

XIII - Payment and Settlement Systems

[Developments During 2000-01](#) [Institutional Measures](#)

Introduction

13.1 The Reserve Bank has been playing a central role in the reform of the payment and settlement system in India, particularly since January 1995. While the apex-level National Payments Council, constituted by the Reserve Bank in May 1999, lays down the broad policy parameters, the design and development of a national state-of-the-art robust payment and settlement system is entrusted to a multi-disciplinary Payment Systems Group which is guided by the Payment Systems Advisory Committee.

13.2 Modernisation of the payment and settlement system has been accorded high priority in the agenda of financial sector reforms in India during the 1990s in view of its role as a key determinant of the efficiency of financial intermediation and financial system stability. Technology has been the driving force behind the payment and settlement system reforms. While computerisation has been at the base of the reform process, connectivity of branches of banks by means of networking of computers and inter-connectivity of banks has been a focus area of attention. The operationalisation of the INdian FIAncial NETwork (INFINET) in June 1999, by the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad represents a major step forward in providing a communication network for the exclusive use of banks and financial institutions in the form of a Closed User Group.

13.3 Reforms in the payment and settlement systems have been driven by the three-pronged approach of consolidation, development and integration. The consolidation of the existing payment systems in the form of Computerised Cheque Clearing (CCC), Electronic Clearing Services (ECS) and Electronic Funds Transfer (EFT) was a thrust area during the year. Development included initiatives aimed at opening new clearing houses, designing multiple net settlement systems, technology upgradation relating to modes of payment and funds transfer and the implementation of systems aimed at better funds management by banks and their constituents. The integration of these strategies within the Reserve Bank and across the financial sector would ensure completion of the reform process. The ultimate objective is to set up a Real Time Gross Settlement (RTGS) system in an on-line environment in which various payment and settlement systems would be integrated. Several factors have impacted upon the pace and sequencing of payment system reform, *viz.*, (i) the different degrees of computerisation in the financial system; (ii) geographical spread of the banking sector; (iii) defining the regulatory role of the Reserve Bank in relation to the payment systems; (iv) systemic risks in payment and settlement systems; (v) legal infrastructure; and (vi) impact of payment and settlement system reforms on the conduct of monetary policy.

13.4 Issues relating to clearing operations, electronic funds movement systems, the Centralised Funds Management System (CFMS) and the process of moving towards a RTGS are discussed in the sub-section on developments during the year. This is followed by discussion on institutional measures for the modernisation of the payment and settlement system covering consolidation of

the existing systems and improvement in operational efficiency, upgradation of technology and the expansion of electronic services and security considerations in an integrated payment and settlement system. The important issues covered are queuing and message processing for the RTGS, strengthening of the INFINET, including Structured Financial Messaging Solution (SFMS), security services, legal issues, the deliberations of the working groups set up by the Reserve Bank on systems reform and a medium-term perspective for the on-going modernisation of the payment and settlement system.

DEVELOPMENTS DURING 2000-01

13.5 The imperatives for accelerating the integrated development of the payment system are emerging out of the rising turnovers in the financial markets and integration of various segments in response to financial sector reforms. The switchover from physical currency to paper-based payment instruments and to electronic media has warranted technological upgradation in clearing arrangements. This is reflected in the rising value of transactions put through cheque clearances, the ECS and the EFT ([Table 13.1](#)).

Table 13.1 : Clearing and Settlement Operations

Transaction	Rupees crore	
	2000-01	1999-00
1	2	3
Cheque clearances through MICR	22,642	21,727
Cheque Clearances in four Metropolitan Centres	21,871	19,679
Ratio of Cheque Clearance to GDP#	489.0*	471.7
Value of ECS Transactions	3,642	1,475
Value of EFT Transactions	137	79
Daily Turnover in Financial Markets		
Central Government Dated		
Securities Market	4,512	3,389
Call/Notice Money Market	32,157	33,382
Equity Market (BSE)	3,984	2,729
Equity Market (NSE)@	5,337	3,303

* Estimated.

In per cent.

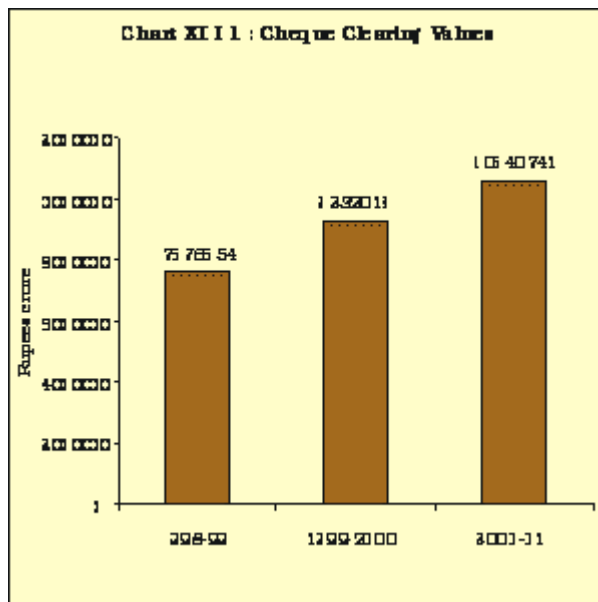
@ Pertains to capital market segment.

Clearing Functions

13.6 In line with international trends, the value of transactions cleared through the domestic cheque clearing system has grown rapidly, showing an increase of 14.2 per cent during 2000-01 over and above the growth rate of 21.9 per cent in the previous year ([Chart XIII.1](#)). The ratio of cheque clearance values to GDP has been showing a consistent growing trend.

13.7 Continuing the process of introduction of MICR-based cheque processing at centres with substantial clearing volumes, seven more centres were brought under the purview of MICR-based clearing during the year taking the total number of MICR centres to twenty three. MICR-

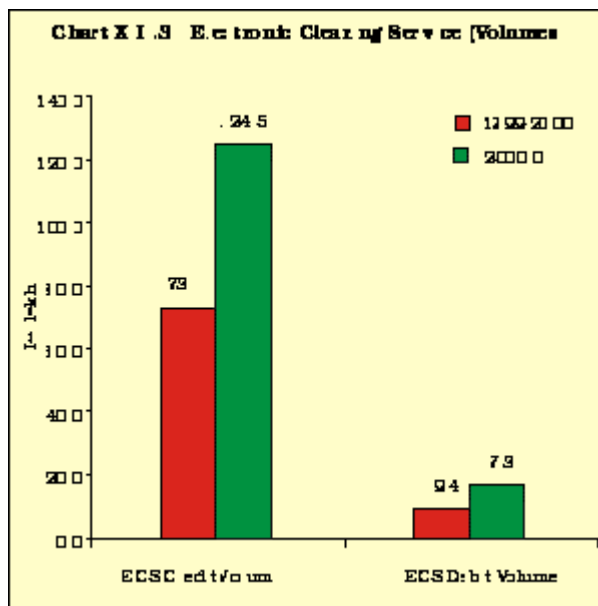
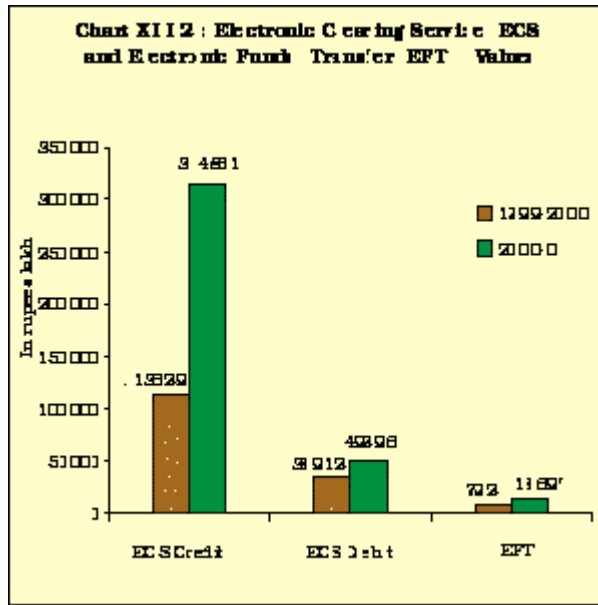
based clearing at seven more centres has been planned for implementation in the near future. Clearing operations are now centred around the 986 clearing houses in the country, with about 65 per cent of the value routed through the computerised clearing houses at the major centres where the MICR technology is in use.



Electronic Funds Movement Systems

13.8 Emphasis continued to be given to increasing the levels of usage of electronic funds movement systems. During 2000-01, six more centres were added to the ECS - Debit Clearing network while eleven more centres were included under the coverage of EFT. Substantial growth was registered in the usage of the ECS -Credit Clearing with 217 users availing of this facility as on March 31, 2001 as against 179 users as on March 31, 2000. The number of users increased to 235 by July 31, 2001. Volumes of ECS - Credit Clearing transactions reached a level of 124.5 lakh during 2000-01, registering a growth rate of 70.4 per cent over the previous financial year. ECS - Debit Clearing too registered an impressive growth of 83.4 per cent, ending the year with a volume of 17.28 lakh transactions ([Charts XIII.2](#) and [XIII.3](#)).

13.9 The EFT, intended to be a mechanism for retail funds transfer, showed a substantial growth during 2000-01. While the average volume of transactions under the EFT increased by 7.3 per cent, the rise in terms of value was 72.9 per cent. Fifteen centres are now part of the EFT network, bringing the total number of bank branches connected by the EFT network to about 8,500.



13.10 The thrust on the large-scale usage of electronic-based funds movement in the form of the ECS - both for credit and debit - and the EFT is being further strengthened. Recognising the need for funds movement across cities in a networked environment, the facility of the 'Centralised ECS Credit', whereby a corporate user could furnish ECS data at one centre with the credit to be disbursed at many other centres, is being provided. The scheme ensures quick, safe and efficient movement of funds for repetitive small value transactions such as credit of interest arising from fixed deposits, dividend from shares, refund amounts and the like.

Centralised Funds Management System

13.11 The development of the Centralised Funds Management System (CFMS), which enables funds managers of banks to obtain a national position of balances in their accounts with the Reserve Bank, was completed during the year, with the software ready for installation at the four major metropolitan centres. The first phase of the project providing for the 'funds enquiry' stage is being implemented and banks can obtain information on their funds position at any point of time. The second phase of the project, scheduled to be completed during 2001-02, would encompass funds transfers across the seventeen locations of the Reserve Bank where Deposit Accounts Departments (DADs) exist.

Real Time Gross Settlement System

13.12 The process of finalising the RTGS design specifications covering the entire gamut of the policy, operational and implementation issues was completed during the year. A Systems Requirements Specification (SRS) document was created for serving as the base for the process of tendering from international software houses which have implemented the RTGS elsewhere in the world. The process of evaluation of the technical bids of the potential vendors was completed and commercial evaluation of the tenders is under progress.

INSTITUTIONAL MEASURES

13.13 The Reserve Bank continued to focus on the phased strengthening of existing paper-based systems, expansion of clearing and settlement mechanisms to cover all the centres of banking activity in the country, setting up of regional and zonal clearing grids, improving collection and clearing of inter-city cheques and expanding the coverage of applications to cover customer payments and cheques, currency chest transfers as well as transactions in Government securities. Upgradation of technology, introduction and expansion of electronic payment services such as EFT and ECS, technological improvement in the existing cheque clearing services with the introduction of imaging of cheques and standardisation of technology platforms constitute the developmental initiatives. Integrated securities and funds settlement, money market dealing systems, the RTGS system and the linking of all centres of financial activity through a reliable communication network comprise the agenda for an integrated payment and settlement system.

13.14 One of the essential requirements of the RTGS system is the need to provide additional liquidity to the participants. The Reserve Bank is working out the modalities of providing intra-day credit, on a collateralised basis, in the form of repos to be settled/adjusted by the end of the day. These credit facilities would be provided at a flat rate irrespective of the quantum of credit.

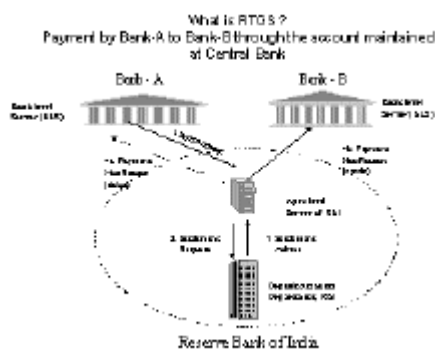
13.15 A key component of the RTGS system is the sub-system of queuing of RTGS messages pending settlement. While the general principle of 'First-in-First-Out' (FIFO) would be the base for the queuing mechanism for the Indian RTGS system, there would be enhancements in the form of priority assignment and potential gridlock identification by the software on the basis of pending queues ([Box XIII.1](#)).

13.16 Initiatives for the establishment of the RTGS hinge upon participants (*i.e.*, banks, SGL account holders including those of the Primary Dealers and secondary dealers of government securities) joining the INFINET. The network, which initially comprised of only the public

sector banks, has been opened up for participation by the other categories of members and 57 members are now part of the network. As many as 667 VSATs have also been installed for facilitating the members' access to the network. The rules and regulations governing the membership to INFINET have been finalised. The INFINET would ensure that messages are sent across participant institutions in a safe and secured mode using the SFMS ([Box XIII.2](#)).

Box XIII.1 Queuing and Message Processing for RTGS

The RTGS provides for continuous (*i.e.*, in real time) processing and settlement of funds transfers. The entire system is based on the concept of the 'Y' topology, which ensures that payment messages emanate from a sending bank and are received by the Reserve Bank through an intermediate processor - the Inter-Bank Funds Transfer Processor (IFTP)-with the beneficiary bank receiving the intimation of credit from the settlement account processor combined with the IFTP.



There would essentially be two sets of queues: for testing for funds availability *en route* to the Integrated Accounting System (IAS) *via* the IFTP of the Reserve Bank and for processing of the debit / credit requests received from the IAS. All transactions would be queued and submitted for funds availability testing on a FIFO basis, *i.e.*, all transactions will be queued in the order in which they were received and the "oldest" transaction in each participant's queue will be tested first. Participants would have the facility to assign priorities to their transactions in most cases, apart from high value multi-lateral net settlement batch transactions such as the operations of the clearing houses and the Reserve Bank (*e.g.*, open market operations). Transactions which fail a funds availability test of the IAS will be returned to the payment queue to be retested periodically. Transactions remaining in the queue at the end of the day after the time for the 'squaring-up' is completed would be removed from the queue and not processed any further. In order to avoid any grid lock situation, there would be an optimising algorithm provided for in the RTGS software which would scan the pending queues periodically during the day - to identify potential grid lock situations and the processing of pending items against matching banks would be performed by the software.

13.17 A key prerequisite for the operationalisation of the INFINET is the level of computerisation in banks. As a result of time-bound schedules imposed on banks for their computerisation, as many as 26 public sector banks achieved the level of 70 per cent of business captured through computerisation, as on June 30, 2001.

Securities Services Systems

13.18 Technological infrastructure requirements for the development of the market for government securities have necessitated the setting up of the Securities Services System, which

is a software-driven trading and settlement system for government securities in a dematerialised environment constituting the Subsidiary General Ledger (SGL) accounts.

13.19 Two basic modules are being developed, *i.e.*, the Negotiated Dealing System (NDS) and the Securities Settlement System (SSS), both of which envisage the setting up of centralised Public Debt Office (PDO) software ([Box IX.2](#)). The development of the software is at an advanced stage and the first set of modules are under trial runs from July 2001. The access to the modules by the constituents including the primary dealers (PDs) in government securities would be through the INFINET.

Legal Issues

13.20 A critical requirement for the acceleration of payments system reform is the appropriate legal framework. The Information Technology Act, 2000 provides for electronic (or magnetic) data to be treated as valid proof in a court of law. The Act, however, specifically states that nothing contained therein would be applicable to negotiable instruments (NI), which continue to be governed by the provisions of the Negotiable Instruments Act, 1881. A Committee set up under the chairmanship of the Principal Legal Adviser of the Reserve Bank to suggest amendments to the NI Act has submitted its recommendations to the Central Government.

13.21 Yet another legal requirement in respect of the payment system-as per the Core Principles of the Bank for International Settlements-is the need for a well-founded legal base for netting systems. On the basis of experiences of other countries where such legislation exists, the Reserve Bank has decided to initiate payment system legislation for which purpose an international consultant firm assisted by an Indian legal expert has been retained. This process would result in the framing of the draft payment system laws which would be the basis for the payment systems predominantly based on newer technology including those on electronic mode. The Task Force on Legal Issues set up by the National Payments Council is examining the need for amendments to various acts as also the need for framing new legislation for the regulation of multiple electronic payments.

Box XIII.2 Structured Financial Messaging Solution (SFMS) on INFINET

The Structured Financial Messaging Solution (SFMS), based on international message standards (SWIFT), is being implemented over the INFINET with a view to ensuring secured message transmission in terms of both computer and communication security. The SFMS, with the hub located at the IDRBT, Hyderabad (on TANDEM computer systems), will be connected to the bank branch network through individual bank gateways. While inter-bank transactions will be archived at the central hub with a bank-level retrieval facility, intra-bank messages would be stored by the bank gateway, though the central hub would take over the function of the bank gateway in case of a bank gateway failure. The SFMS will also have a

RTGS / FIN copy module as is obtaining in the SWIFT.

Public key cryptography would play an important role in providing the needed security services including confidentiality, authentication, non-repudiation and integrity. A Public Key Infrastructure (PKI) would be implemented over the INFINET. Public keys would be bound to their owners by public key certificates - an electronic record that binds the public key of the owner with the public-private key pair - signed by a trusted entity designated as the Certification Authority (CA) who would vouch for the identity of users. The IDRBT would be

functioning as the CA for messages transmitted over the INFINET.

13.22 The internal Working Group on Internet Banking (Chairman: Shri S.R. Mittal) has suggested several measures with a view to ensuring that the authenticity of the message across the Internet is maintained and that only valid users can have recourse to the facility, in addition to the messages being transmitted in a safe mode without being tampered with. The Working Group on Improvements in Monitoring of Clearing Systems (Chairman: Dr. R.B. Barman) has made recommendations relating to measures aimed at risk reduction in clearing systems and accounting of clearing with the purpose of accounting return clearing settlements on the same day. The Advisory Group on Payment and Settlement System (Chairman: Shri M.G. Bhide) to the Standing Committee on International Financial Standards and Codes recommended payment and settlement system reform in line with international best practices ([Box X.4](#)).

13.23 As part of internal improvements, five working groups were constituted for framing the road map for computerisation in the Reserve Bank, to assess the training needs of employees, for process re-engineering of the Banking Department and the house-keeping departments, and for mandatory use of electronic modes of communication within the Reserve Bank. The reports of the Working Groups on a road map for computerisation in the Reserve Bank, the first part of the process re-engineering (House-Keeping), and the mandatory use of electronic modes of communication and assessment of training needs of employees have been submitted.

Outlook

13.24 The Reserve Bank proposes to continue developmental efforts aimed at the setting up of an efficient state-of-the-art payment and settlement system. With a view to moving to the RTGS, the implementation of the initial modules and the development of an IAS have been planned in the immediate future. Pending a full-scale RTGS, the CFMS would be extended. Full imaging is proposed to be implemented at all the four National Clearing Cells (NCC) managed by the Reserve Bank. Besides, the Reserve Bank plans to put in place the NDS and to operationalise the Securities Settlement System by extending the INFINET services to all the banks and eligible financial institutions, with suitable PKI security features. The Reserve Bank would prepare a payment system 'Vision Document' to lay the road map for the adoption of the measures recommended for payment system reforms. The enactment of suitable electronic funds related acts including those for payment systems using electronic channels would also be necessary to develop an efficient payment and settlement system.