bank customers can use a different bank's ATM free of charge for the first five transactions (of any type, financial or non-financial) in a month, with subsequent transactions being charged (the charge not to exceed INR 20). Customers pay no charges for using the ATMs of their own bank.

2.2.7 Postal orders, money orders and retail services from India Post

Another important and popular payment instrument is the money order (MO) service offered by India Post. MOs allow money to be transmitted via the postal network. The originating post office collects the remittance, plus a commission, from the person remitting the funds and sends an advice to the destination post office, where the funds are paid to the beneficiary. India Post also offers postal orders (POs), which are a prepaid funds transfer facility issued in various denominations. Recipients can encash them at any post office. MOs and POs are both giro payment instruments and are cleared outside the banking system. MOs are used for individual point-to-point transfers whereas POs are usually used to make small payments, eg for official charges or fees.

Other payment services from India Post include the Instant Money Order (iMO), an online money transfer service for amounts ranging from INR 1,000 to INR 50,000. An international money transfer service is also available, through a collaboration between India Post and Western Union (for more information on remittances, see Section 2.3.4).

India Post has recently been authorised to issue prepaid payment cards to its account holders.

2.3 Recent developments

Removal of charges for payment services

The RBI has waived the processing charge levied on banks for ECS, NEFT and RTGS transactions until March 2011 to encourage the use of electronic payments and allow banks to pass on the benefit to the customers. Similarly, the limits on the size of ECS and NEFT transactions were removed in November 2004 to increase the user base.

2.3.1 Rationalisation of service charges

The RBI has advised all banks of a framework for service charges.By this code, customers should not pay any charge for using the ATMs of their own bank. The use of a different bank's ATM is free up to the first five transactions (of any type, financial or non-financial) in a month, with subsequent transactions being charged (the charge not to exceed INR 20).

Under Section 18 of the Payment and Settlement Systems Act, 2007, the RBI has also issued a directive on the charges that banks can levy for various electronic products and for cheque collection services. The service charges are as follows:

Services	Transaction amount	Charges
Inward RTGS/ NEFT/ECS		Free
Outward RTGS	– INR 200,000–500,000 – INR 500,001 and above	– not exceeding INR 25 per transaction – not exceeding INR 50 per transaction
Outward NEFT	– Up to INR 100,000 – INR 100,001–200,000 – INR 200,001 and above	– not exceeding INR 5 per transaction – not exceeding INR 15 per transaction – not exceeding INR 25 per transaction
Outstation cheque collection	– Up to INR 10,000 – INR 10,001–100,000 – INR 100,001 and above	– not exceeding INR 50 per instrument – not exceeding INR 100 per instrument – not exceeding INR 150 per instrument

2.3.2 Mandatory use of electronic mode of funds transfer

An RBI directive has made it mandatory to route payments of INR 1,000,000 or more between RBI regulated entities and markets through electronic payment systems.

2.3.3 Internet/mobile phone banking

Many banks offer internet banking services, which include access to account information as well as funds transfers between accounts, bill payments and online securities trading. The growing number of internet users and widening reach of internet services will have a significant impact on the way credit transfers are carried out.

Broader usage of mobile phones has encouraged banks and non-banks to develop new payment services for their customers, usually in cooperation with mobile service providers. Although other countries have adopted mobile phone-based technologies as a way of delivering access to financial services to a broader segment of the population, India has opted for a bank-led model.

The rapid growth in mobile phone banking prompted the RBI to issue a set of operating guidelines for banks in October 2008. For this purpose, "mobile banking transactions" are defined as banking transactions initiated by bank customers using their mobile phones that involve credits or debits to their accounts. The guidelines were relaxed in December 2009 to allow mobile banking transactions up to INR 50,000, both for e-commerce and money transfers. Banks are also permitted to provide money transfer facilities of up to INR 5,000 from a bank account to beneficiaries without bank accounts. In such cases, cash can be paid out at an ATM or a banking correspondent. By value, funds tranfers account for a much larger share of mobile phone transactions than payments for goods or services. By volume, the reverse holds true. Final settlement of mobile banking transactions is made in central banking money.

2.3.4 Remittance services

The flow of inward remittances into the country has increased with the number of people migrating abroad for work. Such remittances are regulated by the RBI.[29] Remittances are received mainly through banks. In order to facilitate the faster receipt of funds by residents, the RBI permits money transfer agents to handle inward transfers, but not transfers out of the country.[30] Inward cross-border remittance services are offered by various money transfer agents and post offices. Agents must be authorised under the PSS Act to provide these services to Indian recipients.

2.3.5 Role of intermediaries

Electronic and online payment channels, which are increasingly popular for bill payments or online shopping, generally involve the use of intermediaries such as aggregators and payment gateway service providers. Platforms for such payments are also provided by electronic commerce and mobile commerce (e-commerce and m-commerce) service providers. The RBI has issued guidelines that safeguard the interests of customers and seek to ensure that their payments are duly accounted for by intermediaries,[31] so that transactions are completed in a safe and orderly way. The RBI stipulates that all accounts opened and maintained by banks for facilitating collection of payments by intermediaries from customers of merchants are to be treated as internal accounts of the banks.

The permitted credits/debits in these accounts are set out below:

1. Credits
    (a) Payments from individuals towards purchase of goods/services.

---

[29] All providers of cross-border inward remittance services must be authorised by the RBI under the PSS Act.

[30] Under the Money Transfer Service Scheme (MTSS) guidelines, only personal remittances from abroad to beneficiaries in India and remittances to foreign tourists visiting India are permissible. The system is based on tie-ups between money transfer companies abroad and agents in India who pay out the remittances to the beneficiaries at current exchange rates. Outward remittances can be sent only through banks under the Foreign Exchange Management Act, 1999. As the INR is legal tender in Nepal, money transfers to Nepal are treated differently to other outward remittances (see also Section 1.3.4).

[31] Agents who deliver goods and services (such as travel or movie tickets) immediately on payment by the customer are not defined as "intermediaries" for this purpose.

(b) Transfers from other banks as per agreement into the account, if this account is the nodal bank account for the intermediary.

(c) Transfers representing refunds for failed/disputed transactions.

2. Debits

(d) Payments to merchants/service providers.

(e) Transfers to other banks as per agreement into the account, if that account is the nodal bank account for the intermediary.

(f) Transfers representing refunds for failed/disputed transactions.

(g) Commissions to intermediaries. These amounts shall be at pre-determined rates/frequency.

3. Payment systems (funds transfer systems)

3.1 General overview

The settlement of both large-value and retail interbank payments in India was predominantly cheque-based[32] until RTGS was implemented in March 2004 and the subsequent issuance of instructions on the mandatory use of electronic payments for transactions between RBI-regulated entities and markets in March 2008. Since the introduction of the RTGS system, operated by the RBI, large-value and interbank transactions have progressively migrated to the RTGS system. The funds leg for settlement of securities, foreign exchange and CBLO transactions is also settled in the RTGS system. The separate high-value clearing for cheques of INR 100,000 and above, with same-day clearing and settlement, has also been discontinued since March 2010.[33]

The cheque-based clearing system continues to occupy a significant position, due to its volume, widespread usage and geographical coverage. There are 1,139 cheque clearing houses (as of March 2010) that clear and settle various types of paper-based instruments such as cheques, demand drafts, payment orders, interest and dividend warrants etc. In 66 of these clearing houses, cheque processing centres (CPCs) use MICR technology. Seventeen of these clearing houses are managed by the RBI, which provides settlement services for them through its banking department. In other places, the clearing house is managed by the State Bank of India (the country's largest public sector bank) and other public sector banks. These banks also perform the settlement bank function in these centres (a centre is within the jurisdiction of the clearing house).

The settlement of foreign exchange transactions has undergone significant changes, evolving from the direct settlement of transactions on a gross basis between trading members to multilateral net settlement with a guarantee from CCIL, a CCP. The INR leg of the trade is settled in the RTGS system. In addition, CCIL has introduced FX-CLEAR, a forex trading system which offers both order-matching and negotiation modes for dealing.

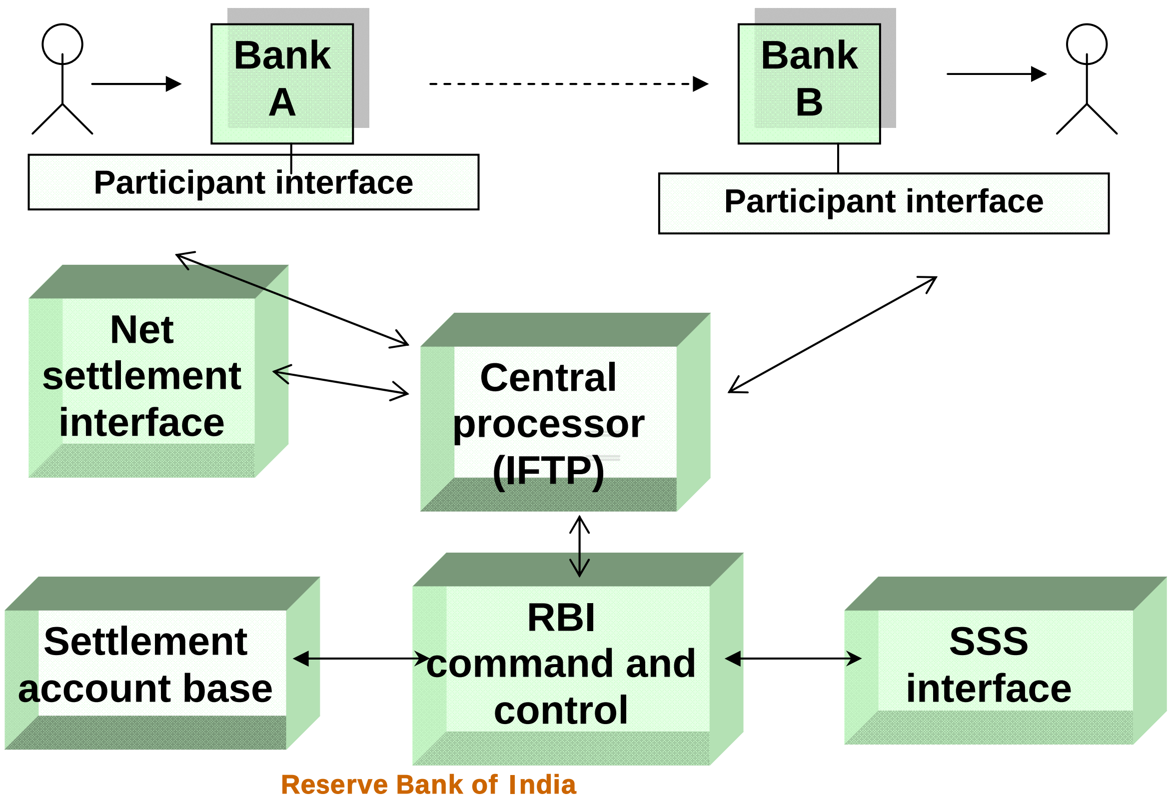
---

[32] A separate interbank clearing and settlement where banker's cheques were exchanged was introduced in 1989 as a risk mitigation measure for the cheque-based system; clearing and settlement was completed within 30 minutes in the accounts of the Reserve Bank.

[33] Transactions have migrated to electronic channels (RTGS/NEFT) or, if cheque–based, they are processed in the normal MICR clearing.

3.2 Real-time gross settlement system

The RTGS system, in operation since March 2004, is a large-value funds transfer system in which financial intermediaries can make payments for their own account as well as for their customers. The system offers final settlement of funds transfers on a continuous, transaction-by-transaction basis throughout the processing day. The process flow of the RTGS system is shown below.



3.2.1 Operating rules

RTGS operations are governed by the RTGS (Membership) Regulations, 2004, and the RTGS (Membership) Business Operating Guidelines, 2004. These were previously contractual in nature but are now notified under the Payment and Settlement Systems Regulations, 2008. The regulations provide for the oversight of the RTGS system, a standing committee for the management of the system, an admission procedure for members etc. The RTGS guidelines detail business operations, including the use of settlement accounts and funding accounts, transaction types, communication, message formats, settlement of transactions, intraday liquidity facility, queue management and gridlock resolution.

3.2.2 Participants

Membership is open to banks, primary dealers (market-makers in the government securities market) and any other institution at the discretion of the RBI.[34] The criteria for membership include membership of INFINET, membership in the NDS/SSS and maintenance of settlement accounts with the RBI in Mumbai. The RBI may provide membership of the RTGS system to clearing houses or agencies even if they do not fulfil the above criteria.

Members are classified into different categories, based on certain criteria. The RBI and the commercial banks belong to category A, primary dealers to category B. Members of categories A and B are direct members of the system. Clearing houses and clearing agencies (including CCIL) are category D membership. (There is no category C membership).

3.2.3 RTGS transaction types

Members of categories A and B can submit their own interbank transactions, but only category A members can submit transactions on behalf of their customers. Transactions emanating from the SSS, settlements of the INR leg of foreign exchange transactions, and multilateral net settlements of cheque-based clearings, the ECS in Mumbai, the NEFT system and NECS are also processed in the RTGS system, in addition to transactions submitted directly by the RBI for its monetary policy operations. Category D members are allowed to submit only net settlement batches to the RTGS system.

3.2.4 Settlement procedure and liquidity support

To settle transactions submitted to the RTGS system, members must maintain an RTGS settlement account with the RBI in Mumbai. This account has to be funded at the beginning of each RTGS processing day from the member's current account with the RBI, and at the end of the day the balance in the settlement account is transferred back to that current account. Since banks maintain current accounts with different offices of the RBI, they are allowed to transfer funds during the RTGS day between these current accounts and the RTGS settlement account. For this purpose, there is an interface between the RTGS system and the Integrated Accounting System (IAS) of the RBI. The IAS is the accounting system of the RBI (members' current accounts are in IAS). The banks use the option available in their Participant Interface (PI) (to transfer funds from one account to another in Mumbai) or use the centralised funds management system (CFMS) if the transfer is between accounts from one office of the RBI to another.

Transactions which have passed all validity checks are taken up for settlement on a FIFO with priority basis. All such transactions based on available balances in the settlement account are duly settled by debiting the account of the sending bank and crediting the account of the receiving bank. Settlement finality on a gross basis in real time is achieved when this process is complete.

Members can obtain intraday liquidity (IDL) from the RBI (fully collateralised by Indian government securities held by the members in their IDL-SGL account) free of interest to augment their available liquidity in the RTGS system. IDL must be returned by the end of the RTGS day. Failure to do so is subject to a penalty interest charge on outstanding balances.

---

[34] Foreign banks operating in India with a branch are RTGS members.

3.2.5 Transaction processing environment

The RTGS system operated and managed by the RBI uses a Y-shaped message flow structure. Members connect to the system through INFINET and use the participant interface (PI) to communicate with the interbank funds transfer processor (IFTP), which validates all communications. When a transaction is successfully completed and this is confirmed by the RTGS system, the IFTP forwards the credit information to the beneficiary member's PI. All communications between the PI and the IFTP are encrypted and use digital signatures (under public key infrastructure).

3.2.6 The RTGS system process flow

The RTGS business day starts at 09:00. Customer and interbank transactions can take place from the start of day to 16:30 and 18:00 respectively on weekdays and to 13:30 and 15:00 respectively on Saturdays. The IDL facility is available during these business hours.

A payment instruction is sent by a member through its PI, and is validated and acknowledged by the IFTP. It is then forwarded by the IFTP to the RTGS, which maintains the settlement accounts of the participants where the funds transfer actually takes place. In the RTGS, the availability of funds in the settlement account is checked, the funds are transferred (settlement takes place) provided balances are sufficient, and a message is sent to the IFTP for onward transmission to the beneficiary bank.

If sufficient funds are not available in the settlement account of the paying bank, the payment instruction is put in a queue that is processed on a first in, first out (FIFO) basis. Payment instructions can be assigned a priority by members (who can change these priorities until settlement). Instructions with a higher priority are processed first, while FIFO is applied to payment instructions with the same priority.

When a payment instruction is found pending in the queue, a message is sent to the SSS asking for the availability of eligible securities in the member's IDL-SGL account, for triggering IDL. If securities are available, the SSS uses them as collateral and a confirmation is sent to the RTGS system, where the necessary funds are made available and the payment is processed. When securities are not available, the SSS sends a message to the RTGS system and the payment instruction is put back into the queue.

At pre-scheduled intervals, the IDL reversal is activated to check for outstanding IDL utilised by members. If sufficient balances are available in a member's settlement account, the funds are utilised to reverse the IDL and a message is sent to the SSS to release the securities held as collateral into the member's IDL-SGL account. These securities then become available for other uses. Half an hour before the close of the RTGS business day, new IDL provision to members stops and members must return all outstanding IDL by the end of the day.

3.2.7 Credit and liquidity risk

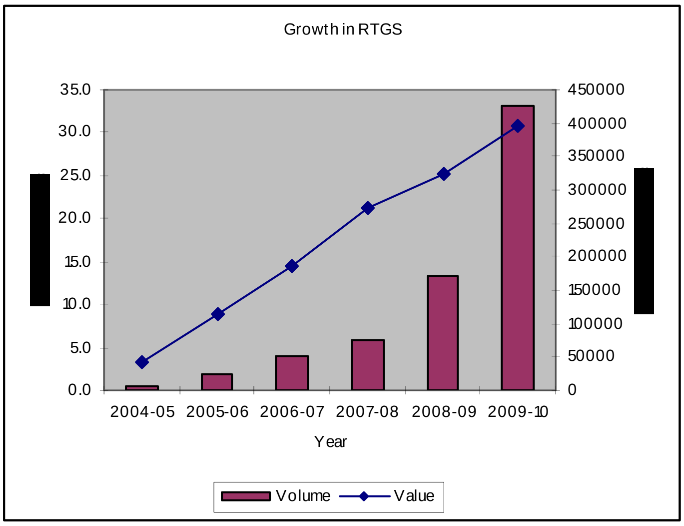
Settlement of transactions in RTGS on a gross basis eliminates credit risk. Liquidity risk is mitigated by the provision of IDL, which facilitates smooth settlement of transactions in the system. Now that the RTGS system is operational, the priority is to integrate other payment systems through the RTGS to mitigate the credit and liquidity risks present in those systems, as well as to promote efficient liquidity management by the participants. To this end, interfaces have been built with the securities settlement system and the foreign exchange transactions settlement mechanism. The settlement of these transactions now takes place in the RTGS system, as does the settlement for CBLOs. The settlement of the clearing operations at Mumbai for cheque-based (MICR clearing) and electronic clearing (ECS in Mumbai, NECS and NEFT) is settled in RTGS as a multilateral net settlement batch (MNSB). In addition to providing an interface to the RTGS system for various payment and settlement systems in the country, the integration of the RTGS system with the RBI's internal accounting system (IAS) facilitates the movement of funds between the RTGS settlement accounts of members and their current accounts held with the RBI using straight through processing (STP).

3.2.8 Pricing

The system's development cost was borne by the RBI. The RBI levies no charge for transaction processing or IDL usage; the RTGS regulations do, however, provide for such charges.

3.2.9 Statistics

Since the RTGS system started operations, the volume and value of transactions have increased from 0.5 million transactions with a value of INR 40,661.8 billion in 2004–05 to 33.4 million transactions with a value of INR 394,533.6 billion in 2009–10. A total of 119 banks through more than 68,000 branches provide access to the RTGS service. The rising trend of RTGS utilisation is shown in the graph below.



3.3 Exchange and settlement system for foreign exchange transactions

Prior to the establishment of CCIL, transactions in foreign exchange markets were settled bilaterally by trading members through their correspondent banking arrangements. The introduction of the guaranteed settlement facility for USD-INR trades through novation by CCIL with itself as the CCP in 2002 has substantially increased the efficiency of the clearing and settlement of such trades. Foreign exchange transactions that are not settled through CCIL still make use of corresponding banking arrangements.

3.3.1 Ownership, governance and regulatory status of CCIL

The ownership structure of CCIL is presented in Section 1.3.2. It acts as a CCP in the settlement of trades in the government securities and foreign exchange markets. Governance is through CCIL's by-laws, regulations and rules. For foreign exchange transactions, the members must adhere to the directives and guidelines issued by the RBI. The Foreign Exchange Dealers Association of India (FEDAI), a self-regulatory organisation, facilitates the framing of market practices and ethics.

The RBI, as the regulator of government securities, foreign exchange and money markets, regulates the clearing and settlement of these instruments by CCIL. Since CCIL provides guaranteed settlement to participants in these markets, the respective regulatory departments within the RBI are in close touch with CCIL concerning its policies and procedures. CCIL also reports all exceptional activities to the RBI.

3.3.2 Participants

CCIL admits participants in the foreign exchange market as members to its foreign exchange segment after ensuring that they fulfil certain admission criteria.

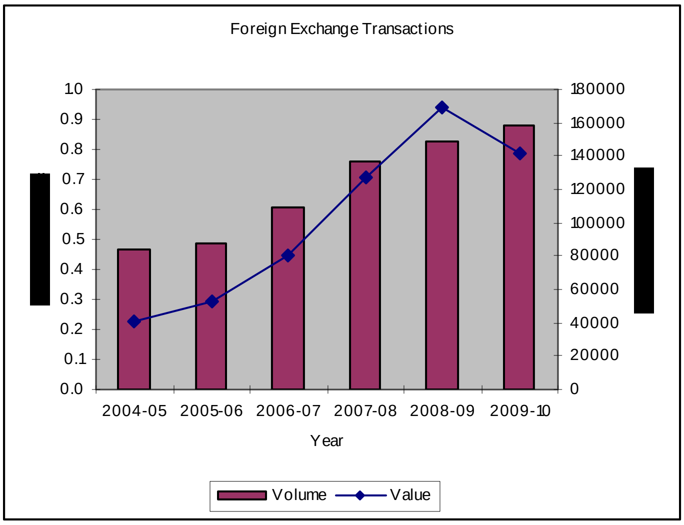
To be eligible, an applicant must:

- be an RBI authorised foreign exchange dealer;
- have a current account with the RBI for settlement of transactions in Indian rupees; and
- have adequate risk management systems in place and employ qualified personnel (for CCIL's risk management see Section 3.3.7).

As of March 2010, there were 75 members in the foreign exchange segment.

3.3.3 Transactions handled

CCIL started operations in the foreign exchange segment in November 2002, providing guaranteed settlement for spot[35] and forward INR/USD transactions, by novation to itself as the CCP. This facility was extended to cash and tomorrow-next transactions in February 2004. Since then CCIL's transaction volumes have grown to 1.4 million trades in March 2010, representing a total transaction value of more than INR 387,395.8 billion (on a gross basis without netting).



[35] (i) ***Cash trades:*** trades where the value date for settlement is the same as the trade date; (ii) ***tomorrow-next trades:*** trades where the value date for settlement is the next business day from the trade date; (iii) ***spot trades:*** trades where the value date for settlement is the second business day from the trade date; (iv) ***forward trades:*** trades where the value date for the settlement falls beyond the spot date.

3.3.4 System operating procedure

CCIL receives trade information through the web-based reporting facility it provides to its members. CCIL has also developed the FX-CLEAR trading platform for its members. When this is used, the trade information is automatically routed to CCIL. Trades reported before the cut-off time (11:30 on T–1 for spot and forward deals, 11:30 on T for cash and tomorrow-next transactions) are matched by CCIL. Unmatched trades are rejected. CCIL verifies the exposures resulting from matched trades vis-à-vis the members' exposure limits (ELs). Members can include trades exceeding ELs under CCIL's guaranteed settlement facility, provided such exposures are fully pre-funded within the designated time. If they are not pre-funded, these trades are excluded from further processing and need to be bilaterally settled by the members outside the CCIL settlement system.

3.3.5 Clearing of trades and settlement obligations

Forward deals are guaranteed for settlement from day T–2, while cash, tomorrow-next and spot deals are guaranteed from the time they are accepted for settlement. CCIL becomes the CCP to every accepted trade by novation. Transactions are processed in batches throughout the day.

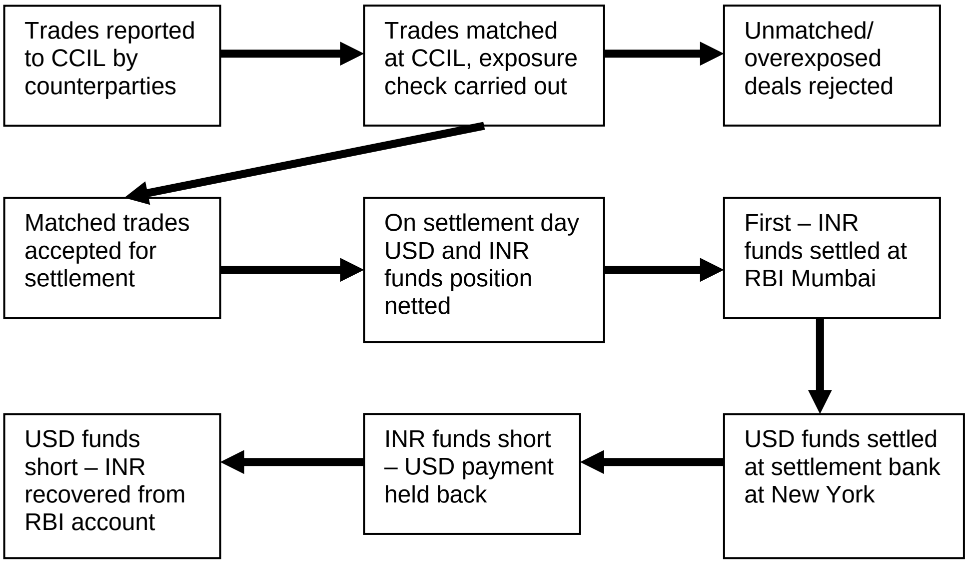
Settlement obligations are calculated separately for each currency, ie USD and INR. Members are advised of their final settlement obligations so that they can make arrangements for funds in each currency.

3.3.6 Settlement procedure

Settlement is not on a PVP basis and is therefore exposed to settlement risk as the INR settlement takes place before the USD settlement. The risk is managed by setting position limits for the members. CCIL collects margins from members to cover market risk exposures for those positions and also for covering credit risk exposures based on a credit scoring model. A loss allocation process, based on notional bilateral net exposures, covers any residual risk.

The settlement of INR obligations takes place in members' accounts with the RBI. The net obligations of members are electronically advised to the RBI in a batch mode and are settled in the RTGS system at the RBI. The amounts to be paid in are first debited from members' current accounts and transferred to the account of CCIL, and the funds are then paid out from CCIL's account to the accounts of the receiving members. To meet any shortfall, CCIL has a rupee line of credit (RLOC) from four banks that hold accounts with the RBI. In case of a funds shortage by members with a net payment obligation, the RLOC is invoked by the RBI (as per CCIL's standing instructions) to complete the settlement. CCIL then withholds the USD payout to the members concerned until they have fulfilled their INR obligations.

The settlement details of the USD leg are sent to CCIL's correspondent bank in New York, through which the USD pay-ins to CCIL's nostro account take place. CCIL also offers a direct debit facility (using a SWIFT MT 300 message) for the USD leg in order to further reduce members' transaction costs. After the members with USD net payment obligation complete their pay-ins, the payouts to members with a USD net credit position take place from CCIL's nostro account. In case of a pay-in default by any member, a USD line of credit with the settlement bank (using the collateral of the settlement guarantee fund (SGF)) enables CCIL to complete the settlement process. Since the USD leg is settled after completion of the INR leg, in case of a USD default by a member, CCIL advises the RBI to debit the member's current account with an equivalent INR amount and to credit it to CCIL's account. This amount is withheld by CCIL until the member has fulfilled its USD obligations. If this does not happen, the INR amount is sold to obtain USD and repay the line of credit. In addition to recovering any additional costs incurred by CCIL, a penalty is levied on members that do not fund their positions in due time.



3.3.7 Risk management

Risk management comprises the following measures: (i) a net debit cap for each member; (ii) a member-specific margin factor and collection of margins by way of contribution to the Settlement Guarantee Fund (SGF) in the form of USD/INR funds, cash, securities etc; (iii) member-specific exposure limit based on the balances in the SGF and the margin factor and (iv) a loss allocation mechanism.

The net debit cap (NDC) for each member represents the maximum potential exposure for CCIL for a given settlement date, arising out of the member's failure to honour its commitment. Net debit cap limits for USD/INR trades are denominated in USD. CCIL sets the NDC according to ratings assigned to members on the basis of financial criteria such as net worth and asset quality. NDCs are periodically reviewed and adjusted.

CCIL also sets a margin factor for each member, based on: (i) a credit factor that reflects the ratings assigned to members based on financial criteria such as net worth and asset quality, and (ii) a volatility factor based on value-at-risk for USD/INR exchange rates over a three-day period.

CCIL also requires margins to be posted for trades settled through it. These comprise (i) a mark to market margin against adverse price movements or against trades accepted at off-market prices; (ii) a volatility margin against sudden increases in market volatility, which is applicable to outstanding trades or a member's securities contribution to the SGF.

CCIL also computes and sets an exposure limit for each member based on its SGF balance and margin factor. The exposure limit is the maximum net amount in USD payable by the member, on a given settlement date, for which a member can settle its trades through CCIL. The maximum exposure limit is the net debit cap.

The loss allocation mechanism consists in appropriating the SGF contribution of the defaulting member prior to apportionment of settlement loss as part of the loss allocation procedure. If CCIL is unable to make good the loss through the member's SGF contribution, the shortfall is allocated to the members who were due to receive payment from the defaulting member(s) in proportion to their individual net exposure in the currency of default. Any amounts subsequently recovered from the defaulting member are apportioned among the members who contributed to making good the shortfall.

If more than one member defaults, any shortfall that is allocated among the other members excludes all the trades done by the defaulting members with each other.

The system has a high netting ratio – up to about 98%. As a result, the residual risk exposure of the settlement system to a participant does not normally exceed 2% to 3% of the transaction value.

3.3.8 Cross-currency CLS-eligible trades

CCIL does not offer CCP clearing for CLS-eligible[36] cross-currency trades. Foreign exchange cross-currency trades in CLS-eligible currencies of the authorised dealers are settled by CCIL under an arrangement with its settlement bank, Royal Bank of Scotland (RBS). CCIL uses the third-party services of RBS, and extends services to the participating banks (fourth parties) as a settlement aggregator.

Trade settlement: CCIL arranges settlement of these trades at a netted level through its accounts with its settlement bank, which in turn settles these trades in the CLS settlement system.

As a third party of a CLS Bank settlement member (RBS), CCIL must meet the settlement obligations of the fourth-party settlement participants settling through it, if the trades are not rescinded before a cut-off time. It therefore collects margins from the settlement participants to cover any exposures arising out of a default by a settlement participant or out of an early payout. Margins are based on potential future exposures on trade positions to be settled. To control the exposure, settlement date-wise limits are set. If required, early payout of receivables are allowed against full collateral cover.

In case of a default, the defaulting member must make good the shortfall by a set time on the next day. Margins are kept blocked until then and are appropriated if the defaulting member fails to make good the shortfall before the deadline. Any remaining shortfall is met by the CCIL's Settlement Reserve Fund.

3.4 Retail payment systems

Retail payment systems in India include both paper-based and electronic (NEFT and ECS/NECS/RECS) funds transfer systems. Cards are another popular option for retail payments.

3.4.1 Card-based systems

The settlement of transactions with American Express, Visa and MasterCard cards (for credit cards, debit cards and pre-paid cards) takes place in commercial bank money at the respective settlement banks.[37]

The RBI regulates the banks issuing the cards. Under the Payment and Settlement Systems Act, payment card systems are also subject to regulation by the RBI. Any new initiatives concerning the card system must be vetted by the RBI before implementation.

Card-based payments now account for a substantial share (56% in terms of volume and 13% in terms of value) of electronic retail payment transactions. Initially, debit cards were mainly single-purpose cards (for instance petrol cards or virtual calling cards issued by the telecom

---

[36] CLS (Continous Linked Settlement) is an international payment system that settles foreign exchange transactions in 17 currencies eliminating settlement risk by means of a PVP mechanism. For details of CLS, please see the corresponding chapter in the forthcoming second volume of this publication.

[37] Bank of America for Visa and Bank of India for MasterCard.

service provider MTNL) and did not involve interbank settlement. Now co-branding is gaining ground.[38]

With the increased usage of credit/debit cards in the country on internet/mobile/interactive voice response (IVR), an additional level of authentication has been mandated by the RBI. This additional authentication/validation will be based on information not visible on the cards for all online "card not present" transactions. Also a system of online alerts[39] to the cardholder for all "card not present" transactions has been mandated.

3.4.2 Cheque clearing system

Payment by cheque is the most popular mode of non-cash payment.

The cheque clearing system was automated with the introduction of MICR technology, initially in the four large cities[40] and subsequently in 62 other cities. With MICR, cheques can be sorted and listed at a centralised location using automated processors, which increases the speed and efficiency of cheque processing. Most of these MICR centres have been set up in the last few years.

More than 83% of the total volume and value of cheques are cleared at MICR processing centres. At these MICR cheque processing centres, banks are required to present to the clearing house before the end of banking hours all the cheques received at their counters or drop boxes for same-day processing. These cheques are processed overnight and reach the paying bank the next morning. The paying bank then accepts the cheque for payment if it is valid and the account of the payer has sufficient funds (value date of clearing or payment); otherwise, it is returned.

Settlement on the accounts of the paying and presenting banks with the settlement bank takes place on the same day. Cheque transactions are settled locally in the current accounts that participants in the system maintain with the bank managing the clearing house. At the 17 centres where the RBI manages the clearing house, settlement takes place in central bank money in participants' accounts with the RBI. However, the presenting banks are only allowed to utilise the funds obtained after the return clearing (the clearing of returned cheques), which also takes place the same day. Also the presenting banks are normally expected not to permit the presenters of the cheques (the beneficiaries) to use the proceeds until the return clearing is complete.

Clearing house membership includes post office savings banks. In centres with more than one post office savings bank, membership is given to the general or head post office of that centre. The other post office savings banks then present their instruments for clearing through the one designated for this purpose by the general or head post office.

To reduce the clearing time for inter-city cheques, "Speed Clearing", a new method of clearing inter-city cheques drawn on bank's "core banking branches"[41] was introduced in June 2008. This is part of the main MICR clearing, in which cheques drawn on core banking branches will be cleared locally irrespective of the branch's location.

High-value clearing was previously used to clear and settle large-value paper-based payments in major cities. Given the significant risks in paper-based clearing systems,

---

[38] General purpose debit cards are linked to bank accounts. These cards can be used at any POS or ATM. Because ATM/POS infrastructure in India is interoperable, interbank settlement is involved as the merchant and the card holder may hold accounts with different banks.

[39] The customer is sent an SMS message detailing any such transactions.

[40] The four large cities are Chennai, Kolkata, Mumbai and New Delhi.

[41] The branches of banks that are computerised and connected.

especially for large-value instruments, this clearing was discontinued at all centres in March 2010.

3.4.3 Electronic Clearing Service (ECS)

The ECS system is available in 88 cities. Membership in the ECS is automatically extended to all members of the cheque clearing systems, provided ECS is available in that centre. As in the case of cheques, ECS transactions are settled locally in the current accounts maintained with the bank managing the clearing house. The two ECS sub-systems are governed by the Clearing House Regulations and Rules and the Procedural Guidelines for each of the systems. These are enforced by way of contracts between the participating banks and the bank managing the clearing house. Settlement takes place locally in the accounts maintained with the settlement bank. NECS was implemented to fill in the coverage gaps left by ECS; the system covers the whole of India, exploiting the IT infrastructure of member banks.

ECS Credit

ECS Credit is used for the payment of salaries, pensions, dividends, interest etc. Payers submit credit instructions through their banks (sponsor banks). On the settlement date, the account of each sponsor bank is debited and the accounts of beneficiary banks are credited. Credit instructions are sent to the beneficiary banks in advance so that instructions can be returned if, for any reason, the beneficiary bank is unable to credit the recipient customer's account.

Settlement for ECS is on T+1 basis. The entity making the payment submits the payment instruction through its sponsor bank. On day T the instructions are processed at the clearing house and passed on to the beneficiary bank. If the beneficiary bank cannot credit the customer for any reason, the instructions must be returned. A separate return clearing is held and final settlement is completed on T+1. Settlement takes place in the books of accounts of the settlement bank.

The volume of ECS transactions increased from 88.4 million during the year to March 2009 to 98.1 million transactions during the year to March 2010, and from INR 974.9 billion to INR 1,176.1 billion respectively in terms of value.

National Electronic Clearing Service (NECS)

NECS was implemented in September 2008 to fill the gaps in ECS coverage. NECS (Credit) facilitates multiple credits to beneficiary accounts in destination branches across the country, against a single debit of the account of a user at the sponsor bank. The system covers the whole country, making use of the core banking solutions (CBS) of member banks. This enables all CBS bank branches to participate in the system, irrespective of their location.

In the new set-up, users prepare a single consolidated NECS file and submit it to the central clearing house in Mumbai through their sponsor banks. The files can be uploaded by sponsor banks until the cut-off time one day prior to the settlement day, thus reducing processing time. Settlement is postponed to the next working day for files uploaded after the cut-off time. Returns are also processed on the settlement day itself and thus on the third day users know the status of their transactions.

ECS Debit

This system is used for multiple debits culminating in a single credit. A utility company gives the debit instructions (based on mandates given by its customers) to the sponsor bank, which in turn presents them to the clearing house for further processing. On the settlement date, the customers' accounts are debited and the sponsor banks' accounts are credited.

The clearing and settlement procedure is the same as in ECS (Credit).

ECS Debit transactions declined from 160.0 million transactions during the year to March 2009 to 149.3 million transactions during the year to March 2010. However, the value increased from INR 669.8 billion to INR 695.2 billion during this period.

3.4.4 Electronic Funds Transfer system

The Electronic Funds Transfer (EFT) system implemented in the mid 1990s and the National EFT (NEFT) implemented in November 2005 are deferred net settlement (DNS) systems that process credit transfers. With the implementation of NEFT, the EFT system has been discontinued. In the NEFT system, settlement takes place at regular intervals during the day, with 11 hourly settlements on weekdays and five on Saturdays. Final settlement of NEFT batches occurs in the RTGS system.

NEFT

The NEFT system uses the Structured Financial Messaging Solution (SFMS) for EFT message creation and transmission from a branch to the bank's gateway and to the NEFT centre, using the tools available from the SFMS. By using PKI, NEFT considerably enhances the security of funds transfer operations. NEFT is available across the country and is not centre-specific. Bank branches that are computerised and capable of handling electronic transactions are linked to NEFT.

Participants must be banks and members of the RTGS system; they must have SFMS installed; and they must comply with other conditions prescribed by the RBI. All or any of these conditions may be relaxed or waived at the RBI's discretion.

The volume of transactions has increased from 32.2 million during the year to March 2009 to 66.3 million during the year to 2010, and from INR 2,519.6 billion to INR 4,095.1 billion respectively in value terms.

3.4.5 Ongoing and future projects

3.4.5.1 Cheque truncation

The Cheque Truncation System (CTS) was implemented as a pilot project in the National Capital Region (Delhi) in February 2008 with a view to increasing the efficiency of paper-based processing. With the CTS, paper instruments will no longer need to be physically presented to the clearing house. Banks can decide whether to truncate the cheque at the branch level, the central level (service branch) or the gateway (overall bank) level. Clearing and settlement cycles are the same as for MICR clearing: ie T+1, with the exception of the processing cycles and the return clearing cycle, which are advanced by 4–5 hours). The scope for straight through processing and automated payment processing reduces costs, as well as the incidence of reconciliation problems and clearing fraud. Banks can also offer new products and services based on the CTS. The roll-out of the project to other centres (starting with Chennai) is under way.

3.4.5.2 Centralised Funds Management System (CFMS)

The CFMS consists of two components: the Centralised Funds Enquiry System (CFES) and the Centralised Funds Transfer System (CFTS). The CFES enables RBI account holders to view their balance and transaction details at any time. The CFTS enables banks with current accounts with different offices of the RBI to transfer funds from their own account in one RBI office to their own account in another. All 17 RBI offices have introduced the system. Seventy-six banks use the system to make funds transfers. The system has helped treasury managers centralise and improve their cash management; they can now electronically move funds from surplus centres to deficit centres.

4. Systems for post-trade processing clearing and securities settlement

4.1 General overview

The regulatory framework for the securities market, assigned to the RBI under the RBI Act is described in Section 1.1.2. The issue, servicing and repayment of government securities by the RBI is governed by the Government Securities Act, 2006 and the Government Securities Regulations, 2007. The OTC trades of government securities reported over the NDS are accepted for clearing by CCIL. The NDS–OM (NDS-GILTS-Order Matching) is an anonymous electronic order-matching trade system that matches all orders by strict price/time or yield/time priority. Members also have the option of using the Clearcorp Repo Order Matching System (CROMS) an anonymous order matching platform launched by Clearcorp Dealing Systems (India) Ltd, a wholly owned subsidiary of CCIL. The executed trades then flow to CCIL which acts as the CCP for government securities trades. The final settlement of securities takes place in the Public Debt Office (CSD) of the RBI.

SEBI regulates the securities market through powers conferred to it by the Securities and Exchange Board of India Act, 1992 and the Securities Contract Regulations Act, 1956 (SCRA) and through powers delegated to it by the central government under the SCRA. The BSE and NSE, the two major stock exchanges, account for the vast majority of equity transactions in the country. Both the BSE and NSE have their own trading platforms.

The BSE's electronic trading platform for equities is known as BOLT, for BSE On-line Trading. BOI Shareholding Limited (BOISL) is the BSE's clearing house, clearing and settling funds and securities on its behalf. The Indian Clearing Corporation Limited (ICCL) also functions as a clearing corporation for the BSE. At present, it undertakes clearing and settlement for the BSE's mutual funds and corporate debt segments.

The NSE's electronic trading platform is known as the National Exchange for Automated Trading (NEAT). National Securities Clearing Corporation Ltd. (NSCCL) is the clearing corporation for NSE and carries out the clearing and settlement of trades executed in the equities and derivatives segments of the NSE.

BOISL and NSCCL effect the securities pay-ins and payouts through two depositories,[42] the National Securities Depository Ltd (NSDL) and Central Depository Services Ltd (CDSL). Funds settlement takes place in designated settlement banks. In the case of corporate bonds, ICCL and NSCCL effect the funds settlement in the RTGS and the securities settlement in the two depositories.

[42] NSDL is promoted by NSE and CDSL is promoted by BSE, with major banks as the shareholders in both the depositories.

Details of trading, post-trade clearing and settlement

Markets	Asset class	Trading platforms	Clearing	Settlement	
				Securities / currency	Funds
Primary market (Auction bids)	Government securities	NDS	Bids flow directly to the RBI	SSS (PDO, RBI)	RTGS (RBI)
Secondary market (OTC and order matching)		NDS / NDS-OM/ CROMS	CCIL		
Collateralised borrowing and lending obligation	Money market instrument	CBLO dealing system	CCIL	CCIL	
USD-INR	Currency	FX-Clear	CCIL	USD settlement through CCIL's correspondent bank in New York	
Stock market	Equities	NEAT / BOLT	NSCCL / BOISCL	NSDL / CSDL	Settlement banks
	Corporate bonds	NEAT / BOLT	NSCCL / ICCL		RTGS (RBI)

- Classification
- Different asset classes
- Different trading platforms corresponding to the various asset classes
- Clearing done by clearing corporations of the stock exchange and securities settlement done by securities depositories
- Funds settlement in commercial bank money
- Different markets
- Clearing, settlement at the central bank (RBI)
- Clearing, settlement at CCIL
- USD settlement through CCIL's correspondent bank in New York

4.2 Post-trade processing systems

4.2.1 Government securities

4.2.1.1 Institutional framework

The NDS and NDS-OM are owned by the RBI, with NDS being operated by the RBI. NDS-OM is operated by CCIL under a specific agreement with RBI. The OTC trades reported over the NDS are accepted for clearing by CCIL which acts as the CCP for government securities trades that are finally settled in the SSS. NDS-OM is an anonymous order-driven system. Trades executed on NDS-OM flow directly to CCIL which becomes the CCP to each trade done on the system. The system is overseen by the RBI.

4.2.1.2 Participation

The system has 162 participants, comprising banks, primary dealers and other financial institutions. CCIL and RBI are also participants. Participants must be members of INFINET and be eligible to open an SGL and/or CSGL account with the RBI for securities settlement.

4.2.1.3 Transactions handled

On the NDS platform, market participants can trade and report outright and repo transactions in government securities and treasury bills, as well as dated securities issued by state governments. Market participants who are allowed to open gilt custodian accounts for their customers are also allowed to put through the deals of these customers.

4.2.1.4 System operating procedures

The system operates from 09:00 to 17:00 on weekdays for outright and repo trades and on Saturdays from 09:00 to 14:00 exclusively for repo transactions in government securities. All outright transactions in government securities have a standard (T+1) settlement cycle. For repo transactions, settlement can be on either a T+0 or T+1 basis.

4.2.1.5 Pricing

CCIL has prescribed transaction charges for trades in government securities (see Section 4.3.1.7).

4.2.2 Collateralised Borrowing and Lending Obligation (CBLO)

4.2.2.1 Institutional framework

CCIL as a central counterparty offers a money market product approved by RBI known as the Collateralised Borrowing and Lending Obligation (CBLO). The CBLO combines a tradable repo and tripartite repo. Unlike a normal repo transaction, a CBLO is tradable. It is a discounted instrument backed by gilts as collateral. Lenders of funds buy CBLOs. CBLO balances are maintained in electronic book entry. CBLOs can be traded anonymously in the market through a trading system known as the CBLO Dealing system.[43]

---

[43] The CBLO Dealing system is made available by CCIL through its wholly owned subsidiary Clearcorp Dealing Systems (India) Ltd (CDSIL). The Clearcorp Dealing Systems (India) Ltd (CDSIL) owns and manages various trading solutions such as FX-CLEAR (a forex dealing system) and CROMS (Clearcorp Repo Order Matching System; an anonymous order matching platform for dealing in market repos in government securities).

4.2.2.2 Participation

Membership of the CBLO segment is granted to NDS members and non NDS members. The entities eligible for CBLO membership are nationalised banks, private banks, foreign banks, cooperative banks, financial institutions, insurance companies, mutual funds, primary dealers, non-banking financial companies (NBFCs), corporates, provident/pension funds etc.

4.2.2.3 Transactions handled

CCIL offers guaranteed settlement of transactions in CBLOs, both at trade level and at redemption level on maturity. The market is mostly concentrated in overnight CBLOs.

4.2.2.4 System operating procedures

CBLOs can be settled either on a T+0 basis or on a T+1 basis. System operating hours are based on the settlement schedule and on whether the trades are settled directly with RBI or with settlement banks. Where the trades are settled through settlement banks, the system operating hours are shorter. For details of the system operating hours, see Section 4.3.2.4.

4.2.2.5 Pricing

CCIL has prescribed transaction charges for trades in CBLO (see Section. 4.3.2.7).

4.2.3 Interest rate swaps

A trade warehouse for the rupee-denominated interest rate swap market was set up in 2007 using the services of CCIL. All market-makers (ie banks and PDs) are required to report their trades within 30 minutes to the trade warehouse where the trades are matched. Trade matching is not accepted as a trade confirmation. Market participants are required to exchange physical confirmation for each trade. The trade warehouse offers full post-trade processing for the trades in the warehouse. Settlement of daily obligations relating to these trades is also offered by CCIL without any settlement guarantee. Funds settlement occurs in the accounts of the participating institutions with RBI. A portfolio compression model developed by CCIL has been launched.

4.2.4 Exchange-traded securities and derivatives

4.2.4.1 The National Stock Exchange (NSE)

4.2.4.1.1 Institutional framework

The NSE was set up in November 1992 as a for-profit company under the Companies Act, 1956, and is owned by shareholders, who are financial institutions. The NSE is a listed company. The NSE was recognised as a stock exchange by the SEBI in April 1993. The NSE was the first stock exchange in the country to offer a nationwide order-driven, screen-based trading system.

National Securities Clearing Corporation Ltd (NSCCL), a wholly owned subsidiary of NSE, was set up in August 1995. It was the first clearing corporation in the country to provide a novation/settlement guarantee system in India. It started clearing operations in April 1996. NSCCL clears and settles trades executed in the equities and derivatives segments of the NSE. NSCCL has a panel of 13 clearing banks. Every clearing member is required to maintain and operate clearing accounts with any of the clearing banks in the panel at the designated clearing bank branches. The clearing corporation, NSCCL, is governed by the regulations for clearing corporations.[44] Securities pay-in and payout is effected through the two depositories NSDL and CDSL.

4.2.4.1.2 Participation

Membership of the NSE/NSCCL is open to corporate entities, individuals and partnerships who fulfil the eligibility criteria laid down by SEBI and NSE. Trading/clearing members/clients are governed by the respective regulations.[45] All trading members in the cash market segment are also clearing members of NSCCL. The custodian clearing members are also members of the NSCCL panel that carries out clearing and settlement of transactions on behalf of their clients.

4.2.4.1.3 Transactions handled

The trading system at NSE provides a fully automated, screen-based trading for equities and derivatives products. It supports an anonymous order-driven market, which operates on a strict price/time priority basis.

4.2.4.1.4 System operating procedures

The market operates from 09:00 to 15:30 five days a week.

In the cash market segment all trades executed on NSE are electronically transferred to NSCCL after trading hours on the T day itself for clearing and settlement and are settled on a T+2 basis.

In the derivatives segment, the open positions of clearing members (CMs) are arrived at by aggregating the open positions of all trading members (TMs) and all other participants clearing through CM, in the contracts which they have traded. The open position of a TM is calculated by aggregating its proprietary open positions and those of clients for all traded contracts. Proprietary positions are calculated on a net basis for each contract and clients' positions are the sum of the net positions of each individual client. All transactions are cash-settled and there is no physical settlement.

4.2.4.1.5 Pricing

NSE has prescribed transaction charges for trades in various segments.

4.2.4.2 The Bombay Stock Exchange (BSE)

4.2.4.2.1 Institutional framework

The BSE is the oldest stock exchange in Asia. Established in 1875, it was the first stock exchange in the country to be recognised under the Securities Contracts Regulation Act. In August 2005, the exchange changed its legal status from an Association of Persons into a corporate entity, with its name changing from "The Stock Exchange, Mumbai" to "Bombay Stock Exchange". Trading on the BSE in equity, debt and derivatives is entirely screen-based.

BOI Shareholding Limited (BOISL) is the BSE's clearing house, clearing and settling funds and securities on the BSE's behalf. The Indian Clearing Corporation Limited (ICCL), a wholly owned subsidiary of the BSE, functions as a clearing corporation for the BSE's mutual funds and corporate debt segments. The BSE has appointed certain banks as clearing banks

---

[44] NSCCL's operations are governed by the provisions of the Companies Act, SEBI Act, Securities Contract Regulation Act, Depositories Act, Income Tax Act etc, and any rules, regulations notifications, circulars and directives issued under this legislation.

[45] NSCCL has defined rules, regulations and by-laws for its members, which govern the relation between the Clearing Corporation and its members and deal with various operational issues.

through which the funds pay-in and payout are effected. Participants (ie member brokers and custodians) select one of these clearing banks through which to clear their funds obligations. Securities pay-in and payout is effected through the two depositories, NSDL and CDSL.

4.2.4.2.2 Participation

Individuals, companies established under Companies Act, 1956, and financial institutions that fulfil the eligibility criteria can become trading members of BSE.

4.2.4.2.3 Transactions handled

The BSE's electronic trading platform for equity, debt and derivatives is BSE On-line Trading (BOLT).

4.2.4.2.4 System operating procedures

The market operates from 09:00 to 15:30 five days a week.

All equity segment and fixed income securities listed on BSE are settled on a T+2 basis.

4.2.4.2.5 Pricing

BSE has prescribed transaction charges for trades in various segments.

4.2.4.3 BOI Shareholding Limited (BOISL)

The post-trade settlement system includes exchange, clearing corporation, clearing house, member brokers, depositories and public and private sector clearing banks as participants. The clearing and securities settlement in the equity cash segment takes place on a T+2 basis.

4.2.4.3.1 Institutional framework

BOI Shareholding Ltd. (BOISL) was established in 1989 as a joint venture company by Bank of India (BOI) and BSE. BOISL is an independent clearing house of the BSE. BOISL clears and settles funds and securities on behalf of BSE.

4.2.4.3.2 Participation

Information on participation is provided in Section 4.2.4.2.2.

4.2.4.3.3 Types of transaction

BOISL is the clearing house for trades carried out on the BOLT platform in the equity, debt market and derivative segments.

4.2.4.3.4 Operations of the system and settlement procedures

Trades executed on BOLT are netted at the BSE and a consolidated file is uploaded to BOISL on T+1. The file contains details of the funds and securities obligations of each clearing member for the respective settlement. For the fund settlement, the exchange uploads a file with the net obligations of clearing members to BOISL on T+1. After processing this file, BOISL uploads these files to the clearing banks where clearing members maintain their designated settlement accounts, also on T+1. Clearing banks must confirm pay-in by clearing members by 11:00 on T+2 to BOISL. At present, 16 banks act as clearing banks to the exchange.

Members can effect pay-in of dematerialised securities to the clearing house through either of the depositories, ie the NSDL or the CDSL. Members are required to give instructions to their respective depository participants (DPs) with details of settlement number, effective pay-in date, quantity etc.

4.3 Central counterparties and clearing systems

Clearing Corporation of India Ltd. (CCIL): The role of CCIL as a CCP in the government securities, CBLO and USD-INR segment is detailed in the following sections.

4.3.1 Government securities

CCIL[46] acts as a central counterparty and guarantees settlement for government securities. For this purpose, the members of NDS and NDS-OM must become members of the government securities segment of CCIL. There is a direct interface between both systems, to facilitate straight through processing of transactions.

4.3.1.1 Institutional framework

The institutional framework under which CCIL, the CCP, is governed is detailed in Sections 1.3.2 and 4.2.1.1.

4.3.1.2 Participation

Information on participation in this segment can be found in Section 4.2.1.2.

4.3.1.3 Types of transaction

CCIL acts as CCP for secondary trades relating to government securities and provides a guaranteed settlement on a DVP3 basis. Market participants can trade and report outright and repo transactions in government securities and treasury bills, as well as dated securities issued by state governments. Market participants who are allowed to open gilt custodian accounts for their customers are also allowed to put through the deals of these customers.

4.3.1.4 Operations of the system and settlement procedures

For this purpose, NDS and NDS-OM members must become members of the government securities segment of CCIL. There is a direct interface between NDS, NDS-OM, CROMS and CCIL to facilitate straight through transaction processing. Trades that pass the exposure check are accepted for guaranteed settlement and are novated. Consequently, CCIL becomes the buyer to the seller of a trade and the seller to the buyer. CCIL then calculates the net obligations of each member for funds and securities. Members are then advised of their final obligations and the settlement details are sent to the RBI for further processing. Securities and funds settlement take place on a DVP3 basis at the end of the day.

4.3.1.5 Risk management

Margin: When trades are accepted, CCIL collects margins to cover potential future exposures. Mark to market margins are then collected on an intraday or end of the day basis, to cover any loss in value of these trades. A volatility margin is also collected if high volatility is seen in the market. Margins are collected in the form of cash and/or government securities. Appropriate haircuts are applied on securities placed as margins and these are revalued daily at the end of the day. When necessary, CCIL makes additional margin calls on the members to ensure that it has enough collateral to provide the settlement guarantee.

Default procedure: As settlement is on a DVP basis, the first line of defence against a default is to withhold the delivery of funds or securities. The defaulter is allowed to make good the shortfall by a set time on the next day. If the defaulter fails to do so, the withheld funds or securities are appropriated to meet the shortfall. The margin payments are then applied to

---

[46] For institutional details please see the beginning of Section 4.2.1.1.

meet any residual loss. If there is still a residual loss, the CCIL's Settlement Reserve Fund is used to meet it.

Liquidity risk: Liquidity risk is managed through lines of credit from commercial banks and securities lines of credit from commercial banks and financial institutions.

4.3.1.6 Links to other systems

The clearing system of CCIL is linked to NDS, NDS-OM, and CROMS. CCIL is linked to the RTGS system for settlement of funds and to the securities settlement system at RBI (CSD for government securities) for securities settlement. These systems are also used for collateral collection and margins.

4.3.1.7 Pricing

The transaction charges, penalty for margin shortfall, charges payable by the defaulting member when the trade is settled by CCIL or when the trade is allocated to CCIL are published on the website of CCIL.[47]

4.3.2 Collateralised Borrowing and Lending Obligations (CBLO)

4.3.2.1 Institutional framework

The institutional framework under which CCIL, the CCP, is governed is detailed in Sections 1.3.2 and 4.2.2.1.

4.3.2.2 Participation

The participation in this segment is detailed in Section 4.2.2.2.

4.3.2.3 Types of transaction

The types of transaction in this segment are detailed in Section 4.2.2.3.

4.3.2.4 Operations of the system and settlement procedures

CBLO dealing takes place in the auction market and the normal market. The auction market is available only to NDS members with a settlement account at RBI for overnight borrowing and settlement on T+0 basis. Access to the auction market is not available to associate members. Based on the borrowing limits fixed by CCIL, members submit their borrowing requests through the CBLO dealing system indicating the amount, maturity and the cap rate before the start of the auction session. Members are permitted to borrow and lend funds on overnight basis indicating the cap rate(s)[48] which is linked to CCBOR.[49]

The CBLO normal market is available to both CBLO (NDS) members and associate members. CBLO (NDS) members access the market via INFINET and associate members access it via internet. Members deposit cash and/ or eligible securities prior to starting CBLO dealing operations. Limits are made available to members based on the cash or eligible securities deposited with CCIL for that purpose in the CBLO segment. CBLO members can place borrowing or lending orders until the end of market hours for either T+0 settlement or T+1 settlement.

---

47 http://www.ccilindia.com/.

48 A cap rate is the maximum rate which the borrower is willing to pay.

49 CCBOR stands for CCIL Collateralised Benchmark Offer Rate.

Trades received from the CBLO dealing system are novated and netted for settlement. A single obligation is generated for each member for each settlement date by netting trades received for settlement on that business date with the redemption obligation for the same date. For members who are not eligible for a current account at RBI, the funds settlement takes place at a designated settlement bank. The final interbank settlement obligations (including the settlement bank obligations) are settled in central bank money at the RBI. Securities of equivalent value are blocked for members against their borrowing limits.

CBLO credits in the form of book entry are given to those members who have lent funds after the CBLO funds settlement is completed. The CBLO holdings are maintained with CCIL. The CBLO leg is therefore settled in the books of CCIL. The settlements are carried out on a DVP3 basis. A report gives details of securities encumbered in the CBLO segment.

4.3.2.5 Risk management

Margins: CCIL collects margins to cover potential future exposures on trades. Collateral in the form of government securities is also collected from the sellers of CBLOs, who effectively borrow funds from the buyers of the CBLOs. Appropriate haircuts are applied on securities placed as collateral for margin purposes and these are revalued daily at the end of the day. Settlement is on a DVP3 basis, with the settlement of CBLOs occurring in the books of CCIL and final interbank funds settlement at the RBI.

Default procedure: As settlement is on a DVP basis, the first line of defence against a default is to withhold the delivery of funds or CBLOs. In case of a default on the redemption proceeds of CBLO on maturity, the collateral collected in the form of margins is also blocked. The defaulter is allowed to make good the shortfall by a set time on the next day. If the defaulter fails to do so,[50] the withheld funds or CBLOs or collateral are appropriated to meet the shortfall. The accumulated margin payments are then applied to meet any residual loss. If there is still a shortfall, the CCIL's Settlement Reserve Fund is used to meet it.

Liquidity risk: Liquidity risk is managed through lines of credit from commercial banks.

4.3.2.6 Links to other systems

The CBLO dealing system is hosted and maintained by Clearcorp Dealing Systems (India) Ltd. NDS members access the CBLO dealing system via INFINET and non-NDS members via the internet. CCIL is linked to RTGS for funds settlement for members who maintain a current account in RBI (and are allowed to operate that current account for settlement of their secondary market transactions) and to settlement banks in respect of other members. CCIL is linked to the CSD (RBI for government securities) for collateral and margin collections.

4.3.2.7 Pricing

Transaction charges, settlement charges, and default charges, including delayed deposit of margin charged by CCIL, are published on the CCIL website.[51]

---

[50] The deadline for this process is stipulated in the segment's regulations. CCIL communicates any changes by means of a notification to the members.

[51] http://www.ccilindia.com/.

4.3.3 Foreign exchange settlement

4.3.3.1 Institutional framework

The institutional framework under which CCIL, the CCP, is governed is detailed in Sections 1.3.2 and 3.3.1.

4.3.3.2 Participation

The participation in this segment is detailed in Section 3.3.2.

4.3.3.3 Types of transaction

The types of transaction in this segment is detailed in Section 3.3.3. CCIL provides guaranteed settlement for all interbank cash, tom, spot and forward USD-INR transactions.

4.3.3.4 Operation of the system and settlement procedures

The system operating and settlement procedures are described in Sections 3.3.4, 3.3.5 and 3.3.6.

4.3.3.5 Risk management

Risk management is outlined in Section 3.3.7.

4.3.3.6 Links to other systems

CCIL receives trade information through a web-based reporting facility in addition to its FX-CLEAR trading platform. The settlement of INR obligations takes place in members' accounts with the RBI. The settlement details of the USD leg are sent to CCIL's correspondent bank in New York, through which the USD pay-ins to CCIL's nostro account take place.

4.3.3.7 Pricing

The schedule of fees and charges for settlement of trades, transaction charges and system usage charges and penalties for default charged by CCIL are published on CCIL's website.

4.3.4 National Securities Clearing Corporation Ltd. (NSCCL) and Indian Clearing Corporation Limited (ICCL)

The role of NSCCL as a CCP for trades executed on the NSE and the corporate bond segment and the role of ICCL as a CCP for the BSE's corporate bond segment are detailed in the following sections.

4.3.4.1 National Securities Clearing Corporation Ltd. (NSCCL)

4.3.4.1.1 Institutional framework

The institutional framework under which NSCCL, the CCP, is governed is detailed in Section 4.2.3.2.

4.3.4.1.2 Participation

Cash market segment: All trading members in the cash market segment are also clearing members of NSCCL. Custodian clearing members are also authorised by the NSCCL to carry out clearing and settlement of transactions for their clients.

Derivatives segment: Clearing members can be self clearing members (SCM); trading member-cum-clearing members (TMCM); or professional clearing members (PCM).

Corporate bonds: To settle trades in corporate bonds through NSCCL, participants must register with NSCCL. Entities carrying out settlement on behalf of participants are also registered as participants.

4.3.4.1.3 Types of transaction

Cash market segment: The cash market segment comprises equities, government securities, warrants and exchange traded funds that are cleared and settled by NSCCL.

Derivatives segment: NSCCL clears and settles index futures, index options, stock futures, stock options, currency futures and currency options and interest rate futures.

Corporate bonds: Only corporate bonds.

4.3.4.1.4 Operation of the system

The market operates from 09:00 to 15:30, five days a week.

Cash market segment: All trades executed on NSE are electronically transferred to NSCCL after trading hours on T+0 for clearing and settlement and are settled on a T+2 basis in the cash market segment. NSCCL, the CCP, becomes the counterparty to the net settlement obligations of every member by novation and is obligated to meet all settlement obligations, regardless of member defaults. The NSCCL is the central counterparty to all trades and nets positions so that members have a net obligation to receive or deliver securities and must either pay or receive funds.

Trading members execute transactions on behalf of clients or on a proprietary basis. Settlement obligations are netted at the clearing member level. NSCCL carries out clearing and settlement functions according to the settlement cycles of different sub-segments in the cash market segment.

Derivatives segment: NSCCL becomes the counterparty for all trades in NSE futures and options contracts. Financial obligations are assumed by the NSCCL in the event of any party failing to meet the settlement obligations. Clearing members are responsible to NSCCL for the obligations arising from their own trades, their clients' trades and the trades of trading members for whom they provide a clearing service.

Futures contracts are subject to two types of settlements; the daily mark to market settlement, which occurs on a continuous basis at the end of each day, and the final settlement, which occurs on the last trading day of the futures contract. Settlement of options contracts include the daily premium settlement for options purchased and sold during the day and the final exercise settlement for options positions at in-the-money strike prices on the expiration day.

Corporate bonds: Corporate bond trades are settled between Monday to Friday on three settlement cycles, ie T+0, T+1 and T+2, with different cut-off timings.

4.3.4.1.5 Risk management

NSCCL's risk management system monitors the track-record and performance of members and their net worth; undertakes on-line monitoring of members' positions and market exposure, collects margins from members and automatically suspends members if the limits are breached.

Risk management measures for the cash market segment comprise the following:

- capital adequacy requirements;
- margin requirements include the daily mark to market margin (MTM margin), value at risk-based margin (VaR-based margin) and extreme loss margins (ELM margin). VaR and ELM margins are calculated at client level and collected in advance, whereas the MTM margin is computed and collected at the end of the day.

- an online system monitors the margins of the members in real time. Alerts warn both the member and NSCCL at pre-set levels when a member approaches its allowable capital.

Risk management measures for the derivatives segment: NSCCL monitors margins in real time by means of an online portfolio-based margining and monitoring system. The risk containment measures comprise:

- capital adequacy controls.
- margining and position monitoring is accomplished using an online tool, SPAN (Standard Portfolio Analysis of Risk),[52] to determine the largest loss that a portfolio might reasonably be expected to incur from one day to the next day.
- margins are monitored on a real-time basis. Members are alerted of their positions to enable them to control their positions and margins or bring in additional capital. If deposits are insufficient to cover the margins, the member's trading facility is automatically withdrawn. In addition, various position limits are also set.

Default procedures for the cash and derivatives segments

In the case of funds and securities pay-in defaults, NSCCL initiates a buy-in on T+3 on behalf of clearing members who have failed to make the securities pay-in by the scheduled time on T+2. The buy-in takes place in a separate auction market session on T+3 on the trading system of NSE. The settlement for transactions in the auction session takes place on T+4, when all unsuccessful or unsettled auctions are closed out. Clearing members failing to honour funds pay-in obligations by the cut-off time are suspended from trading if such shortages are above a prescribed value.

Utilisation in case of default

If a clearing member is declared to be in default, NSCCL applies the members' funds and the settlement fund in the following order:

- margin or any other payment of the defaulting member retained by NSCCL for the purpose of clearing and settlement;
- the member's contribution to the settlement fund, whether in the form of cash or securities or bank guarantee;
- the member's security deposit and the proceeds recovered from auctioning or transferring the membership;
- fines, penalties, interest etc earned from investment or disinvestment of the settlement fund, retained earnings of NSCCL and profits available for appropriation;
- contribution of all clearing members to the settlement fund in proportion to the total contribution and deposit made by each clearing member;
- additional contribution called from clearing members in proportion to their contribution to the settlement fund.

Corporate bonds: Trades are settled at participant level on a DVP1 basis, ie on a gross basis for securities and funds. If either of the participants/custodians fail to honour their pay-in obligation by the set time, the transaction is cancelled. The securities or funds received towards the pay-in obligation are returned to the respective participants/custodians.

---

[52] SPAN (Standard Portfolio Analysis of Risk) is licensed from the Chicago Mercantile Exchange. SPAN is used to determine margin requirements.

4.3.4.1.6 Links to other systems

NSCCL clears and settles the trades executed in the equities and derivatives segments over the NSE's trading platform NEAT. NSCCL effects the securities pay-in and payout through the two depositories NSDL and CDSL. The funds settlement takes place in designated settlement banks. In the case of corporate bonds, NSCCL effects the funds settlement in the RTGS and the securities settlement in the two depositories.

4.3.4.2 Indian Clearing Corporation Limited (ICCL):

The functions of ICCL are described below mainly with reference to its role as a CCP in the currency derivatives segment.

4.3.4.2.1 Institutional framework

The institutional framework under which ICCL, the CCP, is governed is detailed in Section 4.2.4.2.1.

4.3.4.2.2 Participation

Participants: ICCL's clearing members can be either (i) trading-cum-clearing members (TCMs), who can trade, clear and settle their own or client trades, as well as clear and settle trades of its associate trading members; or (ii) professional clearing members (PCMs), a member without trading rights. A PCM can clear and settle the trades only of its associate trading members and clients.

4.3.4.2.3 Types of transaction

ICCL undertakes clearing and settlement services for the mutual funds segment and corporate debt segment and the currency derivatives segment of the United Stock Exchange of India Limited (USE) as well of the BSE.

4.3.4.2.4 Operation of the system

The clearing and settlement process in the currency derivatives segment is given below:

Process	
Daily mark to market settlement.	The daily mark-to-market is settled in cash on T+1.
Settlement mechanism	Cash-settled in Indian rupees.
Settlement price	The settlement price is the RBI reference rate on the date of expiry.
Last trading day	The near-month contract is discontinued for trading two days prior to the expiry day (assuming both the days are trading days).
Final settlement day	The final settlement day is the contract expiry date which is generally T+2 from the last trading day of the contract.

ICCL has appointed nine commercial banks as clearing banks to settle the funds obligations of clearing members. A clearing member must open a settlement account with any of the designated clearing banks for this purpose.

4.3.4.2.5 Risk management

ICCL has a risk management framework that includes the collection of various types of margins, collateral etc for the currency derivatives segment.

Margin: margins for the currency derivatives segment comprise:

- initial margin to cover a 99% VaR over a one-day horizon. The initial margin is subject to a minimum of 1.75% on the first day of currency futures trading and 1% thereafter. The initial margin is deducted in advance from the available liquid assets deposited by the clearing member with ICCL;
- extreme loss margin on the mark to market value of the gross open positions is deducted in advance from the available liquid assets of the clearing member; and
- such additional margins which ICCL may require clearing members to pay.

The margins are computed at a client level and collected or adjusted in advance from the liquid assets of the clearing members. Client margins are collected and reported to ICCL by the members.

Collateral requirements for ICCL clearing members comprise:

- A minimum liquid net worth which must be continuously maintained even after adjusting for the initial margin and extreme loss margin requirements;
- Liquid assets must be maintained in cash or cash equivalents and non-cash equivalents, ie approved securities and in the form of collateral as may be approved by ICCL. Liquid assets for trading in currency futures must be maintained separately in the currency derivatives segment. The cash or cash equivalent component should be at least 50% of total liquid assets. These norms are also applicable to the equity derivatives segment.

4.3.5 Bombay Stock Exchange

The institutional framework, participation, types of transaction and system operations are detailed in Sections 4.2.4.2.1; 4.2.4.2.2; and 4.2.4.2.3.

4.3.5.1 Settlement procedure

The pay-in and payout of funds securities based on the delivery or receive order issued by the BSE are settled on T+2.

Members can effect pay-in of dematerialised securities to the clearing house through either NSDL or CDSL. They must give instructions to their respective depository participants (DPs) that specify information such as the settlement number, effective pay-in date, quantity etc.

Members may also effect pay-in directly from the clients' beneficiary accounts through CDSL. For this, the clients are required to specify the settlement details and the ID of the clearing through which they have sold the securities.

Dematerialised securities are credited by the clearing house to the pool or principal accounts of the members. BSE can also transfer payout securities directly to the clients' beneficiary owner accounts without routing them through the members' pool or principal accounts in NSDL/CDSL. If securities received from one depository are to be credited to an account in the other depository, the clearing house does an inter-depository transfer to give effect to such transfers.

The bank accounts of members maintained with the clearing banks, are directly debited for their funds settlement obligations. Members whose funds pay-in obligations are not cleared at the scheduled time are subject to penalty payments or debarment from BOLT. The clearing house instructs the clearing banks to credit the members' accounts with funds on the pay-in day itself in respect of those members who are due to receive funds. If a member fails to deliver the securities, the shortfall in the value of shares delivered is recovered from the member at the day's standard/closing price for the securities concerned.

4.3.5.2 Risk management

The core of the risk management system is the liquid assets deposited by the members with the BSE. These liquid assets meet the following five requirements:

(a) ***mark to market (MTM) losses*** on outstanding settlement obligations. The MTM is computed after trading hours on T+0 at the day's closing price or, if the security has not been traded that day, at the latest available closing price. MTM margins are also adjusted in respect of all the pending settlements on the basis of closing prices of T+0. The MTM is collected from members on the evening of T+0.

(b) ***VaR margins*** to cover potential losses on 99% of trading days. The VaR margin is collected in advance from the total liquid assets of the member at the time of trade.

(c) ***extreme loss margins*** to cover the expected loss in situations that lie outside the coverage of the VaR margins. The ELM is collected from the total liquid assets of the member.

(d) ***base minimum capital*** is the capital required for all risks other than the market risk (for example, operational risk and client claims).

(e) ***special margin*** is collected as a surveillance measure. If applicable, it is collected together with the MTM from the members.

Members are required to maintain sufficient liquid assets (collateral) to cover the above five requirements. There are no other margins in the risk management system. The margins are released when the settlement pay-in is completed.

If a member fails to deliver the securities due, the shortfall in the value of shares delivered is recovered from him at the day's standard/closing price for the securities concerned.

Penalties are specified for non-fulfilment of settlement obligations (ie normal pay-in, securities shortage pay-in and auction pay-in) and failure to deposit additional capital towards the capital cushion requirement by the set time

Trade Guarantee Fund

As required by the SEBI, the BSE has a Trade Guarantee Fund (TGF) to assure the timely completion and settlement of transactions.

The TGF is managed by the Defaulters' Committee, a standing committee of the BSE with a SEBI-approved constitution.

Brokers' Contingency Fund

The BSE's Brokers' Contingency Fund provides temporary refundable advances to members who face temporary financial mismatches. Members can draw an advance from the fund up to six times in a financial year. Advances have a maximum term of 30 days and are available only to meet shortfalls in a member's funds pay-in obligations in a settlement arising out of delivery-based transactions and not for any other obligations in a settlement.

BSE has contributed an initial sum of INR 600 million to the fund. All active members are required to make an initial contribution of INR 10,000 in cash to the fund and also contribute INR 0.01 for every INR 100,000 of gross turnover in all segments by way of continuous contribution to the fund. All active members are required to maintain a base minimum capital of INR 1 million with the BSE. This contribution, which is refundable, is also placed with the fund. In addition, members are required to provide the fund with a bank guarantee of INR 1 million.

Default procedure

Members who have insufficient funds on account to meet margin calls are liable to penalties for margin default. These penalties are reviewed periodically.

4.4 Securities settlement systems

The settlement arrangements for government securities with CCIL as the CPP and related risk mitigation measures are described in Section 4.4.1. Sections 4.4.2 and 4.4.3 cover the settlement of the trades executed on the stock exchanges.

4.4.1 Government securities

The RBI settles the transactions received from CCIL in DVP3: the funds and the securities obligations are settled on a net basis. From 1995 to 2002, settlement was on a DVP1 basis and from 2002 to 2004 it was on a DVP2 basis.[53]

Pay-in of securities takes place from the securities account of members with a net debit position in securities (ie the accounts of the members are debited) into the securities account of CCIL (ie the CCIL account is credited). Thereafter, settlement information is transmitted to the RTGS system for pay-in of funds (from the funds account[54] of members into the funds account of CCIL) and the subsequent payout of funds from the account of CCIL to the accounts of members with a net credit position in funds. Finally, when funds have been successfully transferred, the securities are released from CCIL's account into the accounts of members who hold a net receipt position in the settlement with respect to securities.

CCIL has a rupee line of credit and a securities line of credit with several banks. In case of a securities shortage during settlement, CCIL informs the RBI about any usage of a securities line of credit after utilising the available securities in the settlement guarantee fund. In the case of a funds shortage, the RBI accesses the funds line of credit available to CCIL and then notifies CCIL before settlement completion. Based on the utilisation of the credit lines, CCIL withholds securities or funds payable to the defaulting member(s). These are released to the members after fulfilment of their obligations vis-à-vis CCIL.

The settlement status is then updated in the NDS.

4.4.2 Securities traded on the NSE and the BSE

All actively traded securities are held and settled in dematerialised form at either the NSDL or the CDSL, the two national securities depositories. To allow dematerialised trading in a security, listed companies must connect to both depositories. SEBI mandates that all new IPOs must be traded in dematerialised form. Further, the Companies Act requires that every listed company making an IPO of securities for INR 100 million or more issue the security only in dematerialised form.

---

[53] See Committee on Payment and Settlement Systems, *Delivery versus payment in securities settlement systems*, Basel, 1992, p 4.

[54] The funds settlement takes place in the RTGS settlement account for RTGS members. However, for members who are not RTGS participants, the funds leg of the settlement takes place in their current account with the RBI.

On T+2, members pay securities into their designated clearing member accounts with the depositories within the prescribed time period. The depositories make the securities available to the clearing house. The NSCCL and BOISL are linked to the two depositories for settlement. Similarly, members with funds pay-in obligations make funds available in their designated clearing member funds accounts with the clearing banks within the prescribed time period. The clearing banks make the funds available to the NSCCL or to BOISL. As of March 2010, NSCCL had 12 clearing banks.

Once the pay-ins of funds and of securities are completed, the clearing house ensures that the payouts of funds and delivery of securities to the clearing members takes place through the clearing banks and depositories, respectively.

4.4.3 Derivatives

On settlement day (T+1 for daily settlements and expiry day+1 for final settlements), members make funds available in their designated clearing member funds accounts with the clearing banks. Funds are settled between accounts held at clearing banks.

4.5 Use of securities infrastructure by the Central Bank

The RBI uses the securities infrastructure to implement monetary policy through the Liquidity Adjustment Facility (LAF) and open market operations. LAF operations are normally conducted in the mornings. Bids are received from the participants through PDO-NDS from 09:30 to 10:30. If participants are unable to submit the bids in the PDO-NDS due to connectivity problems or other issues, as a contingency measure participants are allowed to submit a physical bid to the RBI. In such situations, an additional time window of 15 minutes is given for submitting the physical bids in hard copy.[55] Once a decision is taken whether to accept all or some of the bids (based on liquidity considerations), the bids are processed and sent for settlement. The funds leg is settled first on a gross basis in the RTGS system. On completion of the funds settlement leg, the securities leg is settled in the participants' securities accounts, ie their repo constituent (RC) and reverse repo constituent (RRC) accounts with the RBI.

When required a Second LAF (SLAF) can be held from 16:15 hrs to 16:45. An additional five minutes is given for physical bids if any. The process flow and settlement are the same as for the regular LAF operations held in the morning.

In the case of open market operations, bids are received through PDO-NDS between 10:30 and 12:30 hrs, with an additional 30 minutes for submission of physical bids if necessary. Once a decision is taken whether to accept all or some of the bids (based on monetary policy considerations), the bids are processed and sent for settlement. The securities in the principal SGL account held with RBI are blocked first. If sufficient securities are available on the participants' accounts, the funds leg is settled on a gross basis in the RTGS system. The securities leg is then settled in the RBI's PDO.

---

[55] Participants must notify the RBI by fax of their intention to submit a physical bid before the original cut-off time of 10:30.