

**EXECUTIVES' MEETING OF EAST ASIA-PACIFIC CENTRAL BANKS
AND MONETARY AUTHORITIES (EMEAP)**

PAYMENT SYSTEMS IN EMEAP ECONOMIES

EMEAP Working Group on Payment and Settlement Systems

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FOREWORD

The Executives' Meeting of East Asia-Pacific Central Banks and Monetary Authorities (EMEAP) was established in 1991 as a cooperative organization for central banks and monetary authorities from eleven economies. In July 1998, the EMEAP Working Group on Payment and Settlement Systems was initiated by the EMEAP Governors as a forum to discuss and share information on issues of common interest to members relating to payment and settlement systems. The Working Group, reorganized from the former Working Group on Financial Market Development, has met twice a year since its first meeting in March 1999 and six meetings have been held so far.

Payment Systems in EMEAP Economies, or the second edition of the EMEAP Red Book, is an accomplishment of collective study over the past years by the EMEAP Working Group on Payment and Settlement Systems. The Working Group has exchanged information and discussed payment and settlement system updates in member economies at its regular meetings. As part of its activities, it also conducted an internal survey on the structure of interbank payment systems. Through the exchange of information and also based on the survey results, the Working Group recognized the need for providing up-to-date information and promoting further understanding of payment and settlement systems in the EMEAP region. Thus, the Working Group decided to revise the Red Book, first published in November 1997, and publish a second edition.

Payment infrastructures in EMEAP economies have changed significantly since the publication of the first edition of the Red Book. For example, real-time gross settlement (RTGS) systems have been launched in almost all member economies, and new payment instruments such as electronic money have been developed in some economies. And, the legal and regulatory framework for payment and settlement systems have changed in some economies, including amendment of respective central bank acts and the enactment of new legislation covering payment systems.

The second edition of the EMEAP Red Book adopts a format similar to that of Red Book publications by the Bank for International Settlements and the European Central Bank, thereby facilitating cross reference with such publications.

The revision of the EMEAP Red Book greatly owes to invaluable contributions made by EMEAP member central banks and monetary authorities, which have collaborated in drafting individual country chapters and compiling statistical data. In particular, members of the editorial committee, who were kind enough to volunteer their time, have provided great assistance in completing the publication.

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July 2002

INTRODUCTION

Payment Systems in EMEAP Economies, or the EMEAP Red Book, describes payment and settlement systems in eleven member economies of the Executives' Meeting of East Asia-Pacific Central Banks and Monetary Authorities (EMEAP). Like the Red Book published by the Committee on Payment and Settlement Systems (CPSS) of the Group of Ten (G-10) central banks and the Blue Book by the European Central Bank (ECB), the EMEAP Red Book gives an overview of payment and settlement systems in each member economy. It also includes statistics for payment instruments as well as payment and settlement systems in each member economy.

This is the second edition of the EMEAP Red Book prepared by the EMEAP Working Group on Payment and Settlement Systems. While the first edition, issued in November 1997, covers financial market structures as well, the second edition focuses solely on payment and settlement systems. Not only does it provide updates from the previous edition, but it details payment and settlement mechanisms for funds and securities transfers. It also discusses the legal and regulatory framework and the role of the central bank of each member economy. In addition, the second edition has been compiled based on a format similar to that of CPSS and ECB publications so as to enable easy comparison with the G-10 and ECB member countries.

Each country chapter includes descriptive text and statistical tables. The descriptive part consists of five chapters. Chapter 1 outlines the institutional aspects including legal and regulatory framework, and institutions providing payment and securities settlement services. Chapter 2 reviews payment methods including cash and non-cash instruments. Chapter 3 describes interbank settlement systems, both wholesale and retail payment systems. Chapter 4 describes securities settlement systems by type of security and by trading, pre-settlement, and settlement process. Chapter 5 discusses the role of the central bank, including oversight. Descriptions in this part are based on the information at the end of March 2002, except as specified. The statistical part provides some basic information on the institutional framework and the use of payment instruments, and also the volume of transactions with respect to interbank settlement and securities settlement systems. It should be noted, however, that data coverage is limited in some cases. Each member's chapter also includes a list of abbreviations and selected references for the convenience of readers.

Annexes include comparative tables and excerpts from CPSS publications. Comparative tables in Annex 1 compare payment infrastructures among EMEAP member economies, which can also be compared with those of CPSS and ECB member countries. These tables are based on a standard methodology for the compilation of statistics prepared by the CPSS. Part of the methodology is tailored for the EMEAP version, which is given in Annex 2. *Core Principles for Systemically Important Payment Systems* and *Recommendations for Securities Settlement Systems* are quoted in Annex 3 and 4 for references. Annex 5 lists the main contributors to the preparation of the EMEAP Red Book in each member economy.

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PAYMENT SYSTEMS IN AUSTRALIA

Australia

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List of abbreviations

Australian institutions and terminology

- ACCC:** Australian Competition and Consumer Commission. Refer to section 1.2.4
- ASXDM:** Australian Stock Exchange Derivatives Market Pty Limited. Refer to section 4.4
- APCA:** Australian Payments Clearing Association Limited. Refer to section 1.2.4
- APRA:** Australian Prudential Regulation Authority. Refer to section 1.2.4
- ASIC:** Australian Securities and Investments Commission. Refer to section 1.2.4
- ASTC:** ASX Settlement and Transfer Corporation Pty Limited. Refer to section 4.2.2
- ASX:** Australian Stock Exchange. Refer to section 4.2
- AUSTRAC:** Australian Transaction Reports and Analysis Centre. Refer to section 1.1.1
- Austraclear Limited:** Refer to section 4.1
- Australian Payments System Council:** Refer to section 1.2.4
- Authorized Deposit-taking Institution (ADI):** Refer to section 1.2.1
- Banking Ombudsman:** Refer to section 1.2.4
- BPAY:** Refer to section 2.8.
- CHESS:** Clearing House Electronic Subregister System. Refer to section 4.2
- Council of Financial Regulators:** Refer to section 1.2.4
- Debit card:** a card enabling the holder to draw cash from ATMs and cash dispensers and/or to have retail purchases through an EFTPOS terminal directly charged to funds on the card holder's account at a deposit-taking institution. Refer to section 2.4
- Debits Tax:** a tax levied by State Governments on withdrawals from accounts with a cheque facility. Refer to section 2
- Direct credit:** a payment made by the payer's financial institution crediting the payee's account at another financial institution directly using electronic file transfers or magnetic tapes. Refer to section 2.3
- Exchange Settlement (ES) Account:** a settlement account held at the Reserve Bank to settle debts arising from the clearing of payments. Refer to sections 3.6 and 5.1
- Financial Institutions Duty (FID):** a charge levied by State Governments on deposits to customer accounts at financial institutions. Refer to section 2
- Financial Sector Advisory Council:** Refer to section 1.2.4
- OCH:** Options Clearing House Pty Limited. Refer section 4.4
- PSB:** Payments System Board. Refer to section 1.1.1
- Purchased Payment Facilities:** Refer to section 1.1.1
- RITS:** Reserve Bank Information and Transfer System. Refer to section 3.6
- RTGS:** Real-time Gross Settlement. Refer to section 3.6
- SFE:** Sydney Futures Exchange Limited. Refer to section 4.3
- SFECC:** SFE Clearing Corporation Pty Limited. Refer to section 4.3
- SSP:** Special Service Provider. Refer to section 1.2.3
- SWIFT PDS:** SWIFT Payment Delivery System. Refer to section 3.4
- SYCOM:** Sydney Computerized Overnight Market. Refer to section 4.3.1
- Warrant:** a purely interbank paper debit instrument. Refer to section 2.2

Overview

The Australian financial system comprises three broad groups of institutions. Banks authorized to operate in Australia account for around 46% of the assets of the financial system. Other financial intermediaries (including building societies, credit unions and locally incorporated merchant bank subsidiaries of overseas banks) hold about 11% of assets. Funds managers (such as life insurance offices, superannuation funds and unit trusts) make up the remaining 43%.

Banks, building societies and credit unions are the principal providers of payments services in Australia. The Australian Payments Clearing Association (APCA), an industry body, has responsibility for the development and maintenance of industry clearing and settlement procedures for the major payments clearing systems. Obligations arising between providers of non-cash payments services are settled through Exchange Settlement (ES) Accounts at the Reserve Bank of Australia.

In common with many countries around the world, the payments system in Australia has changed significantly in recent years. In part, this has been a response to technological change, but it has also been the result of a comprehensive program of reform.

Far-reaching changes to Australia's financial regulatory structure came into effect on July 1, 1998. These changes represented the Government's response to the recommendations of the Financial System Inquiry (the Wallis Committee), set up in May 1996 to analyze the forces driving change in Australia's financial system and advise on ways to improve regulatory arrangements. Under the new structure, the Reserve Bank gained extensive regulatory powers to promote the stability and efficiency of the payments system under the *Payment Systems (Regulation) Act 1998*. The Reserve Bank's Payments System Board (PSB) determines the Bank's payments system policy.

The key risk reduction initiative in Australia has been the introduction of a real-time gross settlement (RTGS) system in June 1998. The reform eliminated the build up of settlement exposure between financial institutions as a result of the exchange of high-value payments and debt securities settlements. Instead, individual transactions are settled in real time across accounts at the Reserve Bank. The availability of RTGS is also an important step in dealing effectively with foreign exchange settlement risk. The start up of the Continuous Linked Settlement (CLS) Bank, which offers payment-versus-payment settlement of foreign exchange transactions, will bring about a further significant reduction in foreign exchange settlement risk. The Australian dollar is one of seven initial wave currencies that are eligible for settlement in CLS.

Reform to enhance the efficiency of the payment system has also been ongoing. The PSB has encouraged institutions to adopt an industry best practice of a three-day cheque clearing cycle. The Board is also working closely with billers to encourage take up of direct debits by customers as, in the Board's view, this is a particularly efficient payment method of making routine payments.

The PSB has taken a close interest in the operation of card systems in Australia. Following a decision by the PSB, in April 2001 the Reserve Bank formally brought the credit card systems operated in Australia by Bankcard, MasterCard and Visa under its regulatory oversight. This action followed the publication, in October 2000, of a joint Reserve Bank/Australian Competition and Consumer Commission study on debit and credit card

schemes in Australia, which identified a number of shortcomings in competition and efficiency in the provision of card services.

In December 2001, the Reserve Bank released a Consultation Document detailing the Reserve Bank's review of credit card schemes, and submissions from participants and interested parties. The Consultation Document outlined proposed reforms to credit card schemes in Australia in relation to interchange fees, merchant pricing and access. The Reserve Bank has invited further submissions on the proposed reforms before they are finalized.

1. Institutional aspects

1.1 Legal and regulatory framework

Australia is a federation and both Commonwealth and State legislation bear on aspects of the payments system and securities clearing and settlement systems. In June 1998, the Commonwealth Parliament passed legislation that gave the Reserve Bank explicit responsibility for regulating the payments system in Australia. Separate legislation, giving the Reserve Bank an explicit role in the regulation of securities clearing and settlement systems, was enacted in September 2001.

1.1.1 Payment instruments and systems

Legal framework

The *Payment Systems (Regulation) Act 1998* gives the Reserve Bank powers to regulate the payments system and purchased payment facilities (such as travelers' cheques and stored-value cards). This Act allows the Reserve Bank to obtain information from payment system participants and to set access regimes and determine risk control and efficiency standards for designated payment systems. In addition, the Reserve Bank has the power to authorize parties, other than authorized deposit-taking institutions (see section 1.2.1), to act as the holder of the value stored in purchased payment facilities.

The *Payment Systems and Netting Act 1998* allows the Reserve Bank to protect transactions in systems which settle on a real-time gross settlement (RTGS) basis from the potential application of the "zero-hour rule". Under this "rule", a court-ordered liquidation is deemed to commence from the first moment of time on the day the court order was granted. The application of this rule could have resulted in payments made by a failed institution between midnight and the time the court order was made being declared invalid. This would have undermined the irrevocable nature of RTGS payments and may have created severe liquidity, and potentially systemic, problems in the payments system.

This legislation also gives legal certainty to multilateral net settlement arrangements in the payments system which are approved by the Reserve Bank, such as those for direct-entry and card-based payments. Other provisions in the Act give certainty to netting in financial markets, such as those undertaken by the Australian Stock Exchange and the Sydney Futures Exchange. They also provide the legal certainty required in multilateral netting schemes aimed at reducing foreign exchange settlement risk.

The *Cheques Act 1986* is the principal piece of legislation dealing with paper payment instruments in Australia. It establishes the framework under which cheques are drawn, accepted and paid. The Act was amended in 1998 to allow non-bank deposit-taking institutions to issue cheques in their own right. The recent amendments to the Act also allow for the turnback, or presumed dishonor, of cheques for which a failed drawee institution has not settled.

The *Financial Transaction Reports Act 1988* aids law enforcement agencies in detecting money laundering, other financial crime and the recipients of the proceeds of crime. It obliges cash dealers (financial institutions, securities dealers, brokers, bullion dealers, cash carriers, gambling enterprises, etc) to verify the identity of customers before opening accounts, and to report to the Australian Transaction Reports and Analysis Centre (AUSTRAC) all cash transactions of AUD10,000 and above, information about suspect transactions and all international funds transfers. The Act also requires the public to report cash transfers into and out of Australia of AUD10,000 or more or the foreign currency equivalent. AUSTRAC analyses the data, and provides information to law enforcement agencies and to the Australian Taxation Office. The *Proceeds of Crime Act 1987* makes money laundering an offence, and several supporting pieces of legislation provide for the confiscation of the proceeds of crime.

Provisions in the *Trade Practices Act 1974* dealing with restrictive trade practices and consumer protection are relevant to the operation of the payments system. The Act prohibits conduct such as price agreements, boycotts and exclusive dealing with the purpose or effect of substantially lessening competition. However, the Australian Competition and Consumer Commission (ACCC) may authorize such conduct if it judges it to be in the public interest. The regulations and procedures for the five clearing streams operated by the Australian Payments Clearing Association Limited (see section 3) have been authorized by the ACCC. There are also provisions in the *Trade Practices Act 1974* giving the Australian Securities and Investment Commission (ASIC) consumer protection powers in relation to the finance sector.

A Uniform Consumer Credit Code covering the provision of credit was enacted by each of the State and Territory governments in November 1996. The Code focuses primarily on consumer protection. The Code was introduced following an extensive review of previous legislation, which varied widely between the States.

Regulatory framework

The Reserve Bank of Australia is responsible for payments system oversight as well as fulfilling several other payments-related roles. The Reserve Bank operates under the *Reserve Bank Act 1959*, and most of its powers and functions in the payments system derive from that Act and the *Payment Systems (Regulation) Act 1998*.

The power to determine and carry out the policy of the Reserve Bank (other than payments system policy) is vested in the Reserve Bank's Board which comprises the Governor as chair, its Deputy Governor, the Secretary to the Department of the Treasury and up to six other members drawn from various sectors of the economy.

The power to determine the Reserve Bank's payments system policy resides with its Payments System Board (PSB). This includes the exercise of responsibilities under the *Payment Systems (Regulation) Act 1998* and the *Payment Systems and Netting Act 1998*.

The PSB comprises the Governor as chair, one other Reserve Bank appointee, an appointee from the Australian Prudential Regulation Authority (APRA) and up to five other members.

The PSB's mandate is set out in the amended *Reserve Bank Act 1959*. The PSB is responsible for determining the Reserve Bank's payments system policy in a way that will best contribute to controlling risk in the financial system; promoting the efficiency of the payment system; and promoting competition in the market for payment services, consistent with overall stability of the financial system.

While the PSB determines the Reserve Bank's payments system policy, the powers to carry out those policies are vested in the Reserve Bank. These powers, which are wide ranging, are set out in three separate Acts of which the center-piece is the *Payment Systems (Regulation) Act 1998*, under which the Bank may:

- “designate” a particular payment system as being subject to Reserve Bank regulation. Designation is simply the first of a number of steps the Bank must take to exercise its powers;
- determine rules for participation in the system, including rules on access for new participants. The Reserve Bank has the capacity to decide on questions of access to the payments system, since access is an important determinant of efficiency;
- set standards for safety and efficiency for the system. These may deal with issues such as technical requirements, procedures and performance benchmarks; and
- arbitrate on disputes in that system over matters relating to access, financial safety, competitiveness and systemic risk, if the parties concerned wish.

The Payment Systems (Regulation) Act 1998 also gives the Reserve Bank extensive powers to gather information from payment system participants.

The Government's intent was that the Bank would treat these powers as “reserve powers”, to be exercised if other means of promoting efficiency, competition and stability proved ineffective. Accordingly, the Government built considerable flexibility into the new regulatory regime. Under this co-regulatory approach, the private sector will continue to operate its payment systems and may enter into co-operative arrangements, which may be authorized by the ACCC under the *Trade Practices Act 1974*. However, if the Bank is not satisfied with the performance of a payment system in improving access, efficiency and safety, it may invoke its powers. It may then decide, in the public interest, to set access conditions or impose standards for that system. In doing so, it is required to take into account the interests of all those potentially affected, including existing operators and participants. Full public consultation is required and the Bank's decisions can be subject to judicial review. Designation of a payment system occurs only after substantial consultation with participants and after voluntary arrangements have been exhausted.

The Reserve Bank is also required to regulate holders of the stored value behind purchased payment facilities. The holder will either have to be an authorized deposit-taking institution or have an authority, or an exemption, issued by the Reserve Bank.

The role of the Reserve Bank in specific areas of payments system policy and operations is set out in more detail in sections 1.2.4 and 5.

1.1.2 Securities settlement

The enactment of the *Financial Services Reform Act 2001* in September 2001 established a new framework for regulation of securities clearing and settlement systems. Previously, clearing houses and settlement systems were treated differently (on the basis of the asset class involved). The new regime, which commenced in March 2002, provides for a single licensing regime for “clearing and settlement facilities” under the *Corporations Act 2001* (the principal Act amended by the *Financial Services Reform Act 2001*). Licenses are issued by the responsible Minister.

Consistent with its responsibilities for the payments system, and for financial system stability, the Reserve Bank is empowered to set financial stability standards for clearing and settlement facilities. The Reserve Bank also monitors facilities’ compliance with these standards and with their legislative obligation to reduce systemic risk. ASIC is responsible for all other legislative obligations imposed on facilities (see section 1.2.4). ASIC and the Reserve Bank have established a Memorandum of Understanding, which is intended to assist each agency in the performance of its regulatory responsibility in relation to securities clearing and settlement systems.

1.1.3 Enforceability of netting

The *Payment Systems and Netting Act 1998* provides for the enforceability of close-out netting (e.g. as is used in master agreements governing over-the-counter transactions). It also allows the responsible Minister to approve market netting arrangements (such as that undertaken in financial market exchanges), and enables the Reserve Bank to approve multilateral netting arrangements in the payments system.

1.2 Institutions

1.2.1 Providers of payment services

Authorized deposit-taking institutions

Banking in Australia is controlled by Commonwealth legislation. The *Banking Act 1959* provides for the authorization of deposit-taking institutions in Australia and their supervision by APRA (see section 1.2.4). It also permits other financial institutions to offer some banking services, including payments services.

There were 51 banks in Australia authorized under the *Banking Act 1959* as at December 2001. The sector is dominated by four nationally operating groups, which account for around 65% of deposits and around 80% of non-cash transactions. Other Australian-owned banks tend to be regionally based. There are 37 foreign-owned banks in Australia; 25 operate as branches and twelve as locally incorporated subsidiaries.

Foreign bank branches may only accept wholesale deposits, which are not covered by the depositor protection provisions of the *Banking Act 1959*. They generally undertake wholesale, commercial and foreign exchange business. A number of foreign banks operate non-bank subsidiaries in Australia, which are known as merchant or investment banks.

Locally incorporated banks generally provide cheque and savings facilities. Those offering retail services provide credit and debit card services and access to national automated teller

machine (ATM) networks and electronic funds transfer at point of sale (EFTPOS) systems, as well as telephone and Internet banking.

In 2000, locally incorporated banks had around 5,000 branches, down from around 7,000 branches in 1993. Banks have reduced branches in pursuit of operating efficiencies and as a result of rationalization following mergers.

Building societies

Building societies are generally organized on a mutual basis and lend mainly for housing. There were 16 societies as at December 2001. Mergers and conversions to bank status have reduced the number of societies from 54 in 1987.

Most building societies offer comprehensive retail payment services. Cheque-issuing arrangements with banks enable them to offer depositors access to cheque account facilities. With the amendments to the *Cheques Act 1986* (see section 1.1), five societies have commenced issuing their own cheques and another is expected to do likewise. Most building societies provide bulk electronic transfers, ATM and EFTPOS services through an industry bureau, and several offer telephone and Internet banking.

Credit unions

There were 201 credit unions as at December 2001, down from 414 in 1988 following a series of mergers. Credit unions are mutual organizations that provide for deposits and borrowing by their members. Loans are mainly for the purchase of consumer durables, motor vehicles and housing.

Large credit unions provide a wide range of retail payments services to members. Most credit unions have an arrangement with a major national bank whereby depositors with the credit union are able to draw cheques on the credit union's account with the bank, however some credit unions offer cheques under their own name. Most credit unions also provide ATM and EFTPOS services through central industry-owned organizations (see section 1.2.3). Some credit unions also provide telephone and Internet banking.

Cash management trusts

Cash management trusts are a type of unit trust. Some provide limited cheque facilities under arrangements with a bank, or otherwise provide a "sweep" facility whereby funds can be transferred to a bank transaction account when needed.

1.2.2 Providers of securities services

Providers of securities services include authorized deposit-taking institutions (see section 1.2.1), specialist non-bank financial institutions, broking firms and commercial firms (for central counterparty and securities settlement services).

The Reserve Bank was previously the operator of the settlement system for Commonwealth Government securities (CGS). This function was performed by the Reserve Bank Information and Transfer System (RITS), whose role as an interbank settlement system is discussed in section 3.6. In February 2002, the business of CGS clearing and settlement was transferred from RITS to the Austraclear System.

1.2.3 Other service providers

Special Service Providers for non-bank financial institutions

Special Service Providers (SSPs) are industry bodies providing a range of settlement and financial services to the building society and credit union industries. SSPs are supervised by APRA. At present there are two for the credit union industry and one for building societies. Two SSPs have Exchange Settlement (ES) Accounts at the Reserve Bank which they use to settle direct-entry transactions (such as salary credits), ATM and EFTPOS interchanges and high-value payments.

Credit and debit card companies

There are three major credit cards issued in Australia. Banks, and many building societies and credit unions, issue cards which are affiliated with either the Visa or MasterCard schemes. Some banks also issue Bankcard, a local credit card used in Australia and New Zealand. Many institutions issue proprietary debit cards for ATM and EFTPOS transactions.

Charge card issuers

American Express and Diners Club also issue charge cards in Australia. American Express cardholders have access to some bank ATM networks. Some other overseas card issuers have arrangements with Australian merchants to accept their cards. One bank issues American Express credit cards and some banks and several building societies are distributors for American Express.

Retailers

Retailers are not generally providers of third-party payment services. However, many stores and retail chains issue their own cards for use in their premises only; in some cases processing is outsourced. Some oil companies issue their own cards (both credit and debit cards), aimed mainly at commercial fleets. Many stores provide customers with cash through a “cash out” facility at their EFTPOS terminals.

Australia Post

There are around 4,490 Post Office outlets throughout Australia of which 2,975 are licensed Post Offices. Australia Post offers access to banking facilities as an agent for the Commonwealth Bank and for a range of other financial institutions through its giroPost network. While the agreement with the Commonwealth Bank is of long-standing, giroPost was introduced in July 1995. It is an electronic banking and financial services network which provides post office customers with access to their card-based accounts at participating financial institutions. Customers of these institutions can open accounts, make deposits and withdrawals, pay bills and make balance inquiries at Post Offices. There are currently around 2,821 post offices connected to the network, which is used by 76 financial institutions.

Australia Post acts as a payment collection agent for around 450 companies, including a range of public utilities and others such as insurance companies. Australia Post’s Electronic Counter Services network is the largest single network in Australia for receiving payments of utilities’ accounts.

Australia

Australia Post also sells money orders payable to third parties. Use of money orders has diminished greatly in recent years. Australia Post is the sole issuer of money orders denominated in Australian dollars. American Express, as agent for Australia Post, issues foreign currency money orders.

1.2.4 Role of other private and public sector bodies

The role of the central bank

As well as its regulatory responsibilities and powers (see section 1.1.1), the Reserve Bank also has several statutory responsibilities and operational roles in the payments system:

- The *Reserve Bank Act 1959* confers on the Reserve Bank the responsibility for the production and issue, reissue and cancellation of Australia's currency notes. This is managed by the Reserve Bank's Note Issue Department. Australia's currency notes are printed by Note Printing Australia Limited, a separately incorporated wholly owned subsidiary of the Reserve Bank;
- it conducts the ES Accounts used for final settlement of payments;
- it provides banking services to the Commonwealth Government, a State government and a number of government instrumentalities, and in that role processes a substantial volume of cheque and direct-entry (electronic credit) transactions;
- it operates RITS, Australia's RTGS and batch interbank settlement system; and
- it conducts accounts for other central banks and some international financial organizations.

See sections 3 and 5 for a broader description of the Reserve Bank's role.

Australian Prudential Regulation Authority

The Australian Prudential Regulation Authority (APRA) was established on July 1, 1998. It has responsibility for the supervision of banks, building societies, friendly societies, life and general insurance companies and superannuation funds.

APRA operates under the *Australian Prudential Regulation Authority Act 1998* and its powers derive from the *Banking Act 1959*, the *Insurance Act 1973*, the *Life Insurance Act 1995* and the *Superannuation Industry (Supervision) Act 1993*. The power to determine, and carry out, the policy of APRA is vested in its Board.

All authorized deposit-taking institutions are supervised by APRA under one licensing regime and are covered by the same depositor protection provisions. If an authorized deposit-taking institution is, or is likely to be, unable to meet its obligations, APRA may assume control and carry on its business, or appoint an administrator, until its deposits are repaid or APRA is satisfied that suitable provision has been made for their repayment. If APRA believes that the institution will be unable to meet its obligations within a reasonable time period, it has the power to wind it up and distribute its assets, with depositors having first claim. The *Banking Act 1959* provides that the Australian assets of an authorized deposit-taking institution shall be available to meet deposit liabilities in Australia in priority to all other claims, conferring a depositor repayment preference in the event of liquidation.

There is close liaison between APRA and the Reserve Bank. The Reserve Bank has two representatives on the APRA Board, and APRA has a representative on the Payments System Board.

Australian Competition and Consumer Commission

The Australian Competition and Consumer Commission (ACCC) is Australia's competition regulator. It is responsible for ensuring that payments system arrangements comply with the competition and access provisions of the *Trade Practices Act 1974*. It may exempt the conduct of organizations and arrangements from the competition provisions if it judges it to be in the public interest. It may also accept undertakings in respect of third-party access to essential facilities.

The ACCC and the Reserve Bank both have responsibilities for access to the payments system and have agreed a Memorandum of Understanding to ensure a coordinated policy approach. The Reserve Bank may, under the *Payment Systems (Regulation) Act 1998*, impose an access regime on participants and/or set standards for a system. Where the Reserve Bank takes such initiatives, members of that system will not be at risk under the *Trade Practices Act 1974* by complying with the Reserve Bank's requirements. The effect is that the ACCC retains responsibility for competition and access in a payments system unless the Reserve Bank imposes an access regime or sets standards for that system.

Australian Securities and Investments Commission

The Australian Securities and Investments Commission (ASIC) was established on July 1, 1998, as the successor to the Australian Securities Commission. It has responsibility for market integrity and consumer protection across the financial system, including payments transactions. It administers the *Corporations Act* and regulates Australian corporations, financial markets, clearing and settlement facilities (in conjunction with the Reserve Bank – see section 1.1.2) and financial service providers. The major functions of ASIC include the oversight of financial market and clearing and settlement facility licensees, licensing of financial service providers (securities dealers and advisers), registration of auditors and liquidators, and investigating and enforcing corporate and securities law.

Council of Financial Regulators

The Council of Financial Regulators is a non-statutory body chaired by the Reserve Bank and comprising the head and one other representative of the Reserve Bank, APRA and ASIC. Its role, like that of its predecessor – the Council of Financial Supervisors – is to contribute to the efficiency and effectiveness of regulation by providing a high-level forum for cooperation and collaboration among its members. The Council is not a regulator in its own right.

Financial Sector Advisory Council

The Financial Sector Advisory Council was established in 1998 to provide ongoing advice to the Federal Treasurer on financial sector developments and policies. Its members are appointed for a period of two years and include Chairmen and Directors from several financial institutions, as well as the Governor of the Reserve Bank.

The Australian Payments Clearing Association Limited

The Australian Payments Clearing Association Limited (APCA) was established in 1992 to oversee and manage the development and operation of Australian payments clearing systems. APCA is a limited liability company, with a board of directors drawn from shareholders in the payments industry. Shareholders are the Reserve Bank, banks and the building society and credit union industry bodies. The costs of running APCA are met by members in shares broadly proportional to their relative importance in the payments system. Other interested groups or individuals may join as associate members.

APCA operates five clearing streams whose rules have been approved by the ACCC:

- the Australian Paper Clearing System (APCS) for cheques and other paper-based payment instructions;
- the Bulk Electronic Clearing System (BECS) for low-value bulk electronic debit and credit payment instructions;
- the Consumer Electronic Clearing Stream (CECS) for ATM and EFTPOS payment instructions;
- the High-Value Clearing System (HVCS) for high-value electronic payment instructions; and
- the Australian Cash Distribution and Exchange System (ACDES) for the exchange of cash between institutions.

Each clearing stream is managed by a committee drawn from the participants – banks, building societies and credit unions. The Reserve Bank is also a member of each of these committees, in some cases as a participant and in others as of right. In addition, Advisory Councils have been established for each of APCS, BECS and CECS. The role of Advisory Councils is to communicate opinions, advice and information on matters related to their particular clearing stream to the appropriate Management Committee. Advisory Council members are appointed by the APCA Board. Membership is drawn from organizations that participate indirectly in payments transfers managed by each clearing stream.

Australian Banking Industry Ombudsman Scheme

The Australian Banking Industry Ombudsman Scheme is run by the Australian Bankers' Association and funded by participating banks. The Ombudsman's role is to facilitate the resolution of disputes between customers and banks, including those relating to the payments system. The Ombudsman may consider disputes where an individual claimant is claiming damages of up to AUD150,000 and the bank is unable to resolve the dispute through its internal dispute resolution procedures. The Ombudsman has the power to make recommendations and awards which are binding on the banks but not on the complainant, who retains the right to take legal action if he or she does not accept the Ombudsman's ruling.

2. Payment methods

Introduction

There are a wide range of media by which payments are made in Australia. Cash continues to be a popular form of payment for low-value transactions. Australia has well-established debit and credit card networks which have become the main means, other than cash, by which Australians make their payments. Cheques are still prevalent in Australia, although reliance on these has been reduced by growth in the use of debit and credit cards (at the retail level) and by the introduction of RTGS (for wholesale payments). Credit transfers and direct debits are also used widely by governments and businesses. The vast majority (by number) of payments in Australia are for low-value transactions; however, these make up only a small percentage of the value of transactions. Like most other countries, Australia has experienced a move away from over-the-counter and paper-based transactions towards electronic payments. However, smart cards and electronic money are yet to gain widespread use in Australia.

Pricing

Historically, Australian banks have tended to recover much of the cost of providing transaction services through their general deposit and loan business; for the most part, no interest was paid on deposits in cheque accounts. Transactions services were often provided free of explicit charge.

However, competition on deposit and loan business has changed this situation substantially. Banks are increasingly unable to cross-subsidize payments services from other business areas and, as a result, both retail and wholesale payments services usually attract explicit fees.

Transaction accounts generally permit a number of free transactions a month, with charges for excess transactions. Higher charges are applied to over-the-counter transactions. Charges may depend on the average balance of the account and the extent of other business held with an institution. For business customers, charges are generally set on the basis of the overall relationship, though there is generally a limit on the number of free cheques that can be written each month.

The Reserve Bank charges explicitly for the banking services it provides and has supported moves towards cost-based and transparent pricing of payments transactions.

Taxation

Until recently, financial transactions in Australia were subject to two types of transaction tax. Debits Tax (BAD), which is scheduled to be abolished from July 1 2005, is levied by State governments on debits to any account with a cheque facility; it has a tiered structure according to the size of the debit, with a maximum charge of AUD4 for transactions of AUD10,000 or more. Financial Institutions Duty (FID), which was abolished on July 1, 2001, was levied by all but one of the States and Territories on deposits to accounts held at a bank or other deposit-taking institution.

2.1 Cash payments

Currency continues to be a convenient and popular form of payment for everyday, low-value transactions. Coin is produced by the Royal Australian Mint in 5c, 10c, 20c, 50c, AUD1 and AUD2 denominations. The Reserve Bank is the sole issuing authority for Australian currency notes. Currency notes are printed by Note Printing Australia Ltd, a wholly owned subsidiary of the Reserve Bank. Notes are issued in denominations of AUD5, AUD10, AUD20, AUD50 and AUD100. All notes are printed on polymer substrate and incorporate a number of security features which make them highly resistant to counterfeiting.

2.2 Cheques and other paper based instruments

The use of cheques has traditionally dominated Australian non-cash payments and they were, until the mid 1970s, virtually the only non-cash payment instrument. (Unlike European countries, there is no “giro” network for retail credit transfers in Australia, although progressively greater use is being made of credit and debit transfer payments in the electronic direct-entry payments system for periodical payments.) Despite the development of other payment instruments, cheques remain a common form of non-cash payment. The *Cheques Act 1986* allows cheques to be drawn on authorized deposit-taking institutions (i.e. banks, building societies, credit unions and Special Service Providers – see section 1.2.3). Prior to the 1998 amendments to this Act, cheques could only be drawn on a bank.

Banks also use warrants, which are irrevocable paper-based payment instruments, for some transactions between themselves. Use of warrants has declined markedly since the introduction of RTGS. Warrants are limited, by industry agreement, to values of less than AUD500,000.

Prior to the introduction of RTGS, the value of cheques and warrants cleared represented 34% of the gross value of exchanged payments. This share has since fallen to 4%.

2.3 Direct-entry transactions

Direct-entry transactions are exchanged by direct computer-to-computer linkages, usually after many transactions have been gathered together in a “batch”. In Australia the payments are exchanged bilaterally, in contrast to some countries where they are processed through a central automated clearing house. Since March 1994, banks, building societies and credit unions have been linked in an integrated but decentralized national system. Section 3.2 describes arrangements for clearing and settlement of direct-entry transactions.

Direct credits enable a paying institution to transfer funds to the accounts of a large number of recipients. Direct crediting of accounts is used widely, especially by government departments and companies for regular payments such as social security benefits, salary and dividend payments. In 2001, around 800 million direct credit transactions were made, with a value of around AUD2,550 billion (USD1,356 billion). They represented about 26% of retail non-cash transactions by volume, and 38% by value.

The Reserve Bank’s Government Direct Entry Service (GDES) performs a large number of direct-entry payments for government departments. The system uses high-speed data links to gather payments data from government agencies which, after amalgamation, verification and sorting, are distributed electronically to relevant financial institutions. Around 218 million transactions were processed in 2001.

Direct debits are used mostly by insurance and utilities companies and like bodies for collecting regular policy premiums and payments, and by financial institutions to collect loan repayments. Under these arrangements, payers give financial institutions authority to debit their accounts at the initiative of nominated payees.

Direct debits totaled about 300 million in 2001, with a value of around AUD1,950 billion (USD1,037 billion). This represents about 10% of the number and 29% of the value of retail non-cash payments.

2.4 Payment cards

The use of plastic cards as a payment medium continues to grow rapidly in Australia.

Debit cards allow access to funds already in customers' accounts. In Australia, banks, credit unions and building societies are the main issuers of debit cards, which can be used in ATMs, cash dispensers, automated petrol dispensers, telephones and EFTPOS terminals. In 2001, there were around 18 million debit cards on issue in Australia; they were used to make about 645 million transactions with a total value of around AUD38 billion (USD20.2 billion).

Credit cards are issued mainly by banks. The most common are Visa, MasterCard and the local Bankcard. These cards provide prearranged revolving credit, up to a specified limit. Payments for goods and services and withdrawals of cash are made against the line of credit. Restrictions on annual fees for credit cards were removed in 1993. Most issuers offer a range of structures: annual fees of AUD18-30 per annum with up to 55 days interest-free; no annual fees and higher interest rates; lower interest rates with interest charged from the date of purchase etc. In 2001, there were around 10 million credit and multifunction cards on issue in Australia; they were used to make about 759 million non-cash transactions with a total value of around AUD83 billion (USD44.1 billion).

*Travel, entertainment and retailer cards*¹ allow payment to be deferred from the date of purchase until the account due date. They do not generally provide revolving credit. Accumulated balances are payable in full on receipt of the monthly statement. No interest is charged if payments are made on time, but there may be joining and annual membership fees. In some instances, the card may be linked to a separate line of credit through an account with a financial institution.

2.5 Automated teller machines

Automated teller machines (ATMs) were introduced on a wide scale in 1981. As at June 2001, there were 11,949 ATMs across Australia. ATMs allow cash withdrawals, deposits, balance enquiries, transfers between accounts and ordering of cheque books and statements. There are no legal restrictions on the siting or number of machines financial institutions may install. Operators have agreed to meet standards established by Standards Australia covering design and placement. Most operate 24 hours a day. Some institutions also provide limited-purpose Cash Dispensers which can be used only for withdrawals and account balance enquiries. ATM and cash dispenser transactions can be initiated by debit cards and certain credit cards and are authorized using a Personal Identification Number (PIN).

¹ Also called charge, store and private label cards.

2.6 Electronic funds transfer at point of sale

In Australia, electronic funds transfers at point of sale (EFTPOS) transactions involve the use of debit cards. Most of these transactions are PIN-authorized, though some institutions issue a Visa-branded debit card which can be authorized by use of a PIN or a signature. PIN-authorized transactions are posted to customers' accounts in real time. Payment to the merchant is guaranteed by the acquiring bank for authorized transactions. Many merchants also offer a cash-out facility to cardholders making purchases. Terminals operate whenever the merchant is open; for some merchants, such as petrol stations, this is 24 hours a day, seven days a week. Many EFTPOS terminals are integrated with retailer cash registers. There were around 363,000 EFTPOS terminals in Australia in June 2001.

2.7 Stored-value cards/e-cash

There have been a number of trials of stored-value cards and e-cash. The trials include stand-alone facilities, and also stored-value facilities attached to existing products such as prepaid tickets for public transport or public telephones.

2.8 Third-party bill payments

Australia Post provides bill payment services for around 450 billers. Payments can be made by telephone, the Internet or over-the-counter at Australia Post outlets, although not all billers accept payment using all three of these options. Over-the-counter payments can be made using cheques, cash and debit and credit cards.

A bank-owned service company, BPAY, also provides a third-party bill payment service. It allows customers of participating financial institutions to arrange for the transfer of funds from their bank account using phone banking or Internet banking services. Approximately 48% of all BPAY transactions are now initiated via the Internet. There are more than 5,000 billers and over 130 financial institutions participating in BPAY.

3. Interbank settlement systems

Overview

Over 90% by value of non-cash payments between financial institutions are settled on an RTGS basis through RITS (see section 3.6). This includes payment instructions originating from securities settlement systems. However, the majority of payment instructions are made under clearing arrangements developed by the Australian Payments Clearing Association (APCA). These deal with:

- cheques and other paper instruments;
- bulk electronic (direct-entry) payments;
- consumer electronic payments (ATM and EFTPOS);
- large-value electronic payments; and
- the exchange of cash between institutions.

Credit card transactions are currently cleared under bilateral arrangements between participants. BPAY transactions are cleared multilaterally outside the APCA arrangements.

Obligations arising from the clearing of instruments in each of these systems are settled across Exchange Settlement (ES) Accounts at the Reserve Bank. For each of cheques, direct entry (including obligations arising in the BPAY system), ATM, EFTPOS and credit cards, a multilateral net settlement position is determined for each participant. These are combined to calculate the overall net position for each participant. This is settled on a deferred basis at 9:00 the following business day. Large-value electronic payments and payment obligations that arise from settlement of Commonwealth Government securities trades and other fixed interest securities in Austraclear (see section 4.1), are settled on an RTGS basis.

3.1 Cheques – Australian Paper Clearing System (APCS)

Cheques, and other paper-based payment instruments such as money orders, AUD travelers' cheques and warrants are cleared through the APCS, which is managed by an APCA Management Committee drawn from the participants – banks, building societies and credit unions. The Reserve Bank is a member as of right. The Management Committee receives input from an Advisory Council, drawn from institutions involved in the industry in a variety of roles.

3.1.1 Ownership

APCA is owned by its industry members, which include banks, building societies, credit unions and the Reserve Bank.

3.1.2 Participation

There are currently three classes of APCS members. Tier 1A members clear directly with one another and settle their resulting obligations across ES Accounts at the Reserve Bank. Tier 1B members appoint Tier 1A members to clear paper on their behalf, but retain responsibility for their own settlement obligations. Tier 2 members appoint Tier 1A members as their agents to both clear and settle on their behalf. There are ten Tier 1A, two Tier 1B and 48 Tier 2 members of APCS.

3.1.3 Types of transactions

Cheques and other paper-based payment instruments are cleared through APCS.

3.1.4 Operation of the system

Cheques deposited at branches of deposit-taking institutions are value-encoded at the data centers of the institutions or their clearers. These details are added to the magnetic ink character recognition line (the MICR line), which includes details of the customer's account number, institution and branch. Banks and other financial institutions that use agents to clear on their behalf generally have arrangements to lodge cheques initially deposited with them at convenient branches of the agent.

Most cheques are delivered to each institution's processing center in the State or Territory capital city on the day of lodgment. This involves an extensive network of air and road transport. Cheques are then sorted into those drawn on the institution itself and those drawn on other institutions. Although physical exchange of all paper items drawn on other institutions still occurs, settlement for the bulk of items (around 95%) is based on bilateral

exchange of electronic files. Physical cheques are exchanged bilaterally and also at regional clearing centers, but most are on a “not for value” basis.

The regional clearing centers operate under the auspices of APCA. Institutions which clear cheques on their own behalf may choose to clear directly at some, all, or none of the centers, and may appoint direct clearing institutions to act as their agent at any or all centers. Cheques for those institutions which are not members of the relevant clearing Center are passed to their agents.

Cheques deposited by customers are credited to their accounts on the day of deposit. Where appropriate, interest accrues from the day of deposit although funds can usually not be withdrawn until a few days later (see section 3.1.6). Most institutions post debits to their customers’ accounts on the night a cheque is exchanged. This means that paying customers’ accounts are almost always debited on the same day as depositing customers’ accounts are credited, so there is very little institution/customer float generated in the cheque clearing cycle.

3.1.5 Settlement

At the end of each clearing day, Tier 1A institutions advise the Collator at the Reserve Bank in Sydney of their bilateral net settlement positions with other Tier 1A institutions. These settlement balances also incorporate the positions of those institutions that have appointed a Tier 1A to clear and settle on their behalf. Tier 1A institutions are also responsible for reporting the multilateral net settlement positions of Tier 1B institutions for whom they clear.

No later than 3:00 Sydney time on the following day, the final value of the previous day’s exchanges are determined by the Collator, for settlement at 9:00. Institutions’ ES Accounts are credited and debited simultaneously through a batch settlement in RITS. No central bank/institution float is generated. A record of net daily settlement positions is kept, so that at the end of each month interest adjustments can be made between institutions to reflect the fact that, although institutions pay interest to their customers from the day of deposit, they do not receive funds from the paying institution until settlement the next business day.

3.1.6 Risks and risk management

In the absence of a covering line of credit, customers are not generally able to withdraw funds from accounts until the collecting institution is reasonably sure that the cheque will be paid. Cheques are not considered paid until the paying institution has had time to validate the cheque and the drawer’s capacity to cover it. The industry works on an exception basis, with paying institutions notifying collecting institutions only of those cheques which are dishonored.

Collecting institutions electronically transmit to paying institutions a file containing details of the MICR line of the cheque. Physical cheques continue to be exchanged as outlined above, but the values used in settlement calculations are largely based on the electronic presentment. The *Cheques Act 1986* allows for the truncated presentation of cheques exchanged between institutions (i.e. electronic transmittal of data with the physical cheque remaining at the institution which collected it), although this is not widely used in Australia.

Best practice for banks is a “three day clearing cycle”. That is, if a cheque is deposited at an institution on a Monday, and cleared electronically, that institution could make the funds available to its customer on Wednesday.

Arrangements which would apply if a direct settling participant were to fail to meet its obligations are currently under review. Amendments in 1998 to the *Cheques Act 1986* allow for the turnback, or presumed dishonor, of cheques for which a failed institution has not settled. The *Payment Systems and Netting Act 1998* provides legislative protection for approved multilateral net settlement arrangements. To gain the protection of either Act requires approval by the Reserve Bank.

3.1.7 Technical aspects

APCS is not a centralized electronic clearing system and does not operate any technical infrastructure. Most items are exchanged electronically on a bilateral basis. The APCS procedures specify formatting and other message standards.

3.1.8 Pricing policies

There are no transaction-based fees for participation in the APCS. Individual financial institutions are responsible for pricing policies relating to their cheque services.

3.1.9 Governance

The rules and regulations governing participation in the APCS are managed by APCA. A Management Committee, consisting of representatives from APCA’s shareholders, is responsible for approving changes to these arrangements, including means and timing of settlement, technical standards and dispute resolution. Management Committee decisions can be reviewed by the APCA Board, which is made up of executives from APCA’s shareholders.

3.2 Bulk Electronic Clearing System (BECS)

Large-volume electronic credit and debit transfers are processed under the rules of APCA’s Bulk Electronic Clearing System (BECS), which is managed by a committee drawn from the participants – banks, building societies, credit unions and the Reserve Bank. The Management Committee receives input from an Advisory Council, drawn from institutions involved in the industry in a variety of roles, including technology providers, government users, commercial users, message standards organizations and processors and payroll bureaus.

3.2.1 Ownership

The rules and procedures governing clearing of bulk electronic (direct entry) payments are determined by APCA. APCA is owned by its industry members.

3.2.2 Participation

There are two classes of members of BECS. Tier 1 members clear directly with one another and settle resulting obligations across ES Accounts at the Reserve Bank. Tier 2 members

appoint Tier 1 members as their agents to both clear and settle on their behalf. In June 2001, there were 14 Tier 1 and 43 Tier 2 members of BECS.

3.2.3 *Types of transactions*

BECS clears large-volume electronic credit and debit transfers.

3.2.4 *Operation of the system*

In contrast to other countries' Automated Clearing Houses, BECS is not centralized, other than for rule setting, and relies on bilateral arrangements between participants. Files of direct-entry credits and debits are prepared by financial institutions and bilaterally exchanged between Tier 1 members using electronic links. Transactions that cannot be accepted by the receiving institution (due to, for example, incorrect account or insufficient funds) are also returned electronically.

3.2.5 *Settlement*

At the end of each day, Tier 1 members reconcile their inward and outward exchanges (which include the positions of their Tier 2 appointors) and report their bilateral positions against other Tier 1 members to the Reserve Bank Collator in Sydney. These are settled on a multilateral net basis at 9:00 on the following business day through RITS.

3.2.6 *Risks and risk management*

Direct-entry credit transfers are irrevocable and there is no risk of dishonor. This contrasts with the situation for direct debits, which, like cheques, always carry the risk to beneficiaries of payments being dishonored. Dishonors of direct debits are communicated almost immediately by payers' financial institutions. Arrangements which would apply if a direct settling participant were to fail to meet its obligations are currently being reviewed.

3.2.7 *Technical aspects*

BECS is not a centralized electronic clearing system. Most items are exchanged electronically on a bilateral basis. The BECS procedures specify formatting and other message standards.

3.2.8 *Pricing policies*

There are no transaction-based fees for participation in BECS. Individual institutions are responsible for pricing policies relating to their direct entry payments services.

3.2.9 *Governance*

The rules and regulations governing participation in the system are managed by APCA. A Management Committee, consisting of representatives from APCA's shareholders, is responsible for approving changes to these arrangements, including means and timing of settlement, technical standards and dispute resolution. Management Committee decisions can be reviewed by the APCA Board, which is made up of executives from APCA's shareholders.

3.3 Consumer Electronic Clearing System (CECS)

ATM and EFTPOS transactions are cleared under regulations and procedures established by the CECS, which is managed by an APCA committee drawn from industry participants and the Reserve Bank. The Management Committee receives input from an Advisory Council, drawn from institutions involved in the industry in a variety of roles. Members of the CECS Advisory Committee include technology providers, communications providers, retailers, ATM and EFTPOS terminal providers, card organizations, processors and ATM operators.

3.3.1 Ownership

The rules and procedures governing clearing of consumer electronic payments are determined by APCA. APCA is owned by its industry members.

3.3.2 Participation

There are 15 participants in CECS, consisting of twelve banks, two Special Service Providers and one retail firm.

3.3.3 Types of transactions

ATM and EFTPOS transactions are cleared through CECS.

3.3.4 Operation of the system

Linkages between proprietary networks mean that there is one national system of EFTPOS terminals to which all card issuers have access. Much of the national EFTPOS infrastructure is provided by the major national banks and the large regional banks, which service the bulk of the merchant base. One major retailer has its own national network of terminals and is able to switch transactions to different card issuers and transaction processors. Other financial institutions, such as small regional banks, building societies and credit unions, are linked to the national system through arrangements with banks. Service companies also provide switching and transaction processing services to smaller institutions using ATM and EFTPOS networks.

3.3.5 Settlement

Each day, financial institutions calculate their national bilateral positions against other clearing institutions and report these by 4:00 the following business day to the Collator at the Reserve Bank. These balances are then settled on a multilateral net basis at 9:00, through a RITS batch settlement.

3.3.6 Risks and risk management

While the volume of CECS payments in Australia is both substantial and growing relatively quickly, total interbank settlement obligations (and hence the risks) generated from these systems are comparatively small, less than half of 1% of daily settlement flows. Arrangements in the event that a participant in ATM and EFTPOS interchanges cannot settle its obligations are currently being reviewed.

3.3.7 Technical aspects

CECS is not a centralized electronic clearing system. The CECS regulations specify procedures including message and security standards.

3.3.8 Pricing policies

There are no transaction-based fees for participation in CECS. Individual financial institutions are responsible for setting pricing policies relating to ATM and EFTPOS transactions. Customers may be charged for ATM and EFTPOS transactions. Transaction accounts held by customers typically permit a maximum number of fee-free electronic transactions a month, after which a fee is charged for each additional transaction. Institutions pay bilaterally agreed ATM interchange fees for transactions undertaken by their customers at ATMs of other institutions or networks and generally charge their customers a “foreign” ATM fee.

3.3.9 Governance

The rules and regulations governing participation in the system are managed by APCA. A Management Committee, consisting of representatives from APCA’s shareholders, is responsible for approving changes to these arrangements, including means and timing of settlement, technical standards and dispute resolution. Management Committee decisions can be reviewed by the APCA Board, which is made up of executives from APCA’s shareholders.

3.4 High-Value Clearing System (HVCS)

The HVCS was established in August 1997 and accounts for around 65% of the total value of transactions settled across RITS. It is based on S.W.I.F.T.’s FIN-Copy service and its rules are established by APCA. The HVCS is sometimes referred to as the SWIFT Payment Delivery System (PDS). This is due to PDS being the three-field identifier for Australian payments in the S.W.I.F.T. message format.

3.4.1 Ownership

The rules and procedures governing clearing of transactions through the HVCS are determined by APCA. APCA is owned by its industry members and the Reserve Bank.

3.4.2 Participation

The Reserve Bank, authorized deposit-taking institutions and other prudentially supervised providers of payments services which hold ES Accounts at the Reserve Bank are entitled to join the HVCS. There are no special membership categories and all members are directly responsible for their own settlement obligations.

3.4.3 Types of transactions

The HVCS carries large-value payments such as the Australian dollar leg of foreign exchange transactions. There is no minimum transaction value and around 60% of the total number of HVCS transactions (amounting to less than 1% by value) are for transactions of less than AUD100,000.

3.4.4 Operation of the system

HVCS payments are initiated by using a S.W.I.F.T. computer-based terminal to generate a payment instruction. S.W.I.F.T.'s FIN-Copy passes the settlement details associated with each payment to RITS (the RTGS system) through a central computer interface. Customer details are retained by FIN-Copy for forwarding to the receiving financial institution after RITS confirms settlement of the transaction.

HVCS operating hours are 9:15 to 16:30, Monday to Friday. Extensions to these hours are planned to accommodate the commencement of CLS Bank's service (see section 3.7).

3.4.5 Settlement

Settlement is on an RTGS basis in central bank money (see section 3.6).

3.4.6 Risks and risk management

As the system operates on an RTGS basis, participants are not exposed to settlement risk. Further detail on risk management applying to RTGS transactions is set out in section 3.6.6.

3.4.7 Technical aspects

Participants in HVCS are subject to a number of technical requirements. Overall, a participant's computer facilities must be secure, protected against natural disaster and incorporate appropriate hardware, software and communication lines in order to access the SWIFT PDS. Participants' systems must also be capable of meeting minimum throughput requirements. HVCS participants must have back-up facilities which allow them to recover their operations in the event that their primary systems fail. Participants which account for 2% or more of the value of sent and received payments in the HVCS are required to have a remote back-up site. Other members may have back-up facilities in the same building as their primary systems providing certain requirements are met. Participants must regularly test their internal back-up arrangements and provide an annual compliance certificate to APCA management with regard to technical requirements set out in the HVCS procedures.

3.4.8 Pricing policies

There is no transaction-based fee for participating in the HVCS. However, payments messages attract standard S.W.I.F.T. charges and the Reserve Bank charges a fee for each debit and credit to an ES Account. As payments made through the HVCS settle on an RTGS basis, these costs are incurred on a per transaction basis.

3.4.9 Governance

The rules and regulations governing participation in the system are managed by APCA. A Management Committee, consisting of representatives from APCA's shareholders, is responsible for approving changes to these arrangements, including means and timing of settlement, technical standards and dispute resolution. Management Committee decisions can be reviewed by the APCA Board, which is made up of executives from APCA's shareholders.

3.5 Australian Cash Distribution and Exchange System (ACDES)

3.5.1 Ownership

The rules and procedures governing the way institutions exchange cash are determined by APCA. APCA is owned by its industry members.

3.5.2 Participation

Five banks are participating members of ACDES and undertake exchanges of cash directly with each other. These five banks comprise Australia's four major banks and one regional bank. Together, these participants supply the majority of the community's cash needs.

3.5.3 Types of transactions

ACDES covers the exchange of cash between participating members.

3.5.4 Operation of the system

The objective of ACDES is to provide a formal system for participating members to undertake exchanges of cash in an orderly and secure manner. The rules allow members with a shortage of particular denominations of cash in a particular geographic area to obtain cash from members with a corresponding surplus.

3.5.5 Settlement

Settlement of cash exchanges occurs on a deferred net basis through RITS at around 10:00 on the following business day.

3.5.6 Risks and risk management

Members have established exchange trading/dealing limits with counterparties to cover intra-day settlement risk for transactions.

3.5.7 Technical aspects

At present there are no technical requirements for the exchange system. Counterparties deal bilaterally in terms of arrangements set out in the ACDES Regulations and Procedures.

3.5.8 Pricing policies

Members undertake exchanges at face value and share the costs of operating ACDES based on respective percentages of national activity. New members must pay an entrance fee.

3.5.9 Governance

The rules and regulations governing participation in the system are managed by APCA. A Management Committee, consisting of representatives from APCA's shareholders, is responsible for approving changes to these arrangements, including means and timing of settlement, technical standards and dispute resolution. Management Committee decisions

can be reviewed by the APCA Board, which is made up of executives from APCA's shareholders.

3.6 Reserve Bank Information and Transfer System (RITS)

The Reserve Bank Information and Transfer System (RITS) is Australia's Real-Time Gross Settlement (RTGS) system. It settles obligations arising between financial institutions as a result of the exchange of large-value payments in the HVCS and the settlement of debt securities trades in Austraclear. RITS also provides for the settlement of interbank obligations arising from low-value payments transactions and those arising from equities settlement in the Australian Stock Exchange's (ASX's) Clearing House Electronic Subregister System (CHESS).

RTGS was introduced in Australia on June 22, 1998. In RTGS, processing and settlement of transactions takes place continuously and irrevocably in real-time using credit funds in banks' ES Accounts. RTGS was instituted mainly to eliminate the settlement risk associated with domestic interbank high-value payments and to promote the overall efficiency of Australia's wholesale payments system.

3.6.1 Ownership

RITS is owned and managed by the Reserve Bank. The RITS Regulations and Conditions of Operation (the Regulations) and associated contractual agreements between the Reserve Bank and RITS members provide the legal structure for RITS. The Regulations set out the rules for the operation of RITS and the rights and obligations of members and the Reserve Bank. Standard agreements are executed between the member and the Reserve Bank to bind each party to the Regulations.

3.6.2 Participation

Membership of RITS is available upon application to the Reserve Bank. RITS membership is mandatory for all holders of ES Accounts, comprising banks, SSPs and the SFECC (see sections 5.2 and 1.2.3). As a RITS terminal is required to participate in tenders of Commonwealth Government securities, several non-ES Account holders are RITS members.

3.6.3 Types of transactions

All payments transactions that generate settlement obligations between financial institutions (including those relating to securities settlements) are settled using credit funds in ES Accounts. Of these, RITS settles over 90% by value on a transaction-by-transaction basis in real time. RITS also provides a cash transfer facility.

3.6.4 Operation of the system

Final settlement of payments system obligations occurs through ES Accounts at the Reserve Bank. These accounts must be maintained in credit at all times, and the Reserve Bank pays interest on overnight balances in these accounts. Banks and other ES Account holders (see sections 1.2.3 and 5.2) access their ES Accounts through RITS.

RITS provides RTGS settlement of interbank obligations arising from transactions in three "feeder" systems:

- Austraclear, an electronic depository and settlement system for transactions in Australian debt securities (see section 4.1);
- CHES RTGS, an optional RTGS facility for settlement of equities transactions (see section 4.2); and
- HVCS (also called the SWIFT PDS), a payment clearing system for high-value transactions, principally the Australian dollar leg of foreign exchange settlements and interbank customer payments. The management and operation of the HVCS is described in section 3.4.

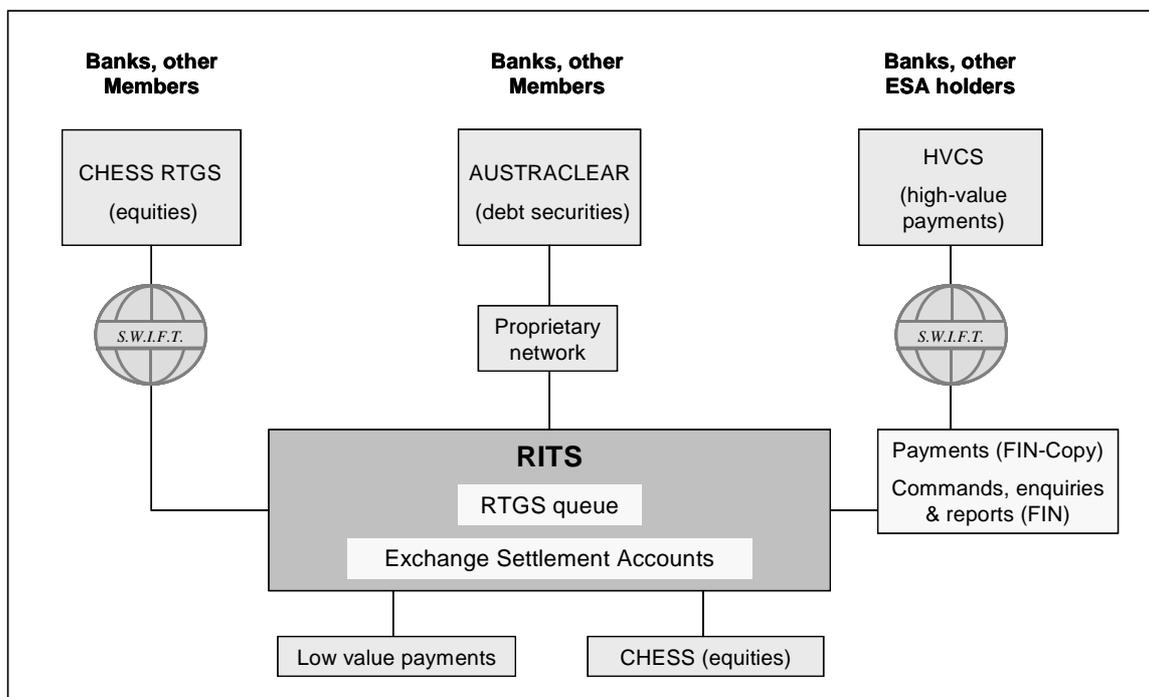
In addition, RITS provides a facility for real-time transfers of cash between ES Account holders.

RITS also provides for interbank settlement of multilaterally netted obligations between ES Account holders. Interbank obligations arising from cheques, credit and debit cards, and bulk electronic payments are settled on a multilateral net basis at around 9:00 on the business day following exchange. RITS is closed between 8:45 and 9:15 in order to allow for settlement of these obligations in the “9am batch”.

Equities transactions are routinely settled on a multilateral net basis in CHES. RITS settles the resulting multilateral net settlement obligations between sponsoring banks in a single RTGS batch (the “CHES Batch”), usually some time after 12:00 noon each business day. The equities settlement process is complete when CHES updates its members’ cash and securities accounts; this is done immediately after the settlement of the CHES batch in RITS.

Chart 1 illustrates the various functions of RITS.

Chart 1: Access to RITS



3.6.5 *Settlement*

Settlement of all obligations is on an RTGS basis in central bank money. All ES Account holders settle their own RTGS obligations, rather than by appointing an agent to settle on their behalf. Prior to settlement, transactions are entered in RITS where they proceed to the RTGS queue. Banks may set a status of “deferred”, “active” or “priority”. Queued transactions with status “active” or “priority” are then tested for settlement. Settlement will occur when the payer’s ES Account has sufficient funds. “Active” transactions will be processed unless a payment would cause the level of the paying institution’s ES balances to fall below an amount specified by each bank (sub-limits can be set within the system so as to reserve a tranche of liquidity). “Priority” transactions ignore any sub-limit and are tested against the full level of ES Account balances.

A transaction may be withdrawn while it is in the RITS Queue, but upon successful settlement testing and simultaneous debiting and crediting of ES Accounts, the transaction is final and irrevocable. This finality and irrevocability is supported by an approval under the *Payment Systems and Netting Act* (see section 3.6.6).

3.6.6 *Risks and risk management*

As the system operates on an RTGS basis, RITS members are not exposed to settlement risk. ES Accounts must be in credit at all times.

A market-based rate of interest is paid on ES balances at the Reserve Bank. However, this pool of funds is quite small when compared with the total value of transactions settled through the system. Liquidity risk is managed in two main ways – a liquidity-conserving feature “auto-offset” and access to additional ES funds through intraday repos.

The auto-offset facility automatically searches for bilateral offsetting transactions, or a group of offsetting transactions, between banks for simultaneous settlement – which potentially reduces the call upon each bank’s liquidity. The intraday repo facility with the Reserve Bank enables banks to convert holdings of Commonwealth Government securities and securities issued by State and Territory governments into ES funds by a repurchase transaction with an agreement to reverse by the end of the same day. In November 2001, banks held around AUD22.5 billion (USD12 billion) in such securities.

The intraday repo facility can be utilized either manually by banks (the first leg of the transaction proceeds automatically at the Reserve Bank) or automatically. In the latter case, stock that has been placed in an auto-repo sub account is sold as needed to the Reserve Bank. The system queue will proceed with an auto-repo after checking that: there are insufficient funds in that bank’s ES Account to allow settlement; the payment has been on the queue for five minutes or more; the auto-repo functionality has been turned on; and there is stock in the repo sub-account. However, the automatic facility is rarely used.

To provide further liquidity, the Reserve Bank endeavors to make payments to the banking system (either on its own account or for its customers) at the start of the trading day.

An end-of-day facility is also available which allows banks, through an overnight repo, to obtain funds at a cost of 25 basis points above the Reserve Bank’s target cash rate for monetary policy. Banks must notify the Reserve Bank before accessing this facility. The

relatively high cost of this facility is to provide an incentive for banks to find cash in the market, rather than come to the Reserve Bank at the end of the day.

Contingency arrangements for RITS (and for other wholesale payments systems) were updated prior to the Year 2000. The industry has detailed plans and procedures in place to deal with contingencies which are regularly tested. These are coordinated by the Reserve Bank and set out the industry response in circumstances where either RITS, the SWIFT PDS or Austraclear is unavailable. They also cover circumstances where an individual bank is unable to send and receive payments.

Industry participants also have internal procedures to deal with contingencies. For many of the major players, these include the ability to switch to a secondary connection to RITS, Austraclear and the SWIFT PDS in circumstances where their primary communications link is unavailable. RITS has a hot back-up facility at its primary site and shares with Austraclear a remote back-up site that can be activated in within 40 minutes.

The RITS Regulations operate as a binding contract between each and every member and the Reserve Bank. The PSB has given approval to RITS as an “approved RTGS system” under the *Payment Systems and Netting Act*. This ensures the irrevocability of completed RITS transactions by removing the potential for the “zero hour rule” to be applied in the event of an insolvency.

3.6.7 *Technical aspects*

The technical requirements for participation in RITS are set out in the RITS Regulations and Conditions of Operation. Users access RITS via the Austraclear National Network Infrastructure using RITS terminals. Connection is via dial-up access or various forms of leased line access.

3.6.8 *Pricing policies*

There are joining and annual fees applying to RITS members. These are waived for Austraclear members (the majority of RITS members are Austraclear members), since they essentially use the same proprietary network. A fee of 88 cents per side for each debit and credit to a financial institution’s ES Accounts applies, and there is a fee of AUD2.95 per side for cash transfers.

3.6.9 *Governance*

The Reserve Bank owns and operates RITS. The rules and regulations governing participation in the system are managed by the Reserve Bank’s Business Services Group. This is a separate division from that which is responsible for the oversight of the Australian payments system.

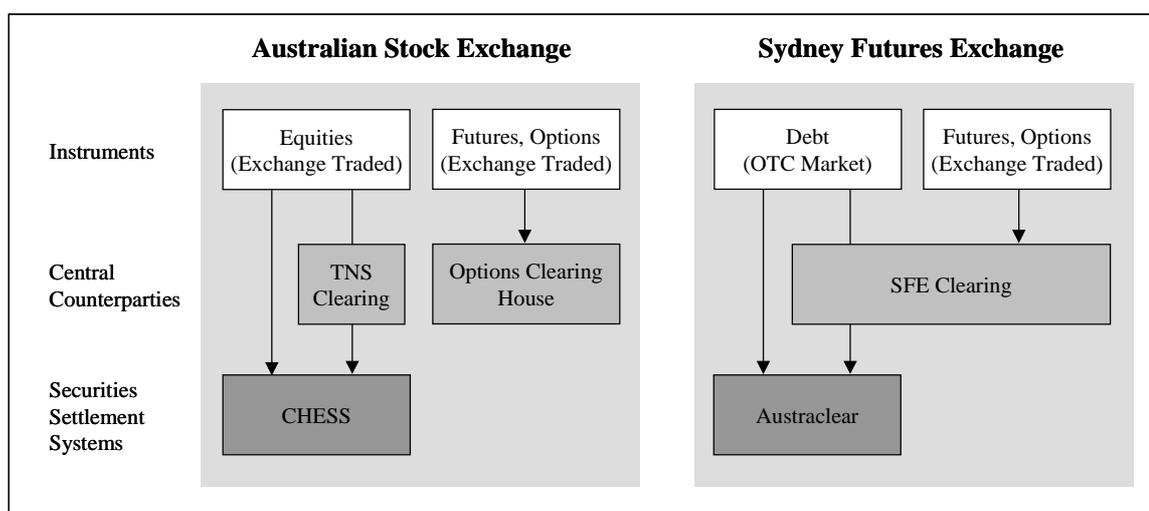
3.7 Major projects and policies being implemented

Settlement arrangements are being modified to allow for the operation of CLS Bank. The operating hours of RITS, and the HVCS are being extended to include an evening session overlapping with European and US time zones. RITS is expected to remain open until 20:00 (Sydney time) in the winter and until 22:00 (Sydney time) in the summer.

4. Securities settlement systems

Clearing and settlement systems in Australia were traditionally fragmented into separate “silos”, with each system serving a separate asset class, and with little or no direct competition between them. In recent years, there has been some rationalization of the number of clearing and settlement operators, and with legislative reforms contained in the *Financial Services Reform Act 2001*, there is now greater potential for competition between systems. Chart 2 shows the current structure.

Chart 2: Clearing and Settlement in Australia



4.1 Debt securities

Debt securities in Australia include Commonwealth Government securities (CGS) as well as securities issued by State governments and the private sector.

CGS comprise treasury bonds (issued for terms of several years at a fixed coupon rate), treasury notes (discount securities issued for terms of less than a year with maturity dates set at peak tax payment due dates), treasury adjustable rate bonds (for terms of several years but with the interest rate adjusted quarterly) and treasury indexed bonds (for terms of several years and with the interest rate set against the consumer price index). All CGS are issued by tender.

Around one-third of Commonwealth debt on issue is held beneficially by overseas investors. Of the remainder, the Reserve Bank is the largest single holder followed by banks and other financial intermediaries.

State government securities comprise negotiable paper securities and registered book-entry securities issued in the Australian domestic market by State & Territory governments.

The majority of private debt is issued by banks and other financial institutions. Asset-backed securities, which finance and are secured by income-yielding assets, such as mortgages, are an increasing presence in Australian debt markets.

Australia

4.1.1 Trading

Market overview

Australia has deep and liquid markets in short-term debt instruments. Over 80% of short-term debt is issued by financial institutions (largely banks) in the form of bank-accepted bills or negotiable certificates of deposit. Liquidity in the long-term debt securities markets is focused on the bonds issued by the Commonwealth Government (i.e. CGS). Turnover in CGS has declined slightly in recent years as the amount on issue has declined.

Trading systems

Trading of debt securities is primarily on an over-the-counter (OTC) basis. The Australian Stock Exchange (ASX) provides exchange-based trading for a range of corporate debt securities on its Interest Rate Market, mainly directed at retail investors.

4.1.2 Pre-settlement

Trade confirmation

Counterparties routinely confirm trade details on the trade date. Separately, trade details are also matched in Austraclear prior to settlement being completed. Counterparties may alter details of a trade in order to effect a match.

Clearing house

The SFE Clearing Corporation (SFECC) operates an optional central counterparty service, called Bond and Repo Clear (BRC), for transactions in CGS and State government securities. Transactions not cleared through BRC are settled directly between the trade counterparties in Austraclear.

Governance

The SFECC is a wholly owned subsidiary of SFE Corporation Ltd. BRC participants are covered by the SFECC By-Laws. See section 4.3.2 for SFECC governance arrangements.

Participation

Currently there are seven BRC participants, the majority of whom are also SFECC futures and options clearing members. BRC participants are subject to the SFECC's risk controls (see below) and must make a commitment to the SFECC's settlement guarantee fund.

Novation

Where the BRC service is used by participants in relation to a trade, novation occurs upon registration of the relevant market contract. Novation typically occurs within thirty minutes of a trade being matched within the Austraclear system.

Role of central counterparty

The SFECC provides, through its BRC service, central counterparty clearing for transactions and reciprocal repurchase transactions (repos) in eligible securities (CGS and certain securities issued by State and Territory governments). In addition to matching and novating trades, the SFECC multilaterally nets members' cash and securities positions.

Risk management

The BRC central counterparty service in relation to eligible bond and repo transactions contains a number of risk management mechanisms. The principal measures cover membership criteria, capital-based position limits, margin calls (including the ability to call upon clearing members for intraday margins if required), and a settlement guarantee fund – this can be drawn on if losses in excess of a defaulter's margin funds are incurred.

STP capability

STP capability has yet to be developed. The SFE has indicated that it is working with both the Global Straight-Through Processing Association (GSTPA) and Omgeo to facilitate STP for the Australian markets. See section 4.5.2.

4.1.3 Settlement

Settlement of debt securities in Australia is effected through the Austraclear System operated by Austraclear Ltd, a wholly owned subsidiary of SFE Corporation Ltd.

Austraclear maintains cash and securities records for its members. Settlement in Austraclear involves the simultaneous debiting and crediting of cash and securities accounts. Through a "feeder system" link to the Reserve Bank Information and Transfer System (RITS), interbank settlement across Exchange Settlement (ES) Accounts occurs simultaneously with settlement in Austraclear. Hence Austraclear provides Model 1 DvP.

Settlement cycle

The market convention for settlement of debt securities in Australia is three days after trade date (T+3), although bilateral agreement on alternative cycles is not precluded.

CSD

Austraclear is Australia's major debt securities CSD. CGS, semi-Government debt and Australian private debt securities are eligible for lodgment in the Austraclear system.

Austraclear holds securities in the name of the member. In the case of paper (certificated) securities, these are immobilized and held by Austraclear as bailee. Book-entry (paperless or dematerialized) securities, on the other hand, are registered in Austraclear's name as nominee for the lodging member. In addition, Austraclear co-ordinates the payment of interest and maturity proceeds on securities lodged in its system.

Governance

Austraclear, like the SFECC, is a wholly owned subsidiary of SFE Corporation Ltd, which is a public company listed on the Austock Exempt Market. The SFECC and Austraclear operate under the business name SFE Clearing. Although Austraclear and the SFECC operate under the same business name, they are separately incorporated as legal entities and each has its own Board.

Austraclear's members and participating banks are bound to each other and to Austraclear through contractual agreements with Austraclear. The regulations are a binding and enforceable contract between each and every member, participating bank and Austraclear.

Participation

As at July 2001 there were 488 members of Austraclear. All members of Austraclear can undertake securities settlement transactions and must have an arrangement with a participating bank which sponsors its cash account in Austraclear. Participating banks settle the obligations which arise between themselves as a result of their own and their sponsored members' securities settlements in Austraclear. This is done on an RTGS basis across ES Accounts held at the Reserve Bank. All participants in Austraclear pay transaction fees based on their use of the system and an annual subscription fee for their communications linkages.

The Reserve Bank uses Austraclear to settle transactions arising from its market operations in eligible securities (i.e. CGS, State government securities and securities of certain supranational organizations). Electronic bidding for tenders of CGS continues to occur in RITS, however, settlement of securities won at tender and lodgment of these securities occurs in the Austraclear system.

Risk management

Banks can control their credit exposures to client members of Austraclear by setting a limit on the maximum debit balance for each member's cash account within the Austraclear system. The system does not allow transactions which breach this limit to proceed. Banks may alter this cash account limit during the day, but will remain obligated for payments made up to the time that the limit was changed. Banks may also, at their discretion, secure this overdraft by taking a mortgage over securities in the member's security account.

Banks can also utilize the Reserve Bank's Automated Information Facility (AIF) for the monitoring of intraday settlement. The AIF provides messaging facilities that can be used by banks to internally control credit allocation to client members, and their own ES Account liquidity, by advising banks of individual transactions and allowing them to determine the priority of each transaction.

No interbank settlement risk is generated in Austraclear, which offers Model 1 DvP settlement of security transactions (see section 4.1.3).

The Payments System Board of the Reserve Bank has given approval to the Austraclear System as an "approved RTGS system" under the *Payment Systems and Netting Act 1998*. This ensures the irrevocability of completed Austraclear transactions by removing the potential for the "zero hour rule" to be applied in the event of a member's insolvency.

Where RTGS is not available, Austraclear’s contingency (“fallback”) arrangements provide for multilateral net settlement of the interbank obligations arising from transactions. Settlement of securities and cash in Austraclear under fallback arrangements follow a Model 2 DvP approach, with securities and cash records updated on a gross basis in Austraclear but interbank settlement of obligations occurring on a net basis at the end of the day. This fallback netting arrangement is protected as an “approved multilateral netting arrangement” under the *Payment Systems and Netting Act*.

Risk management of BRC transactions is discussed in section 4.1.2.

Payment

Austraclear maintains cash accounts and securities accounts for its members. When a transaction is matched in the system, it proceeds to settlement testing. If securities are available and the necessary credit and liquidity checks have been completed, then the transfer of funds for a transaction takes place in central bank funds across ES Accounts held at the Reserve Bank. Simultaneously, the cash and securities records of Austraclear are updated to reflect settlement of the transaction, ensuring Model 1 DvP settlement.

Model 1 DvP is also provided for settlement of BRC-cleared transactions. The netting process will produce for each SFECC BRC member a single long or short position in each type of security for settlement – there will be a delivery obligation and a payment obligation for each series. These obligations are then settled in Austraclear using the process described above.

4.2 Equities

4.2.1 Trading

Market overview

There are three licensed stock exchanges in Australia: the Australian Stock Exchange (ASX), the Bendigo Stock Exchange (BSX) and the Newcastle Stock Exchange (NSX). In addition, there is an “exempt market” operated by Austock Management Ltd.²

The ASX is the dominant exchange, accounting for over 99% of equities trading. This section focuses on the ASX and its trading, clearing and settlement arrangements. At June 30, 2001, the total market capitalization of stocks listed on the ASX was AUD746 billion. On average, 51,386 trades were processed each day during the year 2000/01.

Trading Systems

All trading on the ASX takes place electronically. The principal trading system is the Stock Exchange Automated Trading System (SEATS), an automated trading system which was introduced in 1987. In addition, brokers are able to use other trading systems – there are a

²An exempt market is one which does not have to comply with the full range of legislative obligations on stock markets. This category is restricted, typically to those markets which have a narrow range of specified securities, or are restricted to a clearly defined and limited class of users.

Australia

number of private networks which enable this. ASX trading in equities occurs between 10.00 and 16:00 Monday to Friday.

Governance

The ASX was formed in 1987 by the merger of six State-based stock exchanges. Prior to November 1997, the ASX was a mutual organization owned by its participants. All profits were used to further the objectives of the ASX. In November 1997 it demutualized and became a for-profit company limited by shares. In October 1998 it became the first exchange in the world to list on its own exchange. The ASX is a widely held publicly listed company, whose larger shareholders include nominee companies for banks and other financial institutions. Any shareholder wishing to own more than 15% of the ASX must obtain the approval of the Minister.

Participation

ASX member organizations must meet financial and operational requirements. The ASX has 104 broker members, of which 89 are active (however, three brokers are clearing participants only and do not participate in trading). They include stock broking firms, retail banks and investment banks.

In December 2001, the ASX and the Singapore Stock Exchange (SGX) implemented a reciprocal portal market linkage. This enables Australian investors to directly invest in companies listed on SGX through brokers in Australia. Singaporean investors have the same access to Australian companies. The ASX also provides a one-way link to certain US markets (e.g. NYSE, Nasdaq and AMEX) for Australian investors.

4.2.2 *Pre-settlement*

Trade confirmation

Matching of trades is performed on SEATS. Buy and sell orders are matched on a price/time priority basis. Best-priced orders have priority. If two orders are at the same price, the earlier takes precedence.

Clearing house

The ASX Settlement and Transfer Corporation (ASTC) is a licensed clearing and settlement facility under the *Corporations Act*. It is the operator of TNS Clearing Pty Ltd (TNSC), which acts as the legal counterparty to broker-broker equity trades on the ASX.

Governance

The ASTC is a wholly owned subsidiary of ASX Ltd. In turn, the TNSC is a subsidiary of the ASTC. The actions of these organizations and their participants are governed by the Securities Clearing House (SCH) Business Rules, which are recognized under the *Corporations Act* and have the effect of a contract between the ASTC and its participants.

The ASTC's Articles of Association authorize the ASTC Board to act in the interests of the securities industry generally, including investors. The ASTC Board includes directors affiliated with listed companies, brokers, major investors, custodians and the ASX.

Participation

The TNSC acts as central counterparty for trades between broker members of the ASX. The ASX has 84 brokers who participate in clearing. A limited number of broker members are trading participants only.

Novation

Broker-broker trades are novated to the TNSC. Novation occurs immediately upon the matching of bids and offers in SEATS. If both parties agree, a trade can be excluded from the novation and netting process. Trades involving non-broker clearing house participants are not novated to the TNSC but are netted on an administrative basis.

Role of central counterparty

The TNSC, acting as the central counterparty to broker-broker transactions, nets all cash and securities obligations so that only one transfer of cash and one transfer per security type are required to effect settlement.

Where a participant has a securities shortfall, transactions are removed from settlement and rescheduled. While the TNSC acts as the legal central counterparty to trades, the effect of the power to reschedule transactions is that in practice there is no guarantee of settlement on a specific day. Should a broker fail to make a net payment to the TNSC, under the SCH Business Rules, the TNSC may access 'At Call' funds as a form of bridging finance. These funds are used to offset the amount owing from the broker and enable settlement between the central counterparty and other brokers' banks to proceed.

Equities trades can be settled on an RTGS basis (see section 4.2.3). Where the optional RTGS facility is used, the transaction is "denovated" and removed from the scheduled net settlement process. The TNSC does not act as central counterparty to trades which are settled on an RTGS basis.

Risk management

The ASTC places capital adequacy requirements on members, which are actively monitored. Before settlement occurs, the relevant securities must be available for transfer and authorization must be received from payment providers. If either of these is lacking, transactions can be withdrawn from the process until settlement can proceed. Withdrawn transactions are rescheduled for settlement the following day; penalties can be applied. Under the Corporations Regulations, brokers, clients and the TNSC may in some circumstances claim compensation for any shortfalls arising out of a default from the National Guarantee Fund (NGF).

STP capability

See section 4.5.2.

4.2.3 Settlement

Settlement of all ASX equities trades is effected through the ASTC's Clearing House Electronic Subregister System (CHESS). All interbank obligations arising from sponsored

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broker and non broker participants' cash positions are settled simultaneously in a net batch in RITS once daily. Upon settlement of this net batch, the ASTC simultaneously updates broker and non-broker participants' cash and securities accounts in CHES, thereby achieving Model 3 DvP.

In late 2000, the ASTC introduced a facility for equities settlements to occur on an RTGS basis. This is an optional facility where participants can remove transactions from batch settlement and settle them individually in real time. Settlement in CHES is simultaneous with interbank transfers across ES Accounts, achieving Model 1 DvP. However, this facility is not routinely used at present.

Settlement cycle

The settlement of equities takes place on the third day after trading (T+3). By 8:00 on settlement day the ASTC will notify each participant of its cash and securities settlement obligations. Participants then have until 10:00 to ensure they have the required securities in their accounts. Authorization of participants' cash obligations is also required from sponsoring banks. If a shortfall arises, the ASTC will reschedule transactions until the shortfall is eradicated.

Once all cash authorizations are received, the resulting interbank obligations are settled through RITS and ASTC participants' securities and cash positions are updated in CHES.

CSD

CHES is not a depository but an electronic subregister. It provides a central book entry register for securities holdings. The holding balances maintained by the system are the record of legal title and form a part of a company's register of owners/stock holders. All companies are required to maintain their own register detailing the ownership of all the shares of their company (this function is often outsourced to specialist registry service providers).

Governance

The ASTC, which operates CHES, is a wholly owned subsidiary of the ASX – see section 4.2.2.

Participation

CHES settlement participants comprise 84 broker participants and 60 non-broker participants (the latter include institutional investors, fund managers, margin lenders and custodians). To be a member of CHES, a participant must meet all the operational and financial requirements necessary to become a participating organization. These requirements are designed to minimize operational and systemic risk.

Risk management

All equities settlements in CHES are performed on a DvP basis. In addition, interbank obligations arising from CHES members' cash obligations are settled contemporaneously with equities and cash settlement in CHES.

The legal netting undertaken by the ASTC is recognized under Part 5 of the *Payment Systems and Netting Act*. This provides certainty for the netting process in the event of the insolvency of a participant. In addition, the CHESSTRTGS system is an approved RTGS system under the same Act, which gives it protection from the zero-hour rule.

Payment

Both cash and securities obligations are settled on a net basis in CHESSTRTGS. The interbank payments which arise from the transfers are settled once a day via a batch process across the payment providers' (banks') Exchange Settlement (ES) Accounts at the Reserve Bank.

As described above, CHESSTRTGS offers an optional Model 1 DvP facility. Transactions are removed from net settlement and settled individually on a real-time basis, with interbank settlement across ES Accounts at the Reserve Bank. This is achieved by a CHESSTRTGS linkage to RITS.

4.3 Derivatives – SFE Clearing Corporation

4.3.1 Trading

Market overview

Interest rate, commodity, currency and index futures, and options are traded on the Sydney Futures Exchange (SFE) Ltd. Daily turnover in 2001 averaged around 135,000 in futures contracts, and 7,000 in options contracts.

Trading systems

The SFE operates SYCOM (Sydney Computerised Market) as the trading system. SYCOM is open 24 hours a day, however its Sydney day session runs from 8:30 to 16:30. The SFE has recently introduced a Block Trading Facility. This is an off-exchange (non-SYCOM) trading facility for currency (AUD/USD) and equity index (SPI200) futures and options contracts. It enables traders to enter into a bilateral trade off-market. This arrangement is particularly useful for very large trades that could impact significantly on the market.

Governance

The SFE is a wholly owned subsidiary of SFE Corporation Ltd, which demutualized in September 2000 and is now a for-profit company limited by shares, listed on the Austock Exempt Market. It is due to be listed on the ASX in April 2002.

Participation

The SFE has several different types of membership depending on the type of business to be conducted. The SFE has 25 Full Participants (of which 23 are Clearing Participants), 87 Associate Participants and 61 Local Participants. Full Participants have direct access to the trading system and can trade in their own name or on behalf of clients. Associate Participant status is for firms who wish to deal on behalf of clients but who do not require direct access to the trading system (they place orders via Full Participants). Local Participants have direct access to the trading system and trade on their own account, but may

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not deal for clients. Each membership type has net tangible asset, reporting and administrative requirements.

4.3.2 Pre-settlement

Trade confirmation

Trades are considered to be matched and confirmed at the time they are completed on SYCOM. They are then novated to the SFECC (see below). The SFECC also provides a facility for participant trades to be allocated to specified clearing participants.

Clearing house

The SFECC acts as the central counterparty to all trades effected on the SFE.

Governance

The SFECC is a wholly owned subsidiary of the SFE Corporation Ltd. The SFECC has its own membership requirements and an independent Board. The Board consists of two representatives of Clearing Members, two representatives from the Board of SFE Corporation, two independent directors, the Chief Executive of SFE Corporation and the Managing Director of the SFECC.

Participation

The SFECC has 23 clearing participants who clear on their own behalf and who may also clear on behalf of others. They are required to make a financial commitment to the SFECC's guarantee fund, and have a range of other risk management controls placed upon them, discussed below.

Risk management

The SFECC employs several risk management techniques that are designed to minimize the potential for a member to default and also the extent of losses that may result from such a default. The SFECC imposes membership requirements that require certain financial standards to be met. In addition, members' positions are marked-to-market on a daily basis (or more regularly if required). Each member is also required to post initial and variation margins that are calculated based on the risk of the member's portfolio. The SFECC also maintains a settlement guarantee fund that acts as a further buffer in the event of a default.

Novation

Novation occurs upon the registration of each contract with the SFECC. Through the novation process, SFECC interposes itself between the buyer and the seller, becoming central counterparty to the contract.

Role of central counterparty

The SFECC, as the central counterparty, nets its members' cash obligations so that only one payment of cash per participant is required for settlement. The SFECC provides a settlement guarantee to its clearing members in the event of member default. The SFECC remains

liable to perform against all contracts to which it is a party, even if the buyer or seller fails to fulfil its obligations.

STP capability

See section 4.5.2.

4.3.3 Settlement

Most contracts traded on the SFE are cash settled. This takes place using the RTGS cash transfer facility provided by Austraclear.

The SFECC calculates daily net obligations for clearing members. These comprise principally initial margins (paid upon the registration of a new contract), variation margins (reflecting underlying price changes which affect the value of open positions) and the settlement amounts payable upon the close-out or expiry of a contract. Participants required to pay in on a particular day must do so by mid-morning; after which time the SFECC pays out to members who are due to receive funds on that day.

Daily settlement of margin payments occurs on T+1 – in addition, the SFECC has the ability to call for intraday margins which must be paid on the same day.

Where physical delivery is required the mode of settlement will depend on the underlying instrument. Where securities are required, this is usually done through the relevant securities settlement system.

4.4 Derivatives – Options Clearing House

4.4.1 Trading

Market overview

The Australian Stock Exchange Derivatives Market (ASXDM) trades exchange-traded options. In October 2001 the ASXDM averaged around 50,000 options contracts per day. In late 2001, the ASX reactivated its futures license, and from February 2002, its members were able to commence trading in contracts on the ASX Futures Market (ASXF).

Trading systems

The ASXDM moved from a floor-based market to an electronic platform in 1997. The screen based trading system is called the Derivatives Trading Facility (DTF) and is a modified version of the 'CLICK' system developed by OM Group. The ASXDM is open from 10:00 to 12:30 and 14:00 to 16:15.

Governance

The ASXDM is owned and operated by the ASX, a for-profit company limited by shares which is listed on its own exchange.

Participation

Trading Participants on the ASXDM must be Participating Organizations of the ASX and must meet financial and operational requirements. Currently there are 60 organizations directly involved with trading: 45 trading and clearing members; plus 15 independent market-makers.

4.4.2 Pre-settlement

Trade confirmation

Trades are confirmed at the time the trade is completed on the ASXDM.

Clearing house

The Options Clearing House (OCH) is the clearing house for all trades completed on the ASXDM and the ASXF. It provides a guarantee of performance for all trades novated to it.

Governance

The OCH is a wholly owned subsidiary of the ASX. The OCH's operations are governed by the ASX Business Rules – under the *Corporations Act* these rules have effect as a contract between the ASX and each clearing participant.

Participation

The OCH has 47 clearing participants. Of these, 45 are also trading participants, while two provide clearing services only.

Risk management

The OCH facilitates payment of premiums and collects margins on members' open positions. These are routinely calculated using end-of-day prices, but can also be marked-to-market intra-day. Margin requirements can be satisfied by cash or collateral. Acceptable collateral includes equities, bank guarantees and money market securities.

The OCH can also request a participant to maintain cover with the clearing house for its margin payments. It has the power to close out a participant's excessive positions, and has procedures to be implemented in the event of default by a clearing participant.

The OCH (as the central counterparty) may in some circumstances claim compensation for any member shortfalls from the National Guarantee Fund (NGF).

Novation

OCH is principal to all transactions it clears. Following registration of a market contract, a pair of open contracts is created with OCH as buyer to the seller and seller to the buyer.

Role of central counterparty

The OCH as the central counterparty nets cash payment obligations so that only one payment of cash per participant is required for settlement.

STP capability

See section 4.5.2.

4.4.3 Settlement

Futures positions are usually rolled over or cash settled. Option contracts which are exercised are settled via cash or, in some cases, via transfer of ownership of a nominated asset/security. Cash settlement takes place in various payment systems.

The OCH calculates daily net obligations for clearing participants. These comprise principally premiums and initial margins (paid upon the registration of a new contract), variation margins (reflecting underlying price changes which affect the value of open positions) and the settlement amounts payable upon the close-out or expiry of a contract.

Daily settlement of margin payments occurs on T+1 – in addition, the OCH has the ability to call for intraday margins which must be paid on the same day.

Where physical delivery is required, the mode of settlement will depend on the underlying instrument. For option contracts on individual equities, delivery of those equities will be effected in CHESS (see section 4.2.3).

4.5 Major projects and policies being implemented

4.5.1 Transfer of CGS business to Austraclear

In 2001, the Reserve Bank and Austraclear (owned by SFE Corporation Ltd) agreed to shift the settlement of CGS from the Reserve Bank Information Transfer System (which as well as being the RTGS system was also a securities settlement system) to the Austraclear system. This was done following the strong support of market participants, based on the potential for increased efficiency; participants now need to maintain access to only one system to settle all of their debt securities transactions. As well as reducing systems costs, the transfer will also help participants to manage their securities and cash flows more efficiently. This change was implemented in February 2002. The Reserve Bank continues to operate the Registry of Inscribed Stock for CGS.

4.5.2 Straight-through-processing and T+1

Both the ASX and the SFE are exploring the ramifications of implementing straight-through-processing (STP) and the possibility of moving to a T+1 settlement cycle. Although no firm decisions have been taken, the ASX has released a discussion paper and conducted consultations with the market, while the SFE has announced an alliance with Omgeo to act as a ‘concentrator’ – a local link between individual market users and the global STP provider.

5 The role of the central bank

General responsibilities

The broad policy objectives of the Reserve Bank set out in the *Reserve Bank Act 1959* are:

- stability of the currency;
- maintenance of full employment; and
- the economic prosperity and welfare of the people of Australia.

The Reserve Bank is also responsible for the oversight and regulation of the payments system and is empowered to set financial stability standards for clearing and settlement facilities (see Chapter 1).

The Reserve Bank also owns and operates Australia's RTGS system (see section 3.6).

5.1 Provision of settlement facilities

Banks, as well as a number of non-bank members of payments clearing arrangements or operators of a clearing house that act as central counterparties hold Exchange Settlement (ES) Accounts at the Reserve Bank. The final settlement of transactions occurs by passing entries to ES Accounts. Accounts must be in credit at all times. Interest is paid on the end-of-day settlement account balances at the publicly announced target cash rate less 25 basis points.

Institutions which are supervised by the Australian Prudential Regulation Authority (APRA), and which satisfy the Reserve Bank that they have the capacity to meet their settlement obligations, are eligible for ES Accounts without special conditions. However, the Reserve Bank may impose collateral requirements on a transitional basis for institutions with only limited payments experience. Applications may also be made for ES Accounts by non-bank entities which are providers of third-party (i.e. customer) payment services, and entities which act as a central counterparty. These entities must satisfy the Reserve Bank of their ability to meet settlement obligations.

Organizations not supervised by APRA which operate in deferred net settlement systems will have to meet collateral requirements on an ongoing basis, except where they are always net receivers in payment clearing arrangements. Organizations which operate in the RTGS system will have to demonstrate that they have the necessary operational capacity and adequate liquidity, but will not be subject to ongoing collateral requirements.

5.2 Monetary policy

In 1993 the Reserve Bank adopted an inflation target as an operating objective. The target is to keep underlying inflation between 2 and 3%, on average, over the cycle. This formulation allows the Reserve Bank to pursue the goal of medium-term price stability while taking into account the implications of monetary policy for activity and employment in the short term. Australia's monetary policy framework was clarified in a Statement on the Conduct of Monetary Policy issued by the Governor of the Reserve Bank and the Commonwealth Treasurer in August 1996.

Since the Reserve Bank began announcing monetary policy changes in early 1990, the stance of monetary policy has been expressed in terms of a target cash rate. The Reserve Bank influences this rate by conducting daily open market operations to maintain liquidity conditions consistent with the announced target. Changes in the level of the cash rate flow through quickly to other short-term interest rates.

The Reserve Bank's market operations are conducted in eligible securities (comprising CGS, securities issued by State and Territory governments and securities issued by nominated supra-nationals). The Reserve Bank accepts bids or offers from any member of RITS. The bulk of its market operations are in the form of repurchase agreements. In addition to term repos which are undertaken to implement monetary policy, the Reserve Bank also provides an intraday repo facility to provide banks with liquidity to make RTGS payments.

The Reserve Bank's ability to achieve a particular cash rate stems from its control over the supply of ES funds. Banks need to hold ES funds because they are the means used to settle transactions among themselves and with the Reserve Bank; each bank needs to hold enough to meet its settlement obligations. If the Reserve Bank supplies more ES funds than banks wish to hold, banks will try to shed funds by lending more in the cash market, resulting in a tendency for the cash rate to fall; the Reserve Bank would normally respond by withdrawing ES funds to keep the cash rate at its target. Conversely, if the amount of funds supplied is less than desired holdings, banks will respond by borrowing in the cash market to try and build up their ES holdings, thereby putting upward pressure on the cash rate; the Reserve Bank would normally act to boost the supply of ES funds to maintain the cash rate target.

5.3 Note issue

The note issue functions of the Reserve Bank comprise the issue of notes (new and reissuable); the processing of notes returned from circulation for authentication and quality-control purposes; general oversight of cash distribution arrangements; and research into and development of note designs and security features.

Over recent years, significant changes have occurred to the Reserve Bank's note issue activities. The volume of notes processed has declined, partly because of the introduction of polymer notes. With the scaling-back of note-processing activities, the decision was taken in late 1999 to close the remaining branch-based cash services operations and to centralize the note-processing function at a new National Note Processing Centre at Note Printing Australia Limited located at Craigieburn, outside Melbourne. This facility commenced operation in June 2001 and the Sydney cash services operation was closed.

The reduced note-processing task has enabled further changes to be made to note distribution arrangements to provide a sound framework for the major participants in the cash industry to seek additional efficiencies in cash distribution and inventory management. Commencing in August 2001, commercial banks progressively assumed ownership of the working stocks of currency notes and coin owned by the Reserve Bank, but held externally in Note and Coin Pools. Prior to that, the Reserve Bank had provided depository facilities to the main participants in currency distribution arrangements through its ownership of external working stocks of currency. These stocks could be accessed daily. However, under the new arrangements those who need the stocks for their ongoing business also own them (see section 3.5).

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Some banks are net receivers of cash and others are net payers. Previously, no direct links had arisen between these parties, as the Reserve Bank was interposed between them. Under the new arrangements, participants deal directly with each other to satisfy their demands for currency and reduce their surpluses. This provides the opportunity for the more efficient recirculation of currency between the various participants.

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Australia

STATISTICAL TABLES

Australia

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (year end)	18,423,600	18,618,300	18,842,200	19,052,600	19,277,200
GDP (AUD millions) ¹⁾	517,526	545,178	576,539	608,270	651,857
GDP per capita	28,090	29,282	30,598	31,926	33,815
Exchange rate vis-à-vis USD: ²⁾					
<i>year end</i>	0.7965	0.6527	0.6139	0.6538	0.5540
<i>average</i>	0.7846	0.7374	0.6285	0.644	0.5761

¹⁾ GDP figures are from the Australian Bureau of Statistics (5206.0).

²⁾ These exchange rates are quoted as the USD value of one AUD.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	AUD millions 2000
Bank notes and coins on issue ¹⁾	19,628	21,098	22,784	24,604	26,928
Transferable deposits ²⁾	75,837	87,039	91,953	101,228	110,693
Narrow money supply (M1)	95,466	108,137	114,737	125,832	137,621
<i>Memorandum items:</i>					
Broad money supply (M2)	372,700	400,461	434,029	463,700	493,040
Outstanding value on e-money schemes ³⁾	nav.	nav.	nav.	nav.	nav.

¹⁾ Private non-bank sector's holding of notes and coins.

²⁾ Includes interest bearing and non-interest bearing current deposits with banks.

³⁾ Although e-money schemes are being trialed these are not significant.

Table 3

Settlement media used by banks ¹⁾

(end of year)

	1996	1997	1998	1999	AUD millions 2000
Transferable balances held at central bank	11,148	6,405	6,756	2,125	642
of which:					
<i>required reserves</i> ¹⁾	4,105	4,501	4,957	nap.	nap.
<i>free reserves</i>	7,043	1,904	1,799	2,125	642
Transferable deposits held at other banks ²⁾	406	503	534	1,625	1,642
<i>Memorandum item:</i>					
Institutions' borrowing from central bank ³⁾	nap.	nap.	4,508	4,615	4,508

¹⁾ Required for prudential purposes. Abolished in 1999.

²⁾ Banks hold deposits at other banks principally as a result of money market transactions.

³⁾ Daily average intraday repos for December.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (AUD millions)
Central bank	1	3	nav.	12,297
Commercial banks	51	5,003 ¹⁾	nav.	407,780
Building Societies	18	310	nav.	11,014
Credit Unions	211	913	nav.	19,162
Other financial institutions ²⁾	279	nav.	nav.	86,661
Postal institution	1	4,479 ¹⁾	nav.	nav.
Total	561	10,708	nav.	536,914
of which:				
<i>virtual institutions</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>
Branches of foreign banks	24	67 ¹⁾	nav.	36,550

¹⁾ As at June 2000²⁾ Money Market Corporations, Finance Companies, Pastoral Finance Companies and General Financiers.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
					thousands
Austraclear ¹⁾	422	447	400	343	350
BITS/SWIFT PDS ²⁾	1,271	1,375	2,675	3,318	3,657
RITS ³⁾	50	49	52	48	42

¹⁾ Austraclear figures include both interbank and intrabank data.²⁾ As part of the introduction of RTGS, all payments formerly made through BITS, a domestic interbank electronic funds transfer system, migrated to SWIFT PDS. SWIFT PDS is more widely used than BITS, which ceased operations after the migration.

Figures for 1996 and 1997 include a negligible number of intrabank transactions.

³⁾ Figures for 1996 and 1997 are estimates and include intrabank data. The 1998 figure also includes intrabank data.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
					AUD billions
Austraclear	nav.	nav.	nav.	nav.	nav.
BITS/SWIFT PDS ¹⁾	5,800	6,700	15,638	16,578	18,569
RITS ²⁾	1,800	1,800	1,200	1,232	1,620

¹⁾ As part of the introduction of RTGS, all payments formerly made through BITS, a domestic interbank electronic funds transfer system, migrated to SWIFT PDS. SWIFT PDS is more widely used than BITS, which ceased operations after the migration. Figures for 1996 and 1997 include a negligible value involving intrabank transactions.²⁾ Figures for 1996 and 1997 are estimates and include intrabank data. The 1998 figure also includes intrabank data.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions ¹⁾

Instruments						millions
	1996	1997	1998	1999	2000	
Cheques	983	986	928	806	856	
Payments by debit card	398	485	559	622	639	
Payments by credit card	281	330	424	550	683	
Credit transfers (retail) ^{1,2)}	434	467	482	529	635	
Direct debits ¹⁾	107	114	151	202	248	
Total	2,203	2,382	2,544	2,709	3,061	

¹⁾ Annual figures estimated using survey data from the month of May.

²⁾ The volumes of high-value credit transfers are set out in Table 5.

Table 8

Indicators of use of various cashless payment instruments: value of transactions ¹⁾

Instruments						AUD billions
	1996	1997	1998	1999	2000	
Cheques ¹⁾	6,133	6,589	3,691	3,100	2,677	
Payments by debit card	21	26	31	36	39	
Payments by credit card	26	32	42	55	74	
Credit transfers ^{1,2)}	1,066	906	911	1,336	1,960	
Direct debits ¹⁾	418	424	608	1,008	1,490	
Total	7,664	7,977	5,283	5,535	6,240	

¹⁾ Annual figures estimated using survey data from the month of May.

²⁾ The values of high-value credit transfers are set out in Table 6.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

						thousands
	1996	1997	1998	1999	2000	
RITS ¹⁾	187	172	149	126	101	
Austraclear ²⁾	149	151	168	188	193	
CHESS	4,016	5,389	6,554	10,254	14,797	
SFECC	25,530	28,410	29,936	29,793	31,277	
OCH	10,778	8,871	8,075	9,991	9,508	

¹⁾ Figures for 1998-2000 do not include intraday repos of around 10,204 (1998), 13,767 (1999) and 16,150 (2000).

Since February 2002, all debt securities have been settled in Austraclear.

²⁾ Figures for 1999-2000 do not include Reserve Bank repos of around 1,618 (1999) and 1,576 (2000).

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

						AUD billions
	1996	1997	1998	1999	2000	
RITS ¹⁾	3,700	3,400	2,664	2,189	2,034	
Austraclear ²⁾	1,500	1,600	1,941	2,126	2,506	
CHESS	160	210	245	307	391	
SFECC ³⁾	8,712	9,668	10,180	10,309	11,159	
OCH	97	79	76	101	102	

¹⁾ Figures for 1998-2000 do not include intraday repos of around 1,539 billion (1998), 2,455 billion (1999) and 2,328 billion (2000). Since February 2002, all debt securities have been settled in Austraclear.

²⁾ Figures for 1998-2000 do not include Reserve Bank repos of around 4 billion (1998), 86 billion (1999) and 192 billion (2000).

³⁾ These figures are for years from July-June. 1996 figures are July 1996-June 1997 and so forth, with 2000 figures representing July 2000-June 2001.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
RITS	nav.	nav.	146	140	138
<i>Banks</i>	nav.	nav.	52	51	51
<i>Other types of financial institutions</i> ¹⁾	nav.	nav.	94	89	87
Austraclear	794	823	596	607	619
<i>Banks</i>	nav.	nav.	nav.	nav.	nav.
<i>Other types of financial institutions</i>	nav.	nav.	nav.	nav.	nav.
CHESS	nav.	nav.	nav.	nav.	160 ²⁾
<i>Banks</i>	nav.	nav.	nav.	nav.	nav.
<i>Other types of financial institutions</i>	nav.	nav.	nav.	nav.	nav.
SFECC	25	24	24	24	23
<i>Banks</i>	8	8	8	8	7
<i>Other types of financial institutions</i>	17	16	16	16	16
OCH	nav.	nav.	nav.	nav.	47 ²⁾
<i>Banks</i>	nav.	nav.	nav.	nav.	nav.
<i>Other types of financial institutions</i>	nav.	nav.	nav.	nav.	nav.

¹⁾ Other types of financial institutions generally include institutions such as finance companies, insurance companies, brokers, trustees, custodians and nominees.

²⁾ This figure is for 2001. Figures for previous years are unavailable but membership numbers have been stable over time.

PAYMENT SYSTEMS IN CHINA

China

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List of abbreviations

ATM	Automated Teller Machine
CCPC	City Clearing Processing Center
CDC	Central Government Bonds Depository and Clearing Corporations Limited
CNAPS	China National Advanced Payment System
CSRC	China Securities Regulatory Commission
DVP	Delivery versus Payment
LCH	Local Clearing House
EIS	Electronic Interbank System
MOF	Ministry of Finance
NII	National Interbank Institution
NIS	National Interbank System
OTC	Over-the-Counter
PBC	People's Bank of China
SD&C	China Securities Depository and Clearing Corporations Limited
STP	Straight-Through Processing
SWIFT	Society for Worldwide Interbank Financial Telecommunication

Introduction

In order to meet objective requirements of China economic and financial developments, the People's Bank of China (PBC) has been ameliorating different payment methods, perfecting relevant payment regulations and standardizing non-cash payment instruments among which bills are principal part. The PBC has also been actively promoting the development of electronic payments and standardizing local clearing houses, to support the developments of China's securities market and FX market.

China's securities market has made major progress in the past few years. By strengthening relevant regulations and rules, China has been continuously standardizing the trading behavior of participants in the securities market and improving the financing channel of security companies. China has allowed all qualified security companies and fund management companies to participate in the national interbank market, in order to combine the capital market and the money market step by step.

1. Institutional aspects

1.1 Legal and regulatory framework

The *Law of the People's Republic of China on the People's Bank of China*, promulgated in year 1995, stipulates that PBC's responsibilities in payment systems are to "maintain the smooth operation of payment and settlement systems". According to the law, the PBC is responsible for formulating regulations related to payment clearing and settlement, as well as for providing interbank settlement services. The *Law of the People's Republic of China on Commercial Banks*, issued in the same year, requires commercial banks to provide payment and settlement services for their customers on a timely basis, and to be subject to supervision and regulation from the PBC.

The *Securities Law of the People's Republic of China*, published in year 1998, lays down some detailed requirements concerning security issue, trading behavior and protection for investor's interests. It also clarifies the rights and obligations of stock exchanges, security companies and securities registration and settlement institutions, and so on.

1.1.1 Payment instruments and systems

The *Bills Law of the People's Republic of China*, promulgated in year 1995, regulates the issue, endorsement, acceptance, guaranty, payment and right of recourse concerning bill of exchange, promissory note and cheque. It also defines the rights, obligations and legal responsibilities of different parties involved in bill transactions.

The *Regulations of the People's Republic of China Governing the Renminbi*, published in year 2000, regulates the design, printing, issuance, circulation and withdrawal of the RMB. The *Provisional Regulations on Cash Management*, issued in year 1988, must be followed by enterprises, for cash on hand and range of its use.

Besides the laws and regulations that must be followed nationwide, there are also some regulations for governing special entities and business. The *Provisions on Funds Transfer of the Postal Remittance*, set in year 1993, defines the opening and usage of accounts held in banks and the PBC, and the receiving and cashing of remittance. The *Provisions on Bankcard Business Management*, published in year 1999, clarifies the approval, interest calculation and

fee standards, accounts and transactions, risk and legal responsibilities relating to bankcards.

1.1.2 Securities settlement

The People's Bank of China and the China Securities Regulatory Commission (CSRC) are responsible for monitoring the interbank bonds market and the securities market respectively, according to their different administrative domain. The Ministry of Finance (MOF) is also accountable for management of the primary and secondary government bonds market.

Set by the PBC, the *Regulations on Trading in the Interbank Bonds Market* define participants' qualification, types of transactions, custody and settlement for the interbank bonds market. The *Temporary Provisions on Management of the Government Bonds Custody*, laid down by the MOF, aims at protecting the legal rights of investors and standardizing the custody behavior for government bonds.

The *Provisions on Management of the Customer's Trading Deposits*, issued by the CSRC, intends to monitor commercial banks involving in management of customer's deposits and security registrars to provide real time fund transfers for securities trading.

1.2 Institutions

1.2.1 Providers for payment services

In China, financial institutions providing payment services are state-owned commercial banks, share-holding commercial banks, urban commercial banks, urban credit cooperatives, rural credit cooperatives and foreign banks.

1.2.1.1 Commercial banks

According to the *Law of the People's Republic of China on Commercial Banks* and the *Company Law of the People's Republic of China*, commercial banks are legal entities that can take public deposits, provide loans and payment services for their clients.

State-owned and some share-holding commercial banks may provide comprehensive payment services to their customers. These banks have already set up their own nationwide electronic funds transfer systems, and about 75% of non-local payments are settled by these systems. For urban commercial banks, they provide not only payment services within a city, but also non-local services by their correspondent banks. By the end of year 2000, 33 foreign banks have started to provide RMB payment services.

1.2.1.2 Credit cooperatives

China's credit cooperatives include both urban and rural ones. In general, there is no competition between urban and rural credit cooperatives, since they operate in different restricted areas. The PBC is responsible for providing assistance to these credit cooperatives in management, technology and financial areas, as well as supervising them to play a proper role.

1.2.1.3 Other service providers

Some institutions not defined in the *Law on Commercial Banks* may also engage in some banking business and provide relevant payment services.

(a) Post offices

According to the relevant regulations, post offices may provide remittance services to enterprises and residents. As post offices increase and improve services, their role in retail payment services will become more and more important.

(b) China unionpay

China unionpay is jointly set up by banks, post offices and credit cooperatives, and so on. It is a self-disciplined bankcard organization conducting domestic bankcard business, and providing information exchange services to its members via a nationwide bankcard network.

1.2.2 Providers for securities services

Securities service providers include securities registration and settlement institutions, securities trading institutions and other securities business-related institutions.

1.2.2.1 Securities registration and settlement institutions

These are institutions that provide centralized registration and settlement services for securities. There are two such companies, namely central government bonds depository and clearing corporations limited (CDC), and China securities depository and clearing corporations limited (SD&C).

(a) Central government bonds depository and clearing corporations limited (CDC)

CDC is a state-owned financial institution set up in 1996. This company is the ultimate custodian of all types of government bonds that have been issued so far (excluding convertible bonds). It operates and manages a bonds business system, which comprises 3 sub-systems: central bonds book-entry system, PBC bonds issue system and PBC open market operation system. In addition to providing bonds registration and settlement services, it offers technical supports for issues of government bonds and financial bonds, etc., as well

(b) China securities depository and clearing corporations limited (SD&C)

SD&C was jointly established by Shanghai and Shenzhen stock exchanges in March 2001. It is not only the ultimate custodian of all stocks, trusted funds and convertible bonds listed in stock exchanges, but also a sub-custodian of other listed bonds. It is under the administration of the CSRC. It has two subsidiaries, one located in Shanghai and the other in Shenzhen.

1.2.2.2 Securities trading institutions

These can be classified as stock exchanges and national interbank lending center.

(a) Stock exchanges

There are two stock exchanges in China, namely Shanghai and Shenzhen stock exchanges. They provide trading places for listed stocks, close-end funds, government bonds and other securities, and engage in related trading management and services. They are directly supervised by the CSRC.

(b) National interbank lending center

This center is a government-sponsored institution directly led by the PBC. It organizes and manages interbank FX transactions and interbank lending business, and provides information services for central competitive pricing of interbank bonds.

1.2.2.3 Securities business-related institutions

These include securities companies and other financial institutions doing securities business.

There are two types of securities companies—comprehensive and brokerage. Comprehensive companies may engage in securities brokerage, self-supporting and underwriting business. Brokerages may only act as brokers. Both types of companies are engaged mostly in securities trading in the stocks market, with some over-the-counter (OTC) business.

Other financial institutions which can do securities business include commercial banks, insurance companies, securities investment funds, financing companies, leasing companies, foreign bank branches, rural credit unions and urban credit cooperatives. All institutions may engage in the trading of government bonds and financial bonds on their own accounts. The institutions, whose qualifications are approved by the PBC, may act as settlement agents for bond transactions. Some commercial banks, also approved by the PBC, may sell and make payments for paper-based government bonds and book-entry bonds, act as agent for issuing open-end funds, and provide services of underwriting and redemption. All of them, except for deposit-taking institutions, can participate in the corporate bonds market.

1.3 Central bank

Based on the law, the PBC can provide services such as cash payments, accounts administration, and clearing and settlement services by organizing and operating interbank payment systems and local clearing houses.

1.3.1 Cash payments

The PBC has the sole right to issue the RMB. Besides designing and printing bank notes, the PBC is also responsible for identifying counterfeit notes and destroying notes that have problems. The PBC also issues and withdraws the RMB by its network of 2,190 branches, in order to meet the requirements of the public in both quality and quantity terms.

1.3.2 Accounts administration

Required reserve accounts held by financial institutions may be used for their interbank payments and settlement. There are nearly 20,000 settlement accounts with the PBC, including those opened by treasuries of all levels.

Based on the *Regulations on Bank Accounts Management* formulated in 1994, the PBC supervises the opening and purpose of bank accounts held by enterprises.

1.3.3 Management of the interbank exchange systems

The PBC administers 2,334 local clearing houses, national interbank system (NIS), and electronic interbank system (EIS). Currently, the PBC is speeding up the set-up of China national advanced payment system (CNAPS) which will gradually replace NIS and EIS.

Meanwhile, the PBC is formulating unified regulations to govern the local clearing houses.

1.4 The role of other public entities

China financial science and technology committee as well as China financial standardization committee are also engaged in the research work on payment systems. Their research mainly focuses on technical aspects and standardization. They work through a number of working groups, studying issues related to the banking business, such as defining bankcard standards and technical specifications, with an aim to promote the standardization of banking process. Both of the committees are chaired by the PBC.

2. Payment methods

2.1 Cash payments

Cash refers to RMB bank notes and coins issued by the PBC. By the year-end 2000, cash in circulation was CNY 1,462.6 billion (USD 176.7 billion). Presently, there are 13 denominations of bank notes in circulation (1, 2, 5, 10, 20, 50 fen, 1, 2, 5, 10, 20, 50, 100 yuan), and 6 types of coins (1, 2, 5, 10, 50 fen and 1 yuan). In addition, the PBC also issues certain amount of commemorative bank notes or coins for significant events.

Cash is mostly owned by domestic residents and enterprises, with only very little abroad. In terms of transaction volume, cash payments usually take place in the face-to-face transactions. In terms of transaction value, deposit withdrawal, consumption payment, and purchase of agriculture product represent quite a high percentage.

Customers can withdraw cash in three ways: from commercial banks by bankbook; from banks or 33,000 ATMs by bankcards; by cash cheques.

2.2 Non-cash payments

Customers have the rights to use payment instruments approved by the PBC. In year 1988, the PBC conducted a reform on payment methods and formulated a new set of regulations, abolishing some instruments no longer suitable for China economic and financial developments, to call for using bills as major instruments. Therefore, bills have become the most widely used instruments in the past few years, where they represent approximately 70% of non-cash payment instruments, while bank drafts and cheques are the most commonly used. Moreover, some traditional instruments such as credit transfers, collections, and collections with acceptance are also being used.

2.2.1 Bank drafts

Banks issue bank drafts after customers have deposited their money. A draft can be used for non-local fund transfers or encashment. Enterprises, small businessmen and residents prefer it since it's rather convenient for non-local purchase. It can likewise be negotiated to others by endorsement. It's estimated that in year 2000, transaction volume of issued drafts amounts to 40% of that of non-local payments.

Bank drafts are issued in the form of paper vouchers. After cashing a draft, the related fund transfer between an issuing bank and a paying bank is processed by their intrabank electronic

funds transfer system. For those small and medium financial institutions, they may choose to use agents to issue the drafts as they have fewer branches. Generally, there are two ways by which bank drafts are issued by the agent: one is where the agent pays the drafts and the other is where the agent issues the drafts for the associated institutions.

The issuing bank will charge CNY 1 (USD 0.12) to each bank draft applicant.

2.2.2 Cheques

Cheques are the most commonly used non-cash payment instruments for drawing money from banks and making fund transfers. It can be used in purchasing goods and services within the same city or clearing region. In the year 2000, 454.1 million cheques were issued mainly by government agencies and enterprises, and rarely by the individual. Currently, cheques represent about 60% of the total volume of non-cash payments.

Cheques are processed by LCHs. In a case a payer and a payee of a issued cheque do not belong to the same bank, the payee shall entrust his bank to collect money while payee's bank presents the cheque to payer's bank through the LCH. If the cheque is not returned within the required period, the payee's bank shall credit the money to payee's account.

Cheques will be returned if they are dishonored, or bearing false signatures. However, the dishonored cheque payer shall be charged a penalty of 5% of the face value and should not be less than CNY 1,000 (USD 120.8). Meanwhile, the payee has the rights to seek for a 2% compensation charge of the face value from the payer. If one frequently issues the dishonored cheque, however, his bank shall disqualify him to issue cheques.

For each cheque sorted by manual work or machine, issuers will be charged by banks for CNY 0.6 (USD 0.07) and CNY 1 (USD 0.14), respectively.

2.2.3 Commercial drafts

Commercial draft includes commercial acceptance draft and bank acceptance draft. They are used for payment after delivery or postponed payment as agreed upon by both parties. Once a commercial draft is committed for payment by a payer or payer's bank, an acceptor will pay unconditionally on maturity date. Therefore, the draft has very strong binding force on the payer. The buying and selling parties may agree on the period of payment but not to exceed 6 months. The draft can also be used to buy commodities, even if its holder has insufficient funds, and be discounted from banks or negotiated to the third party by endorsement.

The amount of commercial drafts in use has been increasing since their introduction to the coal, metallurgy, electric power, chemistry and railway industries in year 1995.

2.2.4 Promissory notes

Promissory note was a new payment instrument introduced by the PBC after a reform on the payment and settlement regulations in year 1988. Banks issue it after customers deposited money. It may also be used for local fund transfers or encashment within a local clearing area. It's widely used in relative advanced cities and in those regions with active small commodities market. It can be negotiated by endorsement.

2.2.5 Credit transfers

Credit transfer is a payment instrument whereby a remitter entrusts a bank to make fund transfers to a beneficiary account. Remitters may make credit transfers by means of mail and telegraphy. Since its procedures are simple and do not require a minimum amount, it has become a main method for customers in making non-local fund transfers.

2.2.6 Collections with acceptance

Collection with acceptance is a payment instrument whereby a seller entrusts a buyer's bank to collect funds for him by sales agreement after delivering goods. In a planned economy, it played an important role in helping enterprises collect their funds. Currently, it is mainly used among the large and medium enterprises with higher creditability and with relatively closed marketing relationship. The required minimum amount of collections with acceptance is CNY 10,000 (USD 120.8).

2.2.7 Collections

Collection is a payment instrument wherein a payee entrusts his bank to get money from a payer if the payee can offer his bank commercial drafts, bonds or certificates received to prove his claims. Both enterprises and residents can use collections. This instrument may be used for local and non-local payments, and not be limited by the required minimum value. Collection's funds can be transferred from the payer's bank to the payee's bank by mail or by telegraph depending on the payee's choose.

Moreover, it is within a local area that utility fees, such as water, power, telephone bills and so on, may be charged by using local special collections in the light of relevant regulations.

2.2.8 Direct debits

China started to use direct debits for non-cash payment in 1980s. Though they account for only a small part in the non-cash payment, direct debits had been developing quickly in the past several years. They were mainly used for payments of utility fees, insurance fees, tax and tuition fees. The payer, payee and bank in this payment method must reach an agreement in advance. In agreed time, the payee submits payment instruction, by writing or on-line transmission, to his bank that will debit payer's account and credits payee's account. It's estimated that in year 2000, transaction volume of direct debits reached 19.4 million, with a total value of over CNY 280 billion (USD 33.8 billion).

2.2.9 Direct credits

Recently, banks have also used direct credits to make fund transfers among different accounts within the same bank for payments of wages, insurance, pension funds. Payment instructions were formerly in writing. Many large enterprises and government agencies, however, nowadays send the instructions by magnetic media or communication networks. In year 2000, transaction volume and value of direct credits exceeded 60 million and CNY 65 billion (USD 7.9 billion).

2.2.10 Bankcards

Financial institutions that engage in banking business issue bankcards. By year-end 2000, bankcards in circulation reached 277.4 million, and their transaction value was estimated to

CNY 1,219 billion (USD 147.3 billion).

Bankcards issued in China, in most cases, follow the basic principle that cardholders must deposit with their institutions before the bankcards can be used for consumption. Consumer credit is only an auxiliary function with bankcards. They may be classified as follows:

- 1) Golden cards and ordinary cards according to creditworthiness of the cardholders. The golden cards are only issued to those with higher creditworthiness.
- 2) Principal cards and attached cards according to different discharge responsibility. The principal cardholders have the rights to end the use of the attached cards.

Most of bankcards are debit cards and few are credit cards. For those with debit function, financial institutions do not allow overdraft to cardholders. As regards those with credit function, the institutions allow their customers to get certain amount of the overdraft in their bankcard accounts. Moreover, the institutions calculate the compound interest of the overdraft on international credit cards on a monthly basis. With regard to the bankcards with credit function, the institutions calculate the single interest of 0.5 per mill per day of the overdraft on a monthly basis.

Credit card holders may enjoy the following preferential terms for non-cash transactions:

- Repayment without interest during a period of time with the maximum length of time of 60 days.
- Minimum amount of repayment. If the holders have some problems repaying the overdraft amount when it is due, they may repay only the minimum amount according to the institutions' requirements.

With regard to fee charging, the institutions usually do not charge any annual fees to debit card holders, but do charge to credit card holders. According to agreements between institutions and retailers, the institutions charge certain percentage of commission on the basis of transaction value. The commission for hotels, restaurants, entertainment and travel agencies should not fall below 2% of the transaction value. On the other hand, the commission for other industries should be a minimum of 1% of the transaction value.

3. Interbank payment systems

The PBC operates 3 interbank payment systems, which comprise more than 2,000 local clearing houses, national interbank system and electronic interbank system. These systems process interbank payments (local and non-local) and high value intrabank payments. They also provide payment services to small banks that do not have their own payment networks.

3.1 Local Clearing Houses (LCHs)

There are 2,334 LCHs in China. All local interbank payments and most intrabank payments are processed via the LCHs.

3.1.1 Ownership

Most of the LCHs are owned by the PBC. The others are owned by their members.

3.1.2 Participation

Most of bank's branches within service area of a LCH are direct participants. Depending upon LCH's organizational structure, those small local branches belonging to the same bank may qualify to be direct members.

3.1.3 Types of transactions

All paper-based credit and debit payment items may be exchanged and settled via the LCHs. The bulk of items exchanged are cheques. In the largest LCH, its average volume of items processed exceeds 200,000 per business day.

3.1.4 Operation of the system

In most cases, PBC branches are responsible for the operation of the LCHs. While the LCHs that locate in the large cities and counties with high volume have two sessions in the morning and afternoon of each business day, the others have only one session in the morning of each business day. Rejected items are usually returned before the next session starts.

3.1.5 Settlement

Settlement of multilateral net positions occurs across accounts at the local PBC branch (or, in some case, the designated commercial bank). The settlement is done based on the principle of "debit first, credit second". Once the receivable members' accounts are credited, the settlement becomes final. The receivable members then may allow their customers to use funds.

3.1.6 Risk and risk management

Since LCHs' members must have sufficient balances with the PBC for settlement, the members may face credit risk and liquidity risk. If a member cannot find sufficient funds to cover its debit position within the settlement period, the PBC will impose a penalty equal to a percentage of the insufficient amount. If the debit position is not covered on the same day, the member will get overnight credit from the PBC. However, the member may be suspended on the next business day. Therefore, when the LCH opens on the next business day, there will be no defaulting members.

3.1.7 Technical aspects

Usually payment items are cleared manually. However, as the volume of local payments has increased, many LCHs have chosen to use computers to do the netting. Sorting machines have been installed in 17 metropolitan and medium-sized cities, such as Shanghai, Beijing, Guangzhou and Shenzhen. The LCHs, in many cities, exchange payment instructions by magnetic media or communication networks before presenting relevant paper-based items.

3.1.8 Pricing policies

The LCHs are non-profit entities. Members apportion the operational costs. In most cases, the LCHs charge members fees in terms of their transaction volume. The others charge members annual fees. It's planned that in the near future pricing standards of the LCHs will be unified, to reduce the cost of customers in using paper-based instruments.

3.1.9 Governance

The LCHs play a very important role in China's payment systems. They are generally managed by PBC branches. The PBC headquarters, however, will draw up the uniform rules and procedures for the LCHs and take steps to rationalize the use of sorting machines and communication networks.

3.2 National interbank system (NIS)

NIS manually handles non-local interbank fund transfers. The PBC headquarters manages the NIS. Different levels of PBC branches process interbank nostros and vostos by presenting vouchers directly to each other, keeping accounts separately, and being monitored centrally. Besides making fund transfers within the PBC and handling in-payment and out-payment of the Treasury, the NIS also make interbank, or on-us fund transfers, for other banks. However, with the development of China national advanced payment system (CNAPS), and most commercial banks gradually setting up their own funds transfer systems, this system will be replaced gradually.

3.2.1 Ownership

The NIS is owned by the PBC. The PBC headquarters is responsible for the construction of NIS electronic computing center, and PBC branches are responsible for the daily maintenance of their own relevant equipment.

3.2.2 Participation

All financial institutions that open their settlement accounts with the PBC qualify as NIS direct participants. All PBC branches and those commercial bank branches acting as agents for the PBC, are also NIS direct participants, and they are called as national interbank institutions (NIIs). Others may access NIS services by the direct participants.

3.2.3 Types of transactions

The NIS may process debit and credit items as follows: interbank credit payments, in-payment and out-payment of the Treasury, and fund transfers among PBC branches on behalf of themselves or their customers.

3.2.4 Operation of the system

In general, payment instruments are directly exchanged between NIIs, by telegraphic or mail remittance. Payment instructions from the sending NIIs may reach the receiving NIIs within the same day by telegraphic remittance.

A basic business procedure of the NIS is as follows: the sending NIIs completes 3 copies of NIS vouchers. The first copy is sent to the receiving NIIs. The second copy is sent to NIS electronic computing center. If truncated by the sending NIIs, relevant payment information will be sent to the electronic computing center. The sending NIIs keeps the third copy. The receiving NIIs will post payment items to relevant accounts trade by trade according to the first copy received.

3.2.5 Settlement

Balance amount between NIS direct participants and NIIs is netted every day and settled step by step in different levels of the NIIs at regular intervals. The NIIs must calculate bilateral net positions for credits and debits in the light of interbank payment items in each business day, and report their balances to the superiors by the end of each year.

3.2.6 Risk and risk management

There is no credit risk within the NIS, as NIS direct participants send their payment instruments only when they have sufficient funds in their settlement accounts. However, the direct participants may sometimes face liquidity risk. If there is liquidity risk, the direct participants may ask their superiors to solve it.

3.2.7 Technical aspects

Payment transactions are processed manually. Reconciliation information for the NIIs is transmitted by PBC Intranet, and processed by the electronic computing center. The NIS has a client/server architecture. There are servers in more than 200 cities and 2,500 client workstations, which are connected to the electronic computing center.

3.2.8 Pricing policy

It is no commission for NIS direct participants, but they shall pay relevant postage for their telegraphic and mail remittance.

3.2.9 Governance

NIS direct participants should comply with the provisions on interbank fund transfers set by the PBC. All transactions are centrally monitored by the electronic computing center. The direct participants may check the transaction by referring to the reconciliation sheet sent by the electronic computing center. In the event of a mistake, they shall consult the electronic computing center to solve it.

3.3 Electronic interbank system (EIS)

In order to reduce a large amount of float, as well as to speed up funds circulation, the PBC set up EIS using VSAT satellite communication technology (at the time, terrestrial communication was rather poor). However, as China national advanced payment system (CNAPS) gradually goes into operation, the EIS will also be replaced.

3.3.1 Ownership

The PBC and commercial banks are co-owners of the EIS. The PBC is its largest shareholder and operates the system.

3.3.2 Participation

All commercial bank branches with settlement accounts at PBC branches, as well as PBC branches, may participate in the EIS. They may send payment instructions on behalf of themselves or their customers. Since the system is not rolled out in every city and country, some financial institutions have been unable to utilize EIS service.

3.3.3 Types of transactions

The EIS only handles credit transfer among participants, including all interbank non-local payments, intrabank high value payment for commercial banks and fund transfers among PBC branches. In year 2000, this system processed, on average, 100,000 transactions per business day, with a total value of CNY 100 billion (USD 12.1 billion).

3.3.4 Operation of the system

The EIS is a distributed processing system. The major role of EIS active site is to forward payment messages between VSAT workstations. It processes payment transactions from 8:30 to 17:30 on business days. In some special case, its operation hours may be extended as required. The EIS processing flow is as follows:

The originating bank (commercial bank's branch) submits payment instructions, electronically or using paper voucher, to the local sending bank (PBC branch). The sending bank then debits the originating bank's account with the PBC, and sends the instructions to EIS national clearing center (NCC) by satellite communication. The NCC transmits it to the receiving bank (PBC branch) that then credits the accepting bank's (commercial bank's branch) account. The receiving bank is responsible either for creating the instructions into printed vouchers that will be collected by the accepting bank, or for sending the instructions via communication network to the accepting bank.

3.3.5 Settlement

All accounting activities for the EIS take place in PBC branches, namely the settlements are processed in both the sending and the receiving bank. If the originating bank does not have sufficient balance in its PBC account, its payment instructions will queue in the sending bank until there are funds available. Once the payee account is credited, then the payment becomes final.

3.3.6 Risk and risk management

Payments can be processed only when the originating bank has sufficient balance in its PBC account. Therefore, there is liquidity risk in the EIS. In the event of liquidity problem, a direct participant may ask its superior to solve it. Due to technical reasons, the EIS might suffer some operational risk. If there is a technical problem resulting in interest loss of direct participants, the PBC will adjust balance of their PBC accounts according to its internal rules and procedures.

3.3.7 Technical aspects

Considering China communication situation then, the PBC decided to set up a private satellite communication network using VSAT technology for the EIS. The network connects the IBM mainframe systems located in Beijing with the VSAT workstations (based on PCs or servers) in PBC branches. Most VSAT workstations have been connected to the accounting book systems of PBC branches. The active site has implemented hot standby, and the passive site for emergency has been set up in Wuxi. The VSAT workstations are also equipped with redundant facility.

3.3.8 Pricing policy

The PBC does not intend to recover its investment and operational cost by charging fees. It only charges postage of CNY 4.5 (USD 0.54) for each payment instruction.

3.3.9 Governance

The PBC manages this system. The PBC headquarters manages EIS national clearing center, and PBC branches administer other levels of clearing centers.

3.4 China national advanced payment system (CNAPS)

China national advanced payment system (CNAPS) is a key project that has two important application systems: high value payment system (HVPS) which is a real-time gross settlement system, and bulk electronic payment system (BEPS). The CNAPS will be operational from year 2002.

3.4.1 Ownership

The PBC will be the sole owner and operator of the CNAPS due to its systemic importance.

3.4.2 Participation

All institutions that open settlement accounts with PBC branches may participate in the CNAPS directly. CNAPS direct participants include bank's branches in cities, credit unions, PBC accounting departments and treasury departments at city level. Moreover, some institutions (such as CDC) approved by the PBC to engage in a given business, may become concessionary participants.

3.4.3 Types of transactions

The CNAPS will process all types of credit and debit transactions. For those high value payments, urgent low value payments and the third party payment instructions are processed by HVPS, which aims to transfer funds in real time. As for batch payments, including interbank debit and low value credit transactions, they are processed by BEPS.

3.4.4 Operation of the system

As HVPS and BEPS have different functions and design requirements, the CNAPS handles high value payments and batch payments differently.

HVPS is a real time gross settlement system that accepts credit payment instructions from 8:00 to 17:00 or to the prolonged time as required. It processes credit payments trade by trade. The instructions might not be executed in the arrival sequences, which will be adjusted by CNAPS direct participants as required.

BEPS operates 24 hours a day. In each business day, payment instructions may be received from 8:00 to 17:00. Batch transactions in city clearing processing centers (CCPCs) are cleared separately from that in CNAPS national processing center (NPC). For CCPC batch payments, the net position of each direct participant will be submitted to the NPC at regular intervals for settlement after CCPC sorts and forwards them. Batch payments across different CCPCs, are forwarded and settled by the NPC at regular intervals. The last batch payments across different

CCPCs are processed in the evening (until 0:00 midnight).

3.4.5 Settlement

Before debiting settlement accounts of direct participants, the CNAPS will check their balance (or daylight overdraft ceiling) in the book of the PBC. Once the accounts are debited or credited, payments become final.

Before 17:00 each business day, the CNAPS processes payment instructions according to direct participant's available balance (including daylight overdraft ceiling). If a participant is short of available balance, his instructions will be queued.

Between 17:00 and 18:00, the system only accepts the instructions that cover debit position or settle payments in queues.

At 18:00, the system will return high value instructions for those positions are still short of payment, and provide loans with high penalty interest to other payments in queues (such as net settlement).

3.4.6 Risk and risk management

One of the PBC's objectives in design of the CNAPS is risk minimization.

The system allows direct participants to check their expected positions in the book of the PBC as soon as possible. It also automatically reminds them of their balances, in order to enhance their liquidity management ability.

The PBC also requires collateral on daylight overdraft of direct participants, and also has the rights to limit types of collateral. The PBC will monitor and assess each direct participant's creditworthiness and payment ability daily. The PBC may cancel a direct participant's daylight overdraft ceiling as necessary.

If the PBC rates that borrowing frequency, or other factors of a direct participant are unsatisfactory, the PBC may also freeze his settlement account, stop debiting, or even close his account in line with relevant regulations. When providing high penalty interest loans at the end of each business day, the PBC may ask for effective collateral to reduce its credit risk.

Daylight liquidity

In order to enhance each direct participant's liquidity, the CNAPS was designed with automated repo and daylight overdraft ceiling mechanism. CNAPS direct participants are required to use the automated repo first. Repo and overdraft cannot be used at the same time.

For those direct participants with access to the automated repo, the CNAPS will automatically ask PBC open market operation system for an automated repo when they are short of liquidity. The PBC open market operation system then responses to the CNAPS according to the rules or agreements between the PBC and direct participants, financing the participants or not.

For those participants with access to the daylight overdraft, PBC branches decide local CNAPS direct participants' ceiling according to their creditworthiness and expected amount of overdraft, and submit this into the system. The participants might pay interest for the daylight overdraft.

3.4.7 Technical aspects

Payment instructions processed by the CNAPS will be transmitted by PBC private satellite network during the initial stage of operation. To ensure a reliable transmission of payment instructions, the PBC will mainly use terrestrial lines to transmit the payment instructions in the near future, and then the private satellite network will be retained as backup.

Mainframes in CNAPS national processing center will be connected by a hot standby structure. A non-local disaster recovery center of CNAPS national processing center will be constructed. As CCPCs are also very important, the PBC will take measures to ensure their availability.

Taking into account the international environment and interdependence of all payment systems, CNAPS message types will conform to the international standards where possible.

3.4.8 Pricing policy

The PBC is reviewing CNAPS pricing policy.

3.4.9 Implementation

The CNAPS will be implemented in different phases. The HVPS will start its operation in Beijing and Wuhan from July 1, 2002. It is expected that the CNAPS will be rolled out to over 300 cities by the year-end 2003.

4. Securities settlement systems

China's securities comprise bonds and equities. Bonds trading are settled by central government bonds depository and clearing corporations limited (CDC) and China securities depository and clearing corporations limited (SD&C). The later is the sole settlement agent of equities.

4.1 Bonds market

China's bonds market is composed of the interbank bonds market and the stock exchanges market. Both markets have different functions, and have not been unified. It is envisaged that both markets will be unified in the future and accessible to all financial institutions, enterprises and residents.

4.1.1 Trading

4.1.1.1 Market overview

The interbank bonds market comprises OTC transactions in which institutional investors play a major role, and transactions effected over the counters of banks by medium and small sized enterprises and residents. This market is an important arena where the Treasury collects funds by issuing bonds, financial institutions adjust their liquidity and rationalize their asset structures, and the PBC conducts open market operation to achieve its monetary policy goals. The bonds issued and circulated in this market include government bonds, central bank bonds and financial bonds of policy banks. This market also supports issues of bonds by market principles. Transaction value for this market has been increasing each year - CNY 30.7 billion

(USD 3.7 billion) in year 1997, and CNY 2,150.9 billion (USD 259.9 billion) in year 2000, increasing more than 70 times. In year 2000, there were 27 bond issues for the MOF, State Development Bank, and Import and Export Bank of China, with a total amount of CNY 390.4 billion (USD 47.2 billion).

Bonds listed in the stock exchanges are government bonds, corporate bonds, and convertible bonds. Government bond transactions in the secondary market, including spot trading and repos, mainly take place in the stock exchanges. It is at the early stage of Shanghai stock exchange that bonds played a dominant role, and now they still maintain a relatively large share. In year 2000, the total value of government bonds in the custody of SD&C Shanghai and Shenzhen branches was CNY 83.2 billion (USD 10.1 billion), and transaction value reached CNY 1,889.1 billion (USD 228.2 billion).

There are several types of transactions in the bonds market. In the interbank bonds market, it's mainly repos and spot trading. Trading parties may define maturity of government bond repos, up to a maximum of 365 days. There are 7 types of repo maturity for PBC open market operation: 7, 14, 21, 28 days, and 2, 3, 4 months. In the stock exchanges, there are 6 types of repo maturity in Shanghai stock exchange: 3, 7, 14, 28, 91 and 182 days; and 9 types in Shenzhen stock exchange: 3, 4, 7, 14, 28, 63, 91, 182 and 273 days.

4.1.1.2 Trading systems

Transactions between members of bonds settlement system are matched in the national interbank lending center by asking price, or made in the form of OTC trading by their own agreements. Open market operations are made by agreements between the PBC and the primary dealers of bonds business system.

In the stock exchanges, the centralized competitive pricing of bonds' transactions shall follow the principle of price precedence and time precedence.

The corporate bonds issued and registered with CDC are, except for negotiation by agreements, not allowed to circulate in the interbank bonds market. However, they can be listed in the stock exchanges.

(a) Governance

The interbank bonds market is managed by the PBC. CDC direct participants must comply with relevant regulations and provisions formulated by the PBC, business rules set by the CDC, and must sign a "master contract for bonds repo" with the CDC. The CDC shall report to the PBC regularly on statistical data or relevant information of bond transactions.

Bond trading in the stock exchanges shall comply with all regulations set by the stock exchanges, and is monitored by the CSRC.

(b) Participation

Direct participants of the interbank bonds market include state-owned commercial banks (headquarters and their authorized branches), share-holding commercial banks (headquarters and their authorized branches), rural credit unions, insurance companies, security companies, security investment fund, financial companies and so on. At this time, there are more than 600 direct participants, including 30 foreign bank branches. Indirect participants include small and medium sized financial institutions, and incorporated enterprise.

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Members of the stock exchanges are their direct participants. Other institutional investors and residents registered with SD&C Shanghai and Shenzhen branches may only trade bonds through the direct participants (also see 4.2.1.2).

4.1.2 Pre-settlement

4.1.2.1 Trading confirmation

Bond transactions in the interbank bonds market are confirmed by CDC members, and matched by the central bonds book-entry system. If matched, the transactions can be settled. There is no confirmation for bond transactions in the stock exchanges (also see 4.2.2.1).

4.1.2.2 Clearing house

There is no specialized clearing house for bond transactions. The clearing process of the transactions is done by the CDC and the SD&C, respectively.

Bond transactions in the interbank market are processed trade by trade, therefore there is no bonds clearing (also see 4.1.3).

Bond transactions, as the same as that of other securities in the stock exchanges, are cleared in SD&C Shanghai and Shenzhen branches (also see 4.2.2.2).

4.1.2.3 STP ability

At this time, the CDC cannot provide STP services because the transactions need to be confirmed by its members, but the SD&C can do that for bond transactions.

4.1.3 Settlement

Settlement cycle

In the interbank bonds market, the transactions are settled trade by trade in real time at the designated date by the CDC.

Bonds trading in the stock exchanges is settle by SD&C Shanghai and Shenzhen branches, respectively. Settlement cycle of the trading is T+1.

4.1.3.2 CSD

There are two CSDs in China, namely the CDC and the SD&C.

The CDC is the general custodian for government bonds, financial bonds of policy banks and corporate bonds. By the end of year 2000, the total amount of bonds in the custody of the CDC was CNY 1,749 billion (USD 211.3 billion). The SD&C is the general custodian and settlement agent for stock, funds and bonds listed in Shanghai and Shenzhen stock exchanges. The following is a brief introduction of the CDC.

(a) Governance

The CDC is not only a general custodian for the bonds market of the whole nation, but also an important financial intermediary and an infrastructure provider for the markets. Moreover, it

contributes to standardization of the market by issuing a set of business rules, operational procedures, and organizing participants to sign the “master contract of bonds repo”.

(b) Participation

Members that can be classified as first, second and third class include all financial institutions, and institutional investors holding corporate bonds or special financial bonds.

The first class is that financial institutions (FIs) are approved by the PBC as settlement agents. The second class is FIs that only trade for themselves. They are both direct settlement members of the CDC. The third class is indirect members who entrust the first class for bond settlements.

(c) Risk management

The following measures are adopted to reduce the relevant risk.

- Gross settling each transaction in real time after matched. This will improve efficiency, reduce mistakes and system risk.
- Providing “Payment After Delivery (PAD)” and “Delivery After Payment (DAP)” (see 4.1.3.4) services on the condition that DVP is not available now, so as to reduce credit risk of related parties in the system.
- Intensifying safety of the central bonds book-entry system. In order to ensure the uniqueness of members, it adopts bilateral identification and business authorization for each member. Trading data are encrypted to prevent tampering and to ensure data integrity.
- Strengthening infrastructure reliability. Currently, the CDC has carried out hot standby for the system and equipped redundant communication facility.
- Setting up internal auditing and monitoring mechanisms, to reduce operational risk and moral hazards.

4.1.3.3 Central counterparty

There is no central counterparty in the interbank bonds market. However, SD&C Shanghai and Shenzhen branches are central counterparty for bond transactions made in the stock exchanges (also see 4.2.3.3).

4.1.3.4 Payment (including DVP)

There are 3 types of funds settlement for the interbank bonds market, namely FOP, PAD and DAP.

PAD refers to that at a delivery date, a buyer makes fund transfers by his bank to a seller’s bank after informing the CDC to make bonds delivery on the condition that the seller has enough payable bonds.

DAP is that at a due date, a seller informs the CDC to make bonds delivery to a buyer after receiving funds.

The funds settlement for bond transactions in the stock exchanges is as the same as that of stock trading (also sees 4.2.2).

It's expected that DVP will be realized after connecting the central bonds book-entry system with the CNAPS.

4.2 Stock market

4.2.1 Trading

4.2.1.1 Market overview

China started to issue stock in year 1987, which was traded over-the-counters in the first few years. Shanghai and Shenzhen stock exchanges began operation in December 1990, and then gradually formed a national stock market. By the end of year 2000, there were 1,088 companies listed (including A and B shares) in the stock exchanges with a total market value of CNY 4,809.1 billion (USD 581 billion), and market value of the public shares reached CNY 1,609.7 billion (USD 194.5 billion).

Stock listed in China include A and B shares (there are also H, N and S shares outside China). A shares are RMB ordinary stock, traded by the domestic investors (citizens in Hong Kong, Macao and Taiwan are not included). B shares are RMB special stock, which can be traded by both domestic residents and overseas investors using US dollars or Hong Kong dollars. Currently, only spot trading is allowed for the listed stock.

4.2.1.2 Trading systems

Stock is traded in Shanghai and Shenzhen stock exchanges. The centralized competitive pricing of stock trading follows the principle of price precedence and time precedence. Stock investors should, firstly open securities trading accounts with their local securities companies, and entrust them to buy/sell securities, in writing, by telephones, terminals or Internet. The securities companies transmit requests to the trading systems according to their customers' instructions. The stock exchanges monitor the trading and publish trading information in real time, and report abnormal transactions to the CSRC.

(a) Governance

Shanghai and Shenzhen stock exchanges are directly administered by the CSRC. Based on the *Securities Law*, the stock exchanges should set up computer systems to monitor the market in real time, and establish information disclosure mechanism, in order to monitor illegal trading and control market risks.

The stock exchanges define the rights and obligations of their members, which include internal supervision, risk management, standards and maintenance of the systems, and others related to securities trading and clearing. The approval and cancellation of membership should be reported to the CSRC for putting on record.

(b) Participation

Members of the stock exchanges are domestic and overseas securities companies. They act as the agent for investors. Some members can also trade for themselves.

4.2.2 Pre-settlement

4.2.2.1 Trading confirmation

Stock trading is automatically processed according to the principle of price precedence and time precedence. There is no need for domestic investors to confirm their trading. However, overseas investors need to confirm their B shares trading.

4.2.2.2 Clearing house

SD&C Shanghai and Shenzhen branches provide clearing services for the Shanghai and Shenzhen stock exchanges.

(a) Governance

According to the *Securities Law*, the establishment of securities registration and settlement companies must be approved by the CSRC. Their operating capital shall not be less than CNY 200 million (USD 24.2 million), and they must have required infrastructure to provide clearing services for the securities trading and other services approved by the CSRC. The articles of association and business rules of the stock exchanges must also be formulated by laws and be subject to approval by the CSRC.

(b) Participation

The domestic and overseas securities companies, after approval by the CSRC, may become a member of the SD&C, and may participate directly in the clearing. Other securities investors can do indirectly via SD&C members.

(c) Risk management

According to the *Securities Law*, the SD&C must have sufficient service facilities and data protection measures. It must formulate comprehensive business, financial and safety regulations and a sound risk management system, to ensure the reliable operation of the system. It should also set up settlement risk funds to cover losses caused by technical errors, operational mistakes and majeure.

Members of SD&C Shanghai and Shenzhen branches should hand over the securities settlement risk funds in a proportion of their trading value. In a case that a member is unable to make payment, the SD&C may use the funds to complete it.

Meanwhile, SD&C Shanghai and Shenzhen branches require their members to save customers deposit in the designated banks, and not to finance or lend securities to their customers. The members must also deposit a certain amount of reserves for securities trading in the designated banks. The securities companies that engage in securities business either for their customers or on their own accounts shall not misappropriate customers' money or mix their trading with their customers'.

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(d) Novation

SD&C members' novation must be approved by the CSRC and other relevant departments.

(e) Role of the central counterparty

The SD&C is a non-profit legal entity. It's responsible for clearing and delivering the securities registered with and for distribution of stock dividend if entrusted by the issuers.

4.2.2.3 STP ability

Shanghai and Shenzhen stock exchanges can provide STP services for stock trading made by the domestic investors (including A and B shares), and not for the overseas investors.

4.2.3 Settlement

4.2.3.1 Settlement cycle

SD&C Shanghai and Shenzhen branches conduct stock settlement. Settlement cycles for A and B shares are T+1 and T+3 days, respectively.

4.2.3.2 CSDs

Stock listed in China is kept centrally in the custody of SD&C Shanghai and Shenzhen branches. Before trading, the shareholder shall register his stock in the SD&C.

4.2.3.3 Central counterparty

SD&C Shanghai and Shenzhen branches are central counterparties of stock trading. After closing of each business day, SD&C Shanghai and Shenzhen branches work out the net amount of all members. The delivery of A and B shares takes place on the T+1 and T+3 day, respectively.

4.2.3.4 Payment (including DVP)

Funds settlement of stock trading is completed in a two-level model. The first level is that between SD&C Shanghai and Shenzhen branches and their members, the second level between securities companies and their customers.

As for A shares, SD&C Shanghai and Shenzhen branches work out the net receivable and payable for all members on T day after the trading, and inform the payable member to prepare sufficient funds. On T+1 day, settlement banks credit or debit all settlement members, based on the T day funds settlement report; and securities companies debit or credit the trading deposit accounts of their investors according to the settlement report.

As regard to B shares, on T+1 day, SD&C Shanghai and Shenzhen branches work out the net receivable and payable for all members and inform them to confirm. On T+3 day, settlement banks debit or credit member's accounts according to the settlement report or the trading confirmation by investors. Funds settlement for the domestic and overseas investors is different. For the domestic investors, the securities companies debit or credit their trading deposit accounts according to the settlement report; for the overseas investors, the bank will be the agent of the securities companies to settle their trading.

4.3 Major projects and policies being implemented

4.3.1 *Over-the-counter bonds trading by banks*

Over-the-counter bonds trading by banks refers to government bonds, financial bonds and other bonds approved by the PBC, in the form of book entry, are issued to the public, enterprises and other institutions, and listed by banks for OTC trading.

4.3.1.1 *Trading*

The bonds issued to investors by underwriting banks are kept in the custody of the CDC, and quoted for trading. The underwriting banks sell new bonds over their counters, and quote bilateral prices of the bonds every business day.

The underwriting banks will set up accounting management systems for OTC bonds trading, which centralize OTC bonds trading data in their head offices, and transmit the data to the CDC using private communication lines.

The CDC will establish a data processing center for OTC bonds trading, and an inquiry system accessible to the public and institutional investors. The data held by the underwriting banks will be transmitted to the inquiry system in time to be accessed by the investor. Thus, the public investors could inquire their investment status through the underwriting banks or through the inquiry system.

4.3.1.2 *Settlement*

There are two levels of bonds settlement for OTC bonds trading. At the end of each business day, the underwriting banks' head offices will collect all trading data, and transmit them to OTC central processing center in the CDC. After sorting the data, the central processing center works out the net trading value of the underwriting banks. According to volume and net value of bonds trading, the underwriting bank will send settlement instructions to the central bonds book-entry system after confirmation. The central bonds book-entry system will automatically initiate bonds delivery between correspondent accounts and self-support accounts of the underwriting banks. OTC bonds trading of the investors is settled by the underwriting bank in a real time.

5. Role of the central bank

5.1 Provision of settlement accounts

The PBC is responsible for managing required reserve accounts opened by financial institutions, and for supervising the opening and purpose of bank accounts.

Financial institutions may apply to open required reserve accounts with the PBC. This account can be used for settlement of interbank and intrabank funds transfer. The PBC also manages the opening and purpose of settlement accounts opened with banks. Based on the *Provisions on Bank Accounts Management* issued in 1994, commercial banks must apply to a PBC branch or notify the PBC when they open and cancel customers' accounts. After approval from the PBC, non-individual customers may open four kinds of savings accounts with commercial banks: basic, general, temporary and specific savings accounts. However, these customers are only able to choose one bank to open their basic saving account with.

5.2 Operation of payment systems

According to the *Law of the People's Republic of China on the People's Bank of China*, the PBC must maintain the sound operation of payment, clearing and settlement systems. The PBC, by the LCHs, NIS, EIS and CNAPS, has provided, or will provide, payment services to institutions that open settlement accounts with it.

The CNAPS, which will be operational soon, will have higher processing capability and reliability. By means of well-defined assistance programs, supporting teams, necessary hardware and communication facility, the PBC will aim to enhance its disaster recovery capability for the CNAPS.

5.3 Operation of securities settlement systems

As a leader and manager of the interbank bonds market, the PBC supervises and guides trading behavior of market intermediaries and participants by approval of market access, formulation of regulations, and supervision.

The PBC conducts open market operations with the primary dealers in the interbank bonds market, to achieve monetary policy goals. In the near future, the PBC will provide daylight automatic repos for CNAPS direct participants by the central bonds book-entry system. This will play a very important role in adjusting liquidity of CNAPS direct participants, improving efficiency of the system, reducing risk and flourishing markets.

5.4 Supervision

According to the law, the PBC has the rights to supervise, manage and provide guidelines to financial institutions doing banking business, and may monitor payment services provided by financial institutions by on-site auditing and analysis of their regular reports. Regulations require banks to report regularly to the PBC transaction information on high value payments, including statistical data on intrabank high value funds transfer and their flow. The PBC has also recently taken measures to monitor high value transactions and possibly abnormal payment activities, in cooperation with other government department to fight money-laundering activities.

5.5 Other roles

In addition to providing payment and settlement services to financial institutions, the PBC has the sole right to issue the RMB and to regulate RMB circulation. The PBC also runs its own banknote printing and coin minting plants. As a bank of the government, the PBC is responsible for managing the Treasury.

The PBC closely cooperates with other entities in China's financial sector, coordinating on organizational and technical issues concerning payments system. The PBC also plays a very important role in China financial science and technology committee and China financial standardization committee. It also actively participates in formulating pricing policy and in managing the current payment systems.

STATISTICAL TABLES

China

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (millions)	1,224	1,236	1,248	1,259	1,295
GDP (CNY billions)	6,788.5	7,446.3	7,834.5	8,191.1	8,940.4
GDP per capita	5,554.2	6,024.5	6,277.6	6,506.0	6,903.8
Exchange rate vis-à-vis USD:					
<i>year end</i>	8.2982	8.2798	8.2787	8.2793	8.2781
<i>average</i>	8.3142	8.2898	8.2791	8.2783	8.2772

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	CNY billions 2000
Bank notes and coins	880.2	1,017.8	1,120.4	1,345.6	1,465.3
Transferable deposits	1,971.3	2,464.9	2,774.9	3,238.2	3,849.5
Narrow money deposits (M1)	2,851.5	3,482.6	3,895.4	4,583.7	5,314.7
<i>Memorandum items:</i>					
Broad money supply (M2)	7,609.5	9,099.5	10,449.9	11,989.8	13,461.0
Outstanding value on e-money schemes	nav.	nav.	nav.	nav.	nav.

Table 3

Settlement media used by banks ¹⁾

(end of year)

	1996	1997	1998	1999	CNY billions 2000
Transferable balances held at central bank	1,306.3	1,547.1	1,414.6	1,430.5	1,601.9
of which ²⁾ :					
<i>required reserves</i>	654.6	914.3	1,414.6	1,430.5	1,601.9
<i>free reserves</i>	651.7	632.8	nav.	nav.	nav.
Transferable deposits held at other banks	1,901.0	2,133.9	784.8	745.2	847.7
<i>Memorandum item:</i>					
Institutions' borrowing from central bank	1,421.0	1,400.3	1,203.3	805.3	893.9

¹⁾ Statistical range is limited to deposit-taking institutions, including state-owned commercial banks, other commercial banks, city commercial banks, rural credit cooperatives, urban credit cooperatives, financial companies and China agriculture development bank.

²⁾ Figures have been not divided between required and free reserves since year 1998.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts (millions)	Value of accounts (CNY billions)
Central bank	1	2,190	nav.	nav.
Commercial banks	117	nav.	nav.	nav.
Credit cooperatives	37,624	49,108	nav.	nav.
Postal institution	1	2,495	nav.	nav.
Total	37,743	nav.	nav.	nav.
of which:				
<i>virtual institutions</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>
Branches of foreign banks	158	6	nav.	nav.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
					millions
LCHs ¹⁾	490.0	505.9	513.5	495.0	517.2
NIS	5.5 ²⁾	5.4	4.5	4.6	4.7
EIS	6.2	10.7	17.6	24.2	31.6
Total	501.8	521.8	535.7	523.8	553.5

¹⁾ Figures are estimated by sample survey.²⁾ It is estimated.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
					CNY billions
LCHs ¹⁾	95,239.7	96,069.9	96,613.4	93,288.4	95,741.2
NIS	22,462.2 ²⁾	21,254.4	22,416.1	18,220.4	17,828.9
EIS	10,079.6	17,801.3	20,396.3	17,258.4	23,544.8
Total	127,781.5	135,125.6	139,425.8	128,767.2	137,114.9

¹⁾ Figures are estimated by sample survey.²⁾ It is estimated.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions ¹⁾

Instruments	millions				
	1996	1997	1998	1999	2000
Cheques	441.5	459.8	458.6	440	454.1
Payments by debit card	84.7	88.7	111.7	291.3	637.6
Payments by credit card	21.5	28.3	34.4	37.8	47.6
Credit transfers	90.8	122.4	125.5	176.5	240.1
Direct debits	2.1	4.9	8.7	14.0	19.4
Total	640.6	704.1	738.9	959.6	1,398.8

¹⁾ Figures are estimated.

Table 8

Indicators of use of various cashless payment instruments: value of transactions ¹⁾

Instruments	CNY billions				
	1996	1997	1998	1999	2000
Cheques	50,924.7	52,012.2	52,432.1	47,735.7	51,958.7
Payments by debit card	432.6	609.8	519.2	676.4	952.0
Payments by credit card	146.6	209.5	208.7	193.1	267.0
Credit transfers	43,001.3	44,522.2	49,127.9	41,154.2	57,000.8
Direct debits	26.1	49.1	97.9	177.3	280.5
Total	94,531.3	97,402.8	102,385.8	89,936.7	110,459.0

¹⁾ Figures are estimated.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	millions				
	1996	1997	1998	1999	2000
Government bonds settlement system	1,743.0	1,617.3	2,031.6	1,707.2	1,979.8
of which:					
Interbank bonds market	<i>nap.</i>	<i>nav.</i>	0.002	0.007	0.03
Stock market	1,743.0	1,617.3	2,031.6	1,707.2	1,979.8
Equities settlement system	253,314.4	256,001.9	215,410.6	293,238.9	475,840.0

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	CNY billions				
	1996	1997	1998	1999	2000
Government bonds settlement system ¹⁾	1,804	1,578	2,440	2,931	4,040
of which:					
Interbank bonds market	<i>nap.</i>	40	280	1,112	2,151
Stock market	1,804	1,538	2,160	1,819	1,889
Equities settlement system	2,133.2	3,072.2	2,355.4	3,131.9	6,082.7

¹⁾ Figures are estimated.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
Interbank bonds settlement systems	nap.	139	489	507	705
of which:					
<i>Banks</i>	<i>nap.</i>	<i>nav.</i>	130	148	178
<i>Securities companies</i>	<i>nap.</i>	<i>nap.</i>	<i>nap.</i>	12	18
<i>Other types of financial institutions</i>	<i>nap.</i>	<i>nap.</i>	359	347	509
Stock exchanges	1,066	840	659	628	631
of which:					
<i>Other types of financial institutions</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	203

PAYMENT SYSTEMS IN HONG KONG

Hong Kong

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List of abbreviations

AI	Authorized Institution
AMS	Automatic Matching System
ATM	Automatic Teller Machine
CCASS	Central Clearing and Settlement System
CCPMP	Cross Currency Payment Matching Processor
CHATS	Clearing House Automated Transfer System
CMT	CMU User Terminal
CMU	Central Moneymarkets Unit
CMUP	Central Moneymarkets Unit Processor
CNS	Continuous Net Settlement
CSD	Central Securities Depository
DTCs	Deposits-Taking Companies
DTCA	DTC Association
DVP	Delivery versus Payment
EFBNs	Exchange Fund Bills and Notes
EPS	Easy Pay System
FOP	Free-of-payment
GEM	Growth Enterprise Market
HKAB	Hong Kong Association of Banks
HKEx	Hong Kong Exchanges and Clearing Limited
HKFE	Hong Kong Futures Exchange
HKICL	Hong Kong Interbank Clearing Limited
HKMA	Hong Kong Monetary Authority
HKNPL	Hong Kong Note Printing Limited
HKSCC	Hong Kong Securities Clearing Company Limited
IFTP	Interbank Fund Transfer Processor
LAW	Liquidity Adjustment Window
LBs	Licensed Banks
MMs	Market Makers
MPC	Multi-purpose stored value card
OTC	Over-the-counter
POS	Point-of-Sales
PPS	Payment-by-Phone Service
PVP	Payment versus Payment
RDs	Recognized Dealers
RLBs	Restricted Licence Banks
RTGS	Real Time Gross Settlement
SAP	Settlement Account Processor
SEHK	Stock Exchange of Hong Kong
SFC	Securities and Futures Commission
SI	Settlement Institution

1. Institutional aspects

1.1 Legal and regulatory framework

There is no specific legislation on the payment systems in Hong Kong. However, there are a number of laws that have direct bearing on various payment instruments and institutions. The relevant ordinances are set out in the following sections.

1.1.1 Payment instruments and systems

Section 3A(1) of the *Exchange Fund Ordinance* provides, inter alia, that the Financial Secretary may, by notice, require an authorized institution (see section 1.2.1.1) to open an account (“Settlement Account”) with the Hong Kong Monetary Authority (HKMA) and to maintain and operate such Settlement Account on such terms and conditions as the Financial Secretary considers appropriate. The Financial Secretary has delegated this power to the HKMA.

Legal Tender Notes Issue Ordinance regulates the issue of banknotes and currency notes. Under the ordinance, the banknotes issued by the Bank of China, the Standard Chartered Bank and The Hong Kong and Shanghai Banking Corporation Limited are legal tender within Hong Kong.

The legal definition of a cheque is stipulated in the *Bills of Exchange Ordinance*. According to Section 73(1) of the Ordinance, a cheque is a bill of exchange drawn on a banker payable on demand.

"Stored value card" is defined in the *Banking Ordinance* as a card (or like thing) on which data may be stored (or otherwise recorded) in electronic, magnetic or optical form and for or in relation to which a person pays a sum of money to the issuer of the card, whether directly or indirectly, in exchange for the storage of the value of that money, whether in whole or in part, on the card and an undertaking by the issuer to supply goods or services itself or that a third party will supply goods and services (including money or money's worth) on production of that card. Stored value card is a “purse-like” payment device, the usage of which does not require user identity verification or bank account validation, and the stored value in the card is instantaneously deducted at point-of-sale (POS).

The definition of stored value cards has two parts:

- (a) the first part defines a “single-purpose card” which will not be subject to the regulatory regime under the Banking Ordinance; and
- (b) the second part defines a “multi-purpose card” by reference to the issuer’s undertaking that, on the production of the card to the issuer or a third party, the issuer or the third party will supply goods or services (including money or money’s worth to cater for the redemption of unused value).

In view of the increasing interest in the issue of multi-purpose stored value cards with the potential to substitute to a significant degree for cash and cheques, the *Banking (Amendment) Ordinance 1997* was enacted to empower the HKMA to regulate the issue of these cards. The ordinance provides that only licensed banks in Hong Kong should have the ability to issue multi-purpose cards that are unrestricted in terms of the goods and services which they

can be used to purchase. The objectives are to maintain the stability of the payment system and provide a measure of protection to cardholders. A non-bank service provider may, however, be authorized as a deposit-taking company whose principal business is to issue or facilitate the issue of multi-purpose cards which are more limited in scope of usage. Furthermore the amended Ordinance provides for the HKMA to grant exemption from the approval process to certain types of multi-purpose cards where the risk to the payment system and to cardholders is considered to be slight.

In developing this regulatory framework, the HKMA seeks to strike a balance between the need to maintain the stability of the payment system (and thus of the financial system as a whole) and the desirability of not stifling developments which would promote competition and innovation.

The *Electronic Transactions Ordinance* was enacted on January 7, 2000 to facilitate the use of electronic transactions for commercial and other purposes. It gives electronic records and digital signatures used in electronic transactions the same legal status as that of their paper-based counterparts. The provisions for legal recognition of electronic records and digital signatures in relation to rules of law and admissibility of electronic records as evidence in court came into operation on April 7, 2000.

1.1.2 *Securities settlement*

The Securities and Futures Commission (SFC) administers Hong Kong's securities and futures legislation. Section 4(1)(b) of the *Securities and Futures Commission Ordinance* provides that the Commission shall have the function of ensuring that the provisions of the relevant ordinances, and the provisions of any other ordinance so far as they relate to securities, futures contracts or property investment arrangements, are complied with.

The SFC has oversight responsibility for the Hong Kong Exchanges and Clearing Limited (HKEx) and its subsidiaries, namely The Stock Exchange of Hong Kong (SEHK), the Hong Kong Futures Exchange (HKFE) and their Clearing Houses. It also has front-line regulatory responsibility for takeovers and mergers activity, regulation of offers of investment products, and the enforcement of laws regarding market malpractices. Since March 6, 2000, the SFC has taken over the front-line regulation of all exchange participants from the two exchanges. As for listed companies, SEHK is the front-line regulator for all companies listed on the Main Board and the Growth Enterprise Market (GEM), except the HKEx, which is regulated by the SFC.

In December 2000, the SFC approved a Memorandum of Understanding (MOU) with the HKEx. The MOU covers matters relating to the supervision of exchange participants, market surveillance and oversight of the activities of the HKEx, the two exchanges and clearing houses, including their rule making powers.

Among its other regulatory responsibilities in relation to the HKEx, the SFC's Enforcement Division monitors trading on the two exchanges with a view to detecting and understanding unusual price and volume movements, and conducts investigations if necessary; the Intermediaries and Investment Products Division conducts routine inspection visits of exchange participants (as well as other intermediaries who are not exchange participants) to ensure that intermediaries comply with regulatory requirements; and the Supervision of Markets Division oversees the operations of the HKEx and its subsidiaries to ensure the sound functioning of their trading, settlement and operational systems.

1.2 Institutions

1.2.1 Providers for payment services

Banks

Hong Kong maintains a three-tier system of deposit-taking institutions, namely, licensed banks, restricted licence banks and deposit-taking companies. They are collectively known as authorized institutions (AIs) under the Banking Ordinance.

Under the Banking Ordinance, the HKMA is the authority responsible for the authorization, suspension and revocation of all three types of AIs. Checks and balances are provided in the Banking Ordinance with the requirement that the HKMA consult the Financial Secretary on important authorization decisions, such as suspension or revocation. The Chief Executive-in-Council is the appellate body for hearing appeals against decisions made by the HKMA.

(a) Licensed banks (LBs) - only LBs may operate current and savings accounts, accept deposits of any size and maturity from the public and pay or collect cheques drawn by or paid in by customers. LBs are required to open and maintain an account with the HKMA for the settlement of HKD. In other words, they have direct access to the HKD Real Time Gross Settlement (RTGS) interbank payment system. Therefore LBs are the major providers for payment services in Hong Kong.

(b) Restricted licence banks (RLBs) - RLBs principally engage in merchant banking and capital market activities. They may take call, notice or time deposits of any maturity of HKD500,000 (approximately USD64,103) and above. In May 2000, the legal arrangement was finalized to allow RLBs with a clear business need to join the RTGS interbank payment system for the settlement of HKD. However, they are not allowed to participate in the clearing of cheques given their restriction in extending current accounts to customers.

(c) Deposit-taking companies (DTCs) - DTCs are mostly owned by, or otherwise associated with, banks. They engage in a range of specialized activities, including consumer finance and securities business. These companies may take deposits of HKD100,000 (approximately USD12,821) or above with an original term to maturity, or call or notice period, of at least three months. DTCs do not have direct access to the HKD RTGS interbank payment system.

Hong Kong has one of the highest concentrations of banking institutions in the world. At the end of December 2001, there were 147 LBs, 49 RLBs and 54 DTCs in business. There are, in addition, 111 representative offices of overseas banks in Hong Kong. A local representative office is not allowed to engage in any banking business. Its role is confined mainly to liaison work between the bank and its customers in Hong Kong.

AIs have to comply with the provisions of the Banking Ordinance which, among other things, require them to maintain adequate liquidity and capital adequacy ratios, to submit periodic returns to the HKMA on required financial information, to adhere to limitations on loans to any one customer or to directors and employees, and to seek approval for the appointment of controllers, directors and senior management.

In May 2000, the HKMA issued a Guideline on the Authorization of Virtual Banks under section 16(10) of the Banking Ordinance. The Guideline sets out the principles that the HKMA will take into account in deciding whether to authorize virtual banks. The main principle is that the HKMA will not object to the establishment of virtual banks in Hong

Kong provided that they can satisfy the same prudential criteria that apply to conventional banks.

In line with existing authorization policies for conventional banks, a locally incorporated virtual bank cannot be newly established other than through the conversion of an existing locally incorporated AI. Furthermore, local virtual banks should be at least 50% owned by a well-established bank or other supervised financial institutions. For applicants incorporated overseas, they must come from countries with an established regulatory framework for electronic banking. In addition, they must have total assets of more than USD16 billion.

Hong Kong Interbank Clearing Limited (HKICL)

HKICL is a private company jointly owned by the HKMA and the Hong Kong Association of Banks (HKAB). HKICL was established in May 1995 to take over in phases the HKD clearing functions provided by the former Management Bank of the Clearing House, The Hongkong and Shanghai Banking Corporation Limited (HSBC). This process was completed in April 1997. The principle activity of HKICL is therefore the provision of interbank clearing services to banks in Hong Kong.

In March 2000, the HKMA appointed HSBC as the settlement institution for the USD clearing system in Hong Kong. In this connection, HKICL has also taken up the role of clearing operator for HSBC, responsible for the development and operation of the USD clearing system.

Apart from payment systems, HKICL also operates the computer system of the Central Moneymarkets Unit (CMU), a central clearing and settlement system for public and private debt securities, on behalf of the HKMA.

1.2.2 Providers for securities services

Licensed dealers

Broadly speaking, any business entity which carries on or holds itself as carrying on a business in Hong Kong of dealing in securities, trading in commodity futures contracts, giving advice on investment in securities or futures contracts, providing margin financing for the trading of securities listed on a stock exchange, or leveraged foreign exchange trading is required to be registered with the SFC as a dealer, an adviser, a securities margin financier or a leveraged foreign exchange trader, as the case may be.

Licensed intermediaries must meet a number of ongoing requirements, including the maintenance of adequate liquid capital, the maintenance of proper books and records, the safe custody of clients' securities, the segregation of investors' monies and the submission by registered intermediaries and their auditors of returns and reports.

The licensing requirements relating to securities dealers and investment advisers are established by Part VI of the Securities Ordinance. The licensing requirements relating to futures dealers and advisers are established by Part IV of the Commodities Trading Ordinance. The licensing requirements relating to securities margin financiers are established by Part XA of the Securities Ordinance. The licensing requirements relating to leveraged foreign exchange trading are established in the Leveraged Foreign Exchange Trading Ordinance.

Exempt dealers

An AI within the meaning of section 2(1) of the Banking Ordinance is exempt from the licensing requirement. In other words, LBs, RLBs and DTCs are exempt dealers which also offer a wide range of securities services.

Hong Kong Securities Clearing Company Limited (HKSCC)

HKSCC was incorporated in May 1989. Pursuant to the Exchanges and Clearing Houses (Merger) Ordinance, HKSCC was converted from a company limited by guarantee to a company limited by shares and its constitution was amended accordingly. Following an allotment of shares prescribed by the Ordinance, HKSCC became a wholly owned subsidiary of the HKEx in 2000.

HKSCC created the Central Clearing and Settlement System (CCASS) in 1992, and became the central counterparty which provides book-entry settlement in securities among its Participants, either free of, or against, payment.

Only securities listed or to be listed on the Exchange will be accepted as Eligible Securities for settlement in CCASS and only brokers, clearing agencies, custodians, stock lenders and stock pledgees based in Hong Kong and such other persons as HKSCC may determine from time to time in accordance with the Rules will be accepted as Participants. HKSCC may from time to time accept other categories of securities, whether or not listed on the Exchange, as Eligible Securities and may admit other categories of participants. HKSCC also offers nominee and company registrar services.

Building upon the capability of the RTGS systems in Hong Kong, the HKMA has extended the Delivery versus Payment (DVP) facility for debt securities transactions to shares transactions. A link between HKICL and CCASS was set up in May 1998 to provide DVP facility for shares denominated in HKD in order to reduce settlement risks and improve settlement efficiency. Following the implementation of USD clearing system in Hong Kong, the DVP facility was extended for shares transactions denominated in USD in August 2000.

Central Moneymarkets Unit (CMU)

The CMU, established in 1990, is operated by the HKMA to provide computerized clearing and settlement facilities for Exchange Fund Bills and Notes (EFBNs). In December 1993, the HKMA extended the service to other HKD debt securities. It offers an efficient, safe and convenient clearing and custodian system for HKD debt instruments.

Since December 1994, the CMU has established a one-way link to such international clearing systems as Euroclear and Clearstream. This helps to promote HKD debt securities to overseas investors who can make use of this link to participate in the HKD debt market. Besides, the CMU also set up a network of bilateral linkages with the Central Securities Depositories (CSDs) in the Asia Pacific region, including Australia (December 1997), New Zealand (April 1998) and South Korea (September 1999), to facilitate cross border trades in securities in the region.

In December 1996, a seamless interface between the CMU and the newly launched HKD RTGS interbank payment system was established. This enables the CMU system to provide for its members real-time and end-of-day DVP services in HKD denominated securities. Through this interface, banks in the HKD RTGS system are able to obtain HK dollar liquidity from the HKMA to facilitate payment flows through intra-day and overnight repo of EFBNs.

Following the implementation of the USD RTGS system in Hong Kong, the CMU system established another seamless interface with the USD RTGS system in December 2000. With this system interface in place, the CMU provides its members real-time and end-of-day DVP settlement of USD denominated debt securities. Furthermore, this interface enables automatic intra-day repo, which helps to provide intra-day USD liquidity to the participants of the USD RTGS system.

All debt instruments cleared through the CMU are either immobilized or dematerialized, and transfer of title is effected in computer book entry form.

1.2.3 Other service providers

Credit/charge card operators

VISA and MasterCard are the two largest credit card operators in Hong Kong. They provide the international network linkages through which the merchants, merchant acquirers and card-issuers are connected.

American Express and Diners Club International mainly operate in their charge card business on a stand-alone or vertical integration basis. That is, they perform the multiple roles of network provider, card issuer and merchant acquirer. In the case of JCB Card, apart from issuing cards and acquiring merchants on its own, it also receives membership royalty fees from other institutions for the issuance of JCB Cards in Hong Kong.

Other network operators

Electronic Payment Services Company (HK) Ltd (EPSCO)

EPSCO is the only network provider for POS debit card services, namely Easy Pay System (EPS). Besides, EPSCO also offers non-POS debit facilities including Payment by Phone Service (PPS) and ETC payment.

Founded in 1985, EPSCO is now co-owned by 36 member banks in Hong Kong. The 36 member banks do not issue separate cards for the payment services because the functions are typically included in the bank Automatic Teller Machine (ATM) cards and credit cards with ATM functions. At present, there are about 10,000 participating retailers signed up for the EPS payment services.

Joint Electronic Teller Services Limited (JETCO)

JETCO was first established in 1982 by a small group of 5 banks. Its core business is to operate an interbank ATM network. Through its network of more than 1,600 ATMs, customers can access their accounts through JETCO ATMs in Hong Kong, Macau and two cities in Mainland China (Zhuhai and Shenzhen). Besides, JETCO also provides electronic non-POS debit instruction services.

Creative Star Limited (CSL)

Octopus card is a stored value card issued by CSL, a company jointly owned by transport operators, primarily for payment of transport services provided by them. It is a “contactless” stored value card. The card scheme was launched in the third quarter of 1997, when it was exempted from the definition of multi-purpose card under the Banking Ordinance because of its restricted range of services and because the risk of its use to the payment system and cardholders was considered slight.

In April 2000, CSL was authorized as a special purpose DTC under the Banking Ordinance. The authorization of CSL allows Octopus Card to be used for a wider range of uses, including some which are non-transport related, with a view to enhancing the convenience for cardholders.

1.2.4 Role of other private and public sector bodies

The Hong Kong Association of Banks (HKAB)

The HKAB is a statutory body established in 1981 under the Hong Kong Association of Banks Ordinance to replace the Hong Kong Exchange Banks Association. All LBs are required to become members of the HKAB and to observe the rules set by the Association under the Ordinance.

The main objectives of the HKAB, among others, are to further the interests of banks, to make rules for the conduct of the business of banking, to act as an advisory body to its members in matters concerning the business of banking, and to provide facilities for the clearing of cheques and other instruments.

DTC Association (DTCA)

Established in 1981 under the Companies Ordinance, the DTCA was originally known as the Hong Kong Association of Restricted Licence Banks and Deposit-Taking Companies. Any RLB or DTC may join the DTCA.

The objectives of the DTCA include furthering the general interests of RLBs and DTCs, serving as an intermediary between the Government and members, and acting as a consultative body to the Government on matters concerning the business of taking deposits in Hong Kong.

2. Payment methods

2.1 Cash

Cash is still by far the most common means of retail payments in Hong Kong. At the end of 2000, HKD notes and coins in circulation amounted to HKD 92 billion, representing 7.2% of the GDP. Compared with the G10 economies, cash usage in Hong Kong is high, similar to Japan and Switzerland. Despite the significant growth of card-based or electronic means of retail payment in the past decade, the Currency to GDP ratio in Hong Kong remains high and this could be mainly due to the significant amount of HKD notes and coins circulating in the Mainland China and Macau.

The Government, through the HKMA, has given authorization to three commercial banks, HSBC, the Standard Chartered Bank and the Bank of China, to issue currency notes in Hong Kong. Authorization is accompanied by a set of terms and conditions agreed between the Government and the three note-issuing banks. Banknotes are issued by the three banks, or redeemed, against payment to, or from, the Government's Exchange Fund in USD, at a specified rate of USD 1 to HKD 7.80 under the linked exchange rate system. The note issuing banks deposits the USD backing with the Exchange Fund in exchange for Certificates of Indebtedness. The Exchange Fund upon redemption of issued bank notes redeems such Certifications.

Hong Kong Note Printing Limited (HKNPL) prints banknotes issued by the three commercial banks in Hong Kong. The Government acquired the banknote printing plant with funds drawn from the Exchange Fund in April 1996. Subsequently, the three note-issuing banks each acquired 10% of HKNPL's issued shares from the Government and became minority shareholders.

Currency notes in everyday circulation are \$10, \$20, \$50, \$100, \$500 and \$1,000. The \$10 notes are gradually being phased out and replaced by the \$10 coin, a process which began in November 1994. The Government issues coins of \$10, \$5, \$2, \$1, 50 cents, 20 cents and 10 cents. Until 1992 these coins were embossed with the Queen's Head. In 1993, a program was initiated to replace the Queen's Head series with a new series depicting the Bauhinia flower. The first Bauhinia coins, the \$5 and \$2 coins, were issued in January 1993. New \$1, 50 cents and 20 cents coins were issued in October 1993, and a new 10 cents coin in May 1994. The \$10 coin, the last of the Bauhinia series of coins, was issued in November 1994. Since the beginning of the coin replacement program in 1993, about 549 million coins of Queen's Head design have been withdrawn from circulation. The Queen's Head coins remain legal tender while the replacement program continues.

Commemorative coins were issued to mark important events such as the establishment of the Hong Kong Special Administrative Region on July 1, 1997 and the grand opening of the Hong Kong International Airport in July 1998.

2.2 Cheques

Corporations or individuals in Hong Kong often use cheques as a means of payment or funds transfer. As a means for retail payment, they are also often used in transactions where debit cards or credit cards are not accepted (e.g. for payment of large value items such as motor cars or payment of deposit for buying a flat). Cheques are also used for some smaller value items such as payment of utility bills, but alternate electronic means of payment have become increasingly popular.

The cheque clearing system in Hong Kong is operated by HKICL and overseen by the HKMA. Interbank money settlement of cheques in net terms takes place between 15:00 and 15:30 on the business day following deposit of a cheque. The cheque clearing system has an interface with the settlement accounts maintained by the banks with the HKMA. On average, about half a million cheques are cleared every day amounting to some HKD20 billion. This is about 5% of the daily amount handled by the HKD RTGS interbank payment system.

As from January 1998, HKD cheques issued by banks in Hong Kong can be presented at banks in the Shenzhen Special Economic Zone and are delivered back to Hong Kong for clearing. Good funds can be made available to the payee in Shenzhen in the afternoon of the next business day after presentation of the cheque. Similar service has been extended to 19 cities in Guangdong Province since October 2000. However the value of such cross-border cheques cleared is minuscule compared with the daily cheque processing volume in Hong Kong.

2.3 Direct credit transfers

Most credit transfers are standing order arrangements made by the originators with their bank. The payer instructs his bank to debit his account and transfer the funds to the payee. The bank then carries out the necessary transfers on a regular specific date, to a specific receiver and for a specific amount. Payroll crediting is the most common direct credit transfers.

Individual instructions are processed together with the bulk credit instructions for that day and the net obligations between banks are settled in the RTGS interbank payment system. The number of credit transfers processed by HKICL in 2000 was nearly 17 billion for a value of HKD399 billion.

2.4 Direct debit transfers

Standing direct debit instructions are commonly used by households for payment of such regular payments as utility bills and charges. In debit transfers, the payee instructs his bank to collect payment for the paying party, often on a recurring basis. Direct debit payments are pre-authorized by the paying customer, who gives permission to his bank to debit his account upon receipt of instructions initiated by the specified originator.

Similar to direct credit transfers, individual debit instructions are processed in bulk clearing by HKICL for that day and the net obligations between banks are settled in the RTGS interbank payment system. The number of credit transfers processed by HKICL in 2000 was nearly 35 billion for a value of HKD52 billion.

2.5 Payment cards

2.5.1 Credit cards

The use of credit cards has become increasingly popular in recent years. According to the HKMA's survey on major card issuers, there were over 9 million credit card accounts involving some HKD62 billion outstanding receivables as at the end of 2001. Credit cards used in Hong Kong are VISA, MasterCard, American Express, Diners and JCB.

Credit card payment involves credit provision by the card issuers to the cardholders. In a credit card transaction, the card issuer pays for the goods and services on behalf of the consumer, after charging the retailer a merchant discount fee. If a cardholder settles his account within the payment grace period offered by the card issuers (usually at least 30 days), the provision of credit is interest free. This buy-now-pay-later benefit is strikingly different from other means of retail payment, and explains why credit cards have become so popular in Hong Kong.

2.5.2 Debit cards

The use of debit cards in Hong Kong is in the form of EPS. EPS links up consumers and merchants via banks electronic systems. Payments can be made with an ATM card at any outlet that displays the EPS logo. An EPS transaction involves direct transfer of funds from the bank account of the consumer to that of the retailer at the POS using bank ATM cards. It is in principle equivalent to payment by means of a credit transfer, except that the account of the payer is debited immediately at the POS but the account of the payee will only be credited by a batch run at day end or early next day.

EPSCO acts on behalf of its 36 member banks as they do not negotiate business with the retailers on their own. EPSCO is therefore the sole merchant acquirer in the market to provide the POS terminals and payment processing services to the participating retailers. EPSCO provides services to all merchant applicants on a uniform basis regardless of their size, location and business volume. It provides the terminals for free and does not impose any minimum service charge on the participating retailers.

2.5.3 Other cards – stored value cards

Stored value cards are at present still the least significant mode of retail payment in Hong Kong but have been growing very fast in the last few years. At present, there are three kinds of stored value cards available in Hong Kong. Octopus is by far the most popular among the three, capturing an extremely large portion of the market in terms of transaction value. The other two, namely Mondex and VisaCash, share the remaining minuscule share.

Unlike credit cards and debit cards, the operation of stored value cards by definition involves prepayment of funds by the cardholders to the card issuers. The aggregate of the stored values constitutes the float and gives rise to the question of float management. Management of such floats is of prudential concern to the HKMA and the public as well. This is one of the considerations leading to the authorization of CSL as a DTC to bring it under the regulatory regime of the HKMA.

As for Mondex and VisaCash, the float amounts are relatively small, and are insignificant compared with the balance sheet of the issuing banks (HSBC Group for Mondex and VISA member banks for VisaCash), which are also under the HKMA's banking supervisory regime. In the case of Mondex, Hang Seng Bank manages all the floats (i.e. the floats arising from the cards issued by HSBC and Hang Seng Bank) as part of its pool of customer deposits. For VisaCash, each issuing member bank manages its own float from the cards that it has issued.

Octopus cards

Octopus Cards are issued by CSL, which was founded by five transport carriers in 1993. The card scheme was launched in the third quarter of 1997, when it was exempted from the definition of multi-purpose card under the Banking Ordinance because of its restricted range of services and because the risk of its use to the payment system and cardholders was considered slight.

In April 2000, CSL was authorized as a special purpose DTC under the Banking Ordinance. The authorization of CSL allows Octopus Card to be used for a wider range of uses, including those, which are non-transport related, with a view to enhance the convenience for cardholders. In the past year or so, it has been made available to retailers such as fast food

shops, convenience stores, vending machine operators, public swimming pools etc. There are also suggestions to allow Octopus cards to be used at supermarkets, post offices, and Jockey Club for payment of admission fees. Any expansion of the multi-purpose use of Octopus to non-transport service providers is subject to the conditions set down by the HKMA when it authorized CSL as a DTC.

By the end of March 2001, the number of cards in circulation reached 7.4 million, and about 6 million transactions per day were recorded. There are about 16,000 merchant terminals available to accept payments by Octopus Card.

VISA Cash

The first general multipurpose stored value card, Prime Visa Cash, jointly developed by the Bank of China, Standard Chartered Bank and Visa International, was launched on a trial basis in August 1996. The Visa Cash system is similar to electronic cheques. The issue of electronic value under the Visa Cash system merely involves a change from deposit liability to stored value liability in the balance sheet of the issuing bank (in the same way as a transfer from a savings account to a cheque account), which does not affect its level of overall liability. Payments made by the Visa Cash system are cleared through the Visa Cash clearing and administration system (in the same way as the cheque clearing system). There is no cardholder-to-cardholder transfer in the Visa Cash system (which is a major difference from Mondex, mentioned in section 2.5.3.3).

Currently, 9 banking groups in Hong Kong issue Visa Cash cards. The cards are available in two types, disposable and reloadable. The disposable card, launched in August 1996, can store a value of HKD200 (USD26) while the reloadable card, introduced in April 1997, can store up to HKD3,000 (USD385). The holders of the reloadable cards can load and unload their cards at hundreds of designated ATMs. Up to March 31, 2001, there were approximately 340,000 cards in circulation. There were about 4,500 merchant terminals in various retail outlets, including supermarkets, fast food chains, convenience stores, department stores, gasoline stations, book stores, hair salons and so on which have signed up for the scheme.

In view of changes in market conditions and product demand, VISA announced in November 2001 that the VisaCash service in Hong Kong would be rolled down within a few months.

Mondex

The Mondex system, which is more akin to banknotes, was first launched in two designated shopping malls in October 1996. The first phase rollout of Mondex took place in November 1997, and extended the Mondex service to merchandisers not in the two designated malls.

Mondex value, like banknotes, may be freely transferred between cardholders and between cardholders and merchants without going through a clearing system. Initially, the maximum amount that can be stored on a card is HKD3,000 (USD385). Currently, HSBC and Hang Seng Bank issue Mondex. Loading and reloading of Mondex value can be done by transferring monetary value from the cardholder's bank account at ATMs and bank counters. The heart of the Mondex payment scheme is the electronic purse in which monetary value is stored and which maintains a record of the last 10 transactions. Mondex electronic purses contain a four-digit "lock code". A Mondex purse can hold up to five different currencies at any one time, and in due course Mondex will permit multicurrency payments.

An “originator” originates Mondex value in the same way as the note issuing bank issues banknotes. The issue of Mondex value creates new liabilities on the part of the originator (in the same way as the issuing of banknotes creates new liabilities on the part of the note issuing bank). Member banks participating in the Mondex scheme may “purchase” Mondex value from the originator (in the same way as they would draw cash from a note issuing bank). The average value stored on the card is around a few hundred HKDs and the cards are mainly used for purchases of items of small value. Up to March 31, 2001, there were about 243,000 cards in circulation. So far, about 1,120 merchants with over 3,000 merchant terminals are available to accept payments by Mondex.

2.6 Electronic non-POS debit instructions

Three electronic non-POS debit instruction services are available in Hong Kong, namely PPS, JET payment and ETC payment. Fewer than 200 retailers in Hong Kong participate in the service networks of those three systems, and the usage so far is mainly for payment of utility bills and charges.

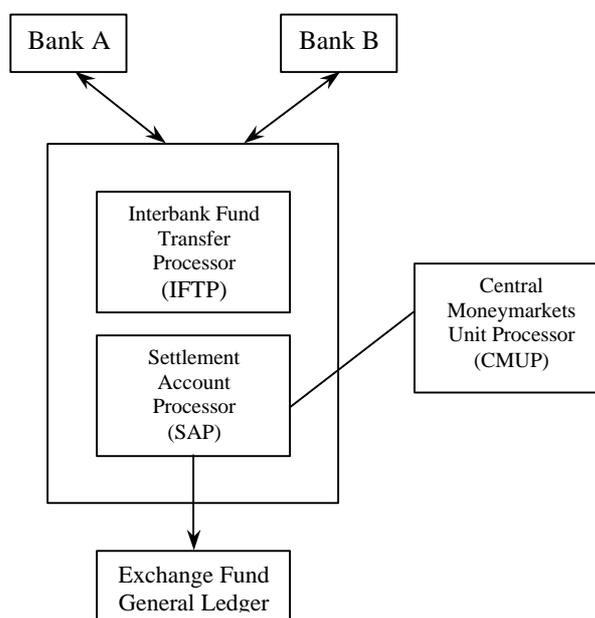
EPSCO and JETCO are the only two network providers in the market. EPSCO operates PPS, which offers payment services on phone and on the Internet, and ETC Payment, which is only available in the ETC ATMs (by using ETC ATM cards). On the other hand, JET Payment, a payment scheme operated by JETCO, is available in the JETCO ATMs (by using JETCO member banks’ ATM cards) and on the Internet as well. Consumers’ prior registration is required for using PPS while it is unnecessary for the other two payment schemes (JET payment and ETC payment).

3. Interbank settlement systems

3.1 The Real Time Gross Settlement (RTGS) System for HKD

The HKD RTGS system, which is known as HKD Clearing House Automated Transfer System (CHATS), was launched on December 9, 1996.

The design of the RTGS system is simple and robust. It uses a Y-shaped topology in the system design in which all participating banks have direct access to the system under a single-tier structure. All Settlement Account holders open and maintain HKD accounts with the HKMA and all interbank payments settled across the books of the HKMA are final and irrevocable. Payment instructions are settled immediately if there is sufficient balance in the settlement account. Banks without sufficient credit balances in their settlement accounts have their payment instructions queued in the system. Alternatively, the banks can make use of the seamless interface between the Settlement Account Processor (SAP) and the book-entry debt securities clearing system (which is known as the CMU Processor or CMUP), to sell and repurchase their EFBNs during the day in the form of intra-day repo transactions to obtain interest-free intraday liquidity from the HKMA.

Chart 1: Design of Hong Kong's RTGS System

3.1.1 Ownership

The RTGS system for HKD is owned by the HKMA.

3.1.2 Participation

All LBs in Hong Kong are required to maintain a settlement account with the HKMA. As stipulated in Section 3A(1) of the Exchange Fund Ordinance, the Financial Secretary may by notice require an AI in Hong Kong to open a settlement account with the HKMA. The account is required to be maintained and operated on the terms and conditions considered appropriate by the Financial Secretary. The Financial Secretary has delegated this power to the HKMA. The Chief Executive of the HKMA has served a Notice to all LBs requesting that they open a Settlement Account to be maintained and operated on the terms set out in the Conditions and the Operating Procedures attached to the Notice and the relevant provisions in the Clearing House Rules. In May 2000, the HKMA announced that RLBs in Hong Kong were also allowed to access the HKD CHATS, provided that they have demonstrated a business need to do so. As at the end of December 2001, there were 136 settlement accounts maintained with the HKMA.

3.1.3 Types of transactions

RTGS transactions

The name of the RTGS system for interbank transaction in Hong Kong is CHATS. HKD CHATS transactions are settled real-time on a gross basis and are across the books of the HKMA. The payments are final and irrevocable upon funds transfer across the books of the HKMA.

Clearing and Settlement of paper cheques (CLG)

This refers to paper cheques and other negotiable instruments drawn on Member Banks which are cleared through HKICL on a bulk clearing and multilateral netting basis. Paper cheques are settled on the next business days on a batch run basis. They are settled after the returned items have been identified and adjusted in order to eliminate the settlement risk related to the returned items. Cheques presented to HKICL on Day D are sorted and sent to the drawee banks overnight. The drawee banks would check for sufficient funds in the drawees' accounts and return all dishonored cheques to HKICL on the next business day (Day D+1). Only cheques presented on Day D that are not returned would be settled on day D+1.

Clearing and Settlement of electronic items (ECG)

The ECG is designed to handle low value bulk volume items, such as:

- EPS installed at POS and ATMs installed at particular bank groups. These items are generated by EPSCO and JETCO;
- fund transfers related to share transactions in the HKEx. The payment instructions are issued by CCASS; and
- autopay of other autocredit and autodebit items.

3.1.4 Operation of the system

The computer operator of the RTGS system is HKICL. The system operates from 9:00 to 17:30 from Monday to Friday and 9:00 to 12:00 on Saturday. During the above operating hours, the bank can settle their interbank level transactions. For customer-related transactions, they have to be handled before 17:00 from Monday to Friday and 11:30 on Saturday.

3.1.5 Settlement

RTGS

All RTGS transactions are settled real-time on a gross basis. When a payment has been settled across the books of the HKMA, it is regarded as final and irrevocable.

Bulk settlement

Bulk settlement is designed to handle low value bulk clearing items. All bulk clearing items are settled on the next business day and on a multilateral netting basis. Settlement occurs after any returned items have been identified and adjusted in order to eliminate settlement risk arising from returned items. Currently, the payment instructions related to stock market transactions, low-value bulk electronic payment items and cheques are settled on a bulk clearing basis at the following times –

<u>Clearing Items</u>	<u>Monday to Friday</u>	<u>Saturday</u>
CCASS (i.e. stock market transactions)	9:30	9:30
EPSCO (EPS + autocredit items)	10:00	10:00
JETCO (Joint Electronic Teller Services)	11:30	9:00
Paper cheques + autodebit items	15:00	Nil

(9:00 on Monday for Friday items)

Delivery vs. Payment (DVP)

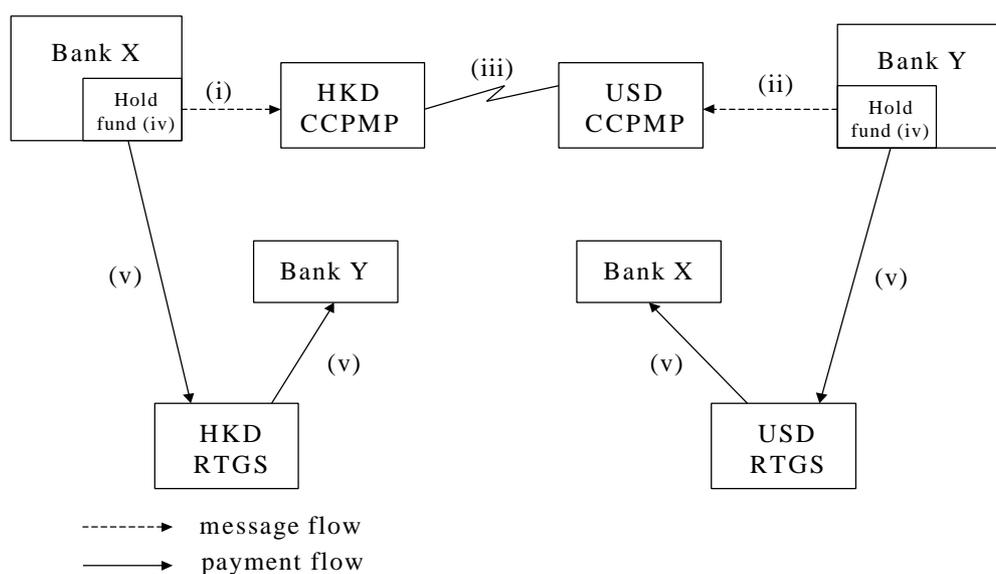
With the establishment of the seamless interface between SAP and CMUP in December 1996, the HKD RTGS system supports the real-time and end-of-day DVP facility for debt securities denominated in HKD that are lodged with the CMU. A similar seamless interface was established in May 1998 with CCASS. Market participants can make use of such linkages to arrange both real-time and end-of-day DVP facility for HKD denominated shares which are listed on SEHK.

Payment vs. Payment (PVP)

The HKD CHATS was linked with the USD CHATS (please refer to section 3.2 for information on USD clearing system in Hong Kong) in September 2000 for settlement of USD/HKD foreign exchange transactions on a PVP basis. This PVP device (which is known as the Cross Currency Payment Matching Processor, or CCPMP) is the first known electronic foreign exchange PVP mechanism which ensures that both USD and HKD legs of the USD/HKD foreign exchange transaction are settled simultaneously which enable the elimination of Herstatt risk. With PVP settlement and the consequent elimination of Herstatt risk, the application of bilateral counterparty trading limits will no longer be relevant, and interbank liquidity may therefore improve as the traded currencies are put to immediate use in the respective clearing systems.

Chart 2 depicts the HKD/USD PVP mechanism. In this example Bank X is selling HKD to Bank Y in exchange for USD. On settlement day, Bank X sends a PVP payment transaction to Bank Y (i). Bank Y also initiates a mirror PVP payment transaction (ii). The CCPMP for HKD and the CCPMP for USD will then communicate with each other and attempt to match the transaction (iii). After successful matching, the HKD RTGS system and USD RTGS system will respectively hold the HKD funding of Bank X and the USD funding of Bank Y in their own settlement accounts (iv). If both Bank X and Bank Y have sufficient funds, the two RTGS systems will transfer the funds to their respective counterparty simultaneously (v).

Chart 2: Operation Flow of PVP Settlement



3.1.6 Risks and risk management measures

The HKMA has introduced a number of risk management measures to ensure the smooth processing of the HKD interbank payment systems:

a) Management of liquidity: It is noted that under the RTGS environment, the availability of intra-day liquidity is a crucial element in order to reduce the chance of having payment gridlock in the system. In this regard, the HKD CHATS has built-in various system features to facilitate liquidity management for the banks. Banks are able to view the balance in their settlement accounts on a real time basis. In addition, they receive advance payment receipts of the net amounts they need to pay (or receive) for each of the four bulk clearing runs that take place during the day. Banks also receive advance notice of the aggregate value of incoming payments from other banks after 17:00 (and 11:30 on Saturdays) which allows banks to assess precisely whether they have a surplus (or a deficit) of funds for meeting their payment obligations.

b) Repo facility: Banks can arrange with the HKMA to obtain liquidity through a repo facility. Within the day, if a bank does not have sufficient balance in its settlement account to effect an outgoing payment but has sufficient EFBNs in its intraday repo account, the system can automatically trigger an intraday repo transaction to generate the required amount of credit balance to cover the shortfall. A bank with excess liquidity in its settlement account may repay the repo at any time. In any case, the intraday repo can be repurchased before the close of business day. Intraday repos that cannot be repurchased before the close of business will be rolled into overnight borrowing under the Discount Window in which interest is charged by the HKMA. Apart from the above facility, banks can also arrange overnight repos with the HKMA through the Discount Window facility if required.

c) Queuing mechanism: The HKD RTGS system is a credit-transfer system. If a bank does not have sufficient balance in its settlement account to effect payment, the transaction is queued in the system. Banks can make use of a re-sequencing function to move the selected transaction to either top or bottom of their queued payments. The queuing mechanism allows the banks to manage their own queues of payment instructions through cancellation, re-sequencing and amendments.

d) Monitoring: To ensure the smooth processing of the payment system, the HKMA closely monitors the payment condition of each bank on a real-time basis. The position of each bank, as well as each transaction detail can be accessed by the HKMA.

e) Throughput guidelines: In December 1996, the HKMA issued a guideline to banks on their CHATS throughput in order to encourage banks to make payments in a timely and an orderly manner throughout the day. Each bank is required to release and settle their interbank payments whose aggregate value is not less than 35% by 12:00, and 65% by 14:30 of the value of its total CHATS payments for the day. The HKMA closely monitors banks' compliance with throughput targets and discusses with individual banks if they under-performed.

f) No overdraft: Settlement Account holders are not required to maintain a minimum amount or reserve in their settlement accounts with the HKMA. Nonetheless, the settlement accounts are not allowed to go into overdraft.

g) Confidentiality: While a bank inputs the full details of its payment instructions, including customer information, to IFTP, the instruction will be stripped so that only the settlement

instruction, i.e. information on the amount, the paying bank and the receiving bank, will be passed onto the SAP.

h) Liquidity Adjustment Window (LAW) facility: LAW is a contingent liquidity facility which allows banks to obtain intraday liquidity from the HKMA through repurchase agreements (repos) of qualified eligible securities lodged with the CMU other than EFBNs. LAW is devised for the purpose of helping banks to settle time-critical bulk clearing obligations.

3.1.7 Pricing policies

All expenses incurred by HKICL in providing, managing and operating the Clearing House and the Clearing Facilities are borne by HKICL, which in turn recovers the expenses through charging the banks fees for use of the clearing facilities. The fees to be charged by HKICL require the approval by its Board of Directors.

3.1.8 Governance

All banks are required to strictly adhere to the Rules as stipulated in the HKD Clearing House Rules. In addition, all participants of the HKD CHATS are required to comply with the terms and conditions in the account opening form and other documents as specified by the HKMA and HKICL.

3.2 The Real Time Gross Settlement (RTGS) System for USD

The USD RTGS system in Hong Kong, which is known as USD CHATS, was launched on August 21, 2000.

The purpose of the USD clearing system is to provide efficient settlement of USD transactions during Asian business hours. USD is the single most widely used currency for the denomination of world trade in merchandise and financial products. Given Hong Kong's role as an international financial center, and the fact that HKD is linked to the USD, there is extensive holding of USD and a considerable trade in USD denominated assets. These activities suggest that there is a business case for introducing improved mechanisms for settling USD payments in Hong Kong.

In the course of examining options for implementing the USD clearing system in Hong Kong, we had widely consulted the banking sector and had been in dialogue with the Federal Reserve Bank of New York. They indicated a preference that the settlement institution should be a commercial bank, and such private sector solution is consistent with the recommendation by the Bank for International Settlements. It is also noted that such practice would be in line with Hong Kong's tradition of adopting market-led solutions. After going through a vigorous selection process, the HKMA appointed HSBC to be the settlement institution for the USD clearing system in Hong Kong for a franchise period of 5 years starting from August 1, 2000.

In terms of system design, the USD CHATS is almost an exact replica of the HKD CHATS, except the following characteristics -

- The Settlement Institution (SI) for the USD CHATS is a commercial bank. In this regard, each direct participant has to open and maintain a settlement account with the USD SI and all transactions will be settled across the books of the USD SI.

- The USD CHATS adopts a two-tier membership structure in which banks can join the system as either direct participants or indirect participants. The system also accepts overseas members as long as they are approved to join the system by the HKMA and the USD SI.
- Unlike the HKD CHATS, the USD SI provides a clean intra-day overdraft facility to the direct participants in the system. Direct participants can enjoy an interest-free overdraft facility and interest-free intraday repo if they can repay HSBC's New York correspondent before the close of the New York CHIPS on that value day (i.e. 5:30 in summer, or 4:30 in winter, Hong Kong time, on Day D+1).

3.2.1 Ownership

The RTGS system for USD is owned by the HSBC. HSBC was appointed by the HKMA as the SI for a franchise period of 5 years starting from August 1, 2000.

3.2.2 Participation

The participation to USD CHATS is not mandatory. Banks are free to join the system as either direct participants or indirect participants. The system also accepts overseas members as long as they are approved to join the system by the HKMA and the USD SI.

3.2.3 Types of transactions

RTGS transactions

All USD CHATS transactions are settled real-time on a gross basis and are across the books of the USD SI. The payments are final and irrevocable upon funds transfer across the books of the USD SI.

Clearing and Settlement of paper cheques (CLG)

CLG refers to USD paper cheques and other negotiable instruments drawn on banks in Hong Kong which are cleared through HKICL on a bulk clearing basis. The establishment of a local USD cheque clearing system can reduce the settlement time to two days for those US paper cheques and other negotiable instruments drawn upon banks in Hong Kong and deposited locally. The detailed mechanics for the clearing process for USD cheques are similar to those for HKD cheques.

Clearing and Settlement of electronic items (ECG)

The ECG is designed to handle low value bulk volume items for funds transfer related to USD denominated share transactions in the HKEx. The payment instructions are issued by CCASS.

3.2.4 Operation of the System

The operator of the USD CHATS is HKICL. The system operates from 9:00 to 17:30 from Monday to Friday and does not open on Saturdays. During the above operating hours, banks can settle their interbank transactions. Customer-related transactions have to be handled before 17:00.

3.2.5 Settlement

RTGS

All RTGS transactions are settled real-time on a gross basis. When a payment is settled across the books of the USD SI, it is regarded as final and irrevocable.

Bulk settlement

Bulk settlement is designed to handle low value bulk clearing items. All bulk clearing items are settled on a next day and multilateral netting basis. They are settled after any returned items have been identified and adjusted in order to eliminate the settlement risk arising from returned items. Currently, the payment instructions for stock market transactions and cheques denominated in USD are settled on bulk clearing basis at the following schedules –

<u>Clearing Items</u>	<u>Monday to Friday</u>
CCASS (i.e. stock market transactions)	9:30
Paper cheques	15:00 (9:00 on Monday for Friday items)

Delivery vs. Payment (DVP)

In December 2000, the USD CHATS system linked up with the CMUP (i.e. the book-entry debt securities clearing system operated by the HKMA) to support real-time and end-of-day DVP facility for debt securities denominated in USD that are lodged with the CMU. A similar seamless interface was established in August 2000 with CCASS. Market participants can make use of such a linkage to arrange both real-time and end-of-day DVP facility for USD denominated shares which are traded on SEHK.

Payment vs. Payment (PVP)

The USD CHATS was linked with the HKD CHATS in September 2000 for settlement of USD/HKD foreign exchange transactions on a PVP basis. This PVP device, which is known as the CCPMP, is the first known electronic foreign exchange PVP mechanism which ensures that both USD and HKD legs of the USD/HKD foreign exchange transaction are settled simultaneously to eliminate the Herstatt risk. With PVP settlement and the consequent elimination of Herstatt risk, the application of bilateral counterparty trading limits may assume less importance, and interbank liquidity may therefore improve as the traded currencies are put to immediate use in the respective clearing systems.

3.2.6 Risks and risk management measures

Various risk management measures are instituted:

- a) Management of liquidity: Similar to the HKD CHATS, the USD CHATS has built-in various system features to facilitate liquidity management for the participating banks. Banks are able to enquire the balance in their settlement accounts on a real-time basis. In addition, they receive advance payment receipts of the net amounts they will need to pay (or receive) for each of the two bulk clearing runs take place during the day. Banks also receive advance notice of the aggregate value of incoming payments from other banks after 17:00 which

allows the banks to assess precisely whether they have surplus (or short of) funds for meeting their payment obligations.

As mentioned above, the direct participants may go into overdraft by making use of the interest-free intra-day overdraft facility provided by HSBC. When a direct participant does not have sufficient credit balance to effect their payment instructions, the bank can make use of the overdraft provided by HSBC to effect their payments to their counterparties. Banks may also arrange manual repo transactions if necessary.

b) Queuing mechanism: If a bank does not have sufficient balance in its settlement account to effect the payments, the transactions will be queued in the system. The banks can make use of the re-sequencing function to move the selected transaction to either top or bottom. The queuing mechanism allows the banks to manage their own queues of payment instructions through cancellation, resequencing and amendments.

c) Monitoring: The USD SI as well as the HKMA closely monitors the payment condition of each direct participant on a real-time basis. Through the USD SAP, the USD SI and the HKMA can access the position of each bank as well as each transaction details. The HKMA also closely oversees the performance of the USD SI. The HKMA meets regularly with the USD SI to discuss on issues which are of mutual interest and beneficial to the users in the USD clearing system.

d) Throughput guidelines: Similar to the HKD CHATS, the direct participants are required to comply with the CHATS throughput guideline in which each direct participant is required to release and settle interbank payments whose aggregate value is not less than 35% by 12:00 and 65% by 14:30 of the value of its total CHATS payments for the day.

e) Oversight by regulatory authority: As the system overseer, the HKMA meets with the SI on a regular basis to understand the operation of the system.

f) Confidentiality: While a direct participant inputs the full details of its payment instructions, including customer information, to the USD IFTP, the instruction will be stripped so that only the settlement instruction, i.e. information on the amount, the paying bank and the receiving bank, will be passed onto the USD SAP.

3.2.7 Pricing policies

The USD CHATS adopts a tier pricing structure in which frequent users will be charged less on an average basis. The fees to be charged by HKICL require the approval from the USD SI and the HKMA.

3.2.8 Governance

All direct participants are required to strictly adhere to the Rules as stipulated in the USD Clearing House Rules. In addition, all participants of the USD CHATS are required to comply with the terms and conditions in the account opening form and other documents as specified by the USD SI and HKICL.

3.3 Major projects and policies being implemented

3.3.1 *Cross-Border Joint Cheque Clearing Facility with Mainland China cities*

The HKMA reached an agreement with the Guangzhou Branch of the People's Bank of China on a joint clearing arrangement to speed up the processing of HKD cheques issued by banks in Hong Kong and presented in Guangdong province. Starting from October 1, 2000, the clearing and settling of HKD cheques issued by banks in Hong Kong and presented in Guangdong province can be reduced to two days before good funds can be credited to the payees' accounts in Guangdong. This is the second cross-boundary joint cheque clearing system with cities in Mainland China. The first one was implemented in early 1998 in Shenzhen, which has been functioning very well since its introduction.

In September 2001, the HKMA further agreed with the Guangzhou Branch of the People's Bank of China that the cross-border joint clearing facility for HKD cheques drawn upon banks in Hong Kong and presented in cities in Guangdong (including Shenzhen) be extended to cover cashier's orders and demand drafts.

To further promote and facilitate the cross-border joint clearing facility with Mainland China, the HKMA and the Guangzhou of the People's Bank of China agreed on a new Joint Clearing Facility to speed up the processing of HKD cheques issued by banks in Guangdong and presented in Hong Kong. Under the new facility, the time required for clearing those cheques will be reduced to two working days. The Joint Clearing Facility will streamline the collection and delivery of the cheques to the clearing houses in Guangdong and Shenzhen for processing.

3.3.2 *Review of retail payment services in Hong Kong*

The HKMA completed, in late 2001, a comprehensive review of retail payment services in Hong Kong, which was conducted by an internal task force of the HKMA set up in August 2000. The Review examined issues such as efficiency, pricing and costs, degree of market access, level of competition and risks associated with the various means of retail payment. It also considered what should be the appropriate regulatory approach for oversight of retail payment services in Hong Kong.

The Review has concluded that Hong Kong's retail payment systems generally function well. They are considered to be efficient and effective, and there exists a wide range of payment instruments. The payment system providers are generally innovative. With Hong Kong's open regime for operation of and participation in retail payment systems, market forces function well to meet the market needs. There are no major shortcomings in Hong Kong's retail payment systems that pose risks to the systemic stability of Hong Kong's financial system or to public confidence.

3.3.3 *Industry-wide cheque imaging and truncation*

The HKAB and HKICL are developing an industry-wide cheque imaging and truncation project targeted for launch in June 2003.

According to the design of the system, collecting banks will be divided into two groups for cheque imaging purposes: - (i) Group A banks (primarily the larger banks) which will have in-house computer hardware/software to create images of cheques for onward delivery to HKICL; and (ii) Group B banks (primarily smaller banks) which will not have this in-house

hardware/software (as it is likely not to be cost-effective in their case) and which will therefore continue to submit cheques in physical form to HKICL. HKICL will then provide imaging services to the Group B banks. HKICL will process clearing using the imaged cheques and electronic data received either directly from Group A banks or prepared by HKICL itself from the physical cheques received from Group B banks. HKICL will provide a data report and submit the cheque images to the paying banks who will check balances and other technical details and verify signatures. For cheques which are to be returned for insufficient funds, technical errors or incorrect signatures, both Group A and Group B banks will generate outward return data files, either using their own in-house facilities or HKICL's image viewing software as the case may be, and will submit the files to HKICL for return processing. HKICL will then pass this electronic data to the collecting banks. In relation to Group B banks, HKICL will also return the physical cheques which will have been retained at HKICL. All unpaid cheques physically presented to the paying banks will be physically returned, via HKICL, to the collecting banks.

Cheques will (with the exceptions referred to below) be retained and truncated at the point of image capture. Therefore, where a collecting bank is a Group A bank, the cheques will be retained by that collecting bank and, in the case of Group B banks, the original cheques will be retained by HKICL following imaging. The paying banks will receive no paper cheques during the clearing process unless either: - (a) the cheque exceeds a threshold amount agreed by the banking industry; or (b) if the collecting bank, having examined a cheque, suspects the cheque to be counterfeit or forged. In these situations, physical presentation of the cheque itself will still be required for security and crime prevention reasons.

For risk management purposes, a system will be instituted for sample checking of the cheques which are proposed to be truncated. To assist paying banks with signature verification from the cheque images, appropriate consideration will be given in the selection of processing equipment and elsewhere to ensuring high quality images. A program will also be devised with a view to ensuring that the cheque imaging process and the cheque images are reliable and secure. The program will be applicable to both Group A banks and HKICL. HKICL will appoint a consultancy firm to design the program. Both HKICL and Group A banks will appoint either internal or external auditors to certify their imaging systems in accordance with the program. Certification will be carried out every three years or sooner on an "as needed" basis.

The banking industry as represented by the HKAB are in favor of cheque imaging and truncation because cheque processing costs and storage costs (currently required for paper cheques) will, in the longer term, be reduced; the efficiency of cheque processing will be increased, as imaged cheques are easy to process, transfer and retrieve.

3.3.4 *EUR and JPY clearing systems in Hong Kong*

As the USD clearing system in Hong Kong is well received by the financial industry, the HKMA is exploring the possibility of introducing other foreign currency clearing systems in Hong Kong (e.g. EUR and JPY). In November 2001, the HKMA conducted a survey covering all banks in Hong Kong to estimate the possible usage of EUR and JPY clearing systems in Hong Kong. The results confirm that there is business demand to support developing the EUR and JPY clearing systems in Hong Kong. With the introduction of additional payment systems, it is envisaged that the clearing and settlement services provided by Hong Kong would be more comprehensive.

4. Securities settlement systems

Securities traded in Hong Kong consist mainly of EFBNs, private debt securities, and equity securities. These transactions are cleared and settled through two distinctive clearing systems:

- The CMU operated by the HKMA, which is a central securities depository providing computerized clearing and settlement facilities for EFBNs and other over-the-counter (OTC) private debt securities denominated in both HKD and non-HKD.
- CCASS operated by the HKEx, which acts as the central securities depository for exchange-traded equity securities.

4.1 Exchange Fund Bills and Notes and other debt securities

4.1.1 Trading

Market overview

The value of HKD debt instruments outstanding at the end of 2000 was HKD473 billion, compared with HKD444 billion at the end of 1999. New debt issuance in 2000 registered an increase of 9% over 1999, reaching HKD456 billion. Issuance of private sector debt was buttressed by increased activities by multilateral development banks (MDBs), non-MDB overseas entities, and AIs, which grew by 22%, 66% and 13% respectively. Local corporate issues, however, declined by about 33%, reflecting a shift to bank financing.

Trading systems

OTC market: The EFBNs and private debt securities are mainly traded in the OTC market where majority of market player are banks.

Exchange Market: In August 1999, EFBNs was listed on SEHK. Retail investors can trade EFBNs through SEHK. Currently, SEHK is using a trading system called “Automatic Order Matching and Execution System” (AMS). Similar to equities transactions, the AMS trading platform allows brokers to conduct automated trades and direct business transactions, dealing either as a principal or on behalf of a customer, on the Stock Exchange. Once a trade is concluded, the transaction details will be recorded in AMS and passed to CCASS for settlement. The mechanism developed for EFBNs has paved the way for the listing and trading of HKD bonds issued by government-owned corporations, such as the Hong Kong Mortgage Corporation Limited.

4.1.2 Pre-settlement

Trade matching and confirmation

The CMU provides two types of trade matching services for CMU Participants. Participants who have installed CMU User Terminal (CMT) can use the “Single Input and Confirmation” method to match their transfer instructions with their counterparties. Another matching service of “Matching at Centre” is also available for all CMU Participants.

“Single Input and Confirmation” is performed in sequence as follows:

- Sellers input trade details in their own CMTs.

- Unconfirmed transactions are sent to buyers' CMTs by the system.
- Buyers check the details of the unconfirmed transactions. They can either confirm or reject the transactions.
- Once the buyers confirm the transactions, the transactions become matched transaction.

“Matching at Centre” is performed in sequence as follows:

- Transfer instructions of both buyers and sellers send to the CMU by means other than CMT, such as SWIFT, or authenticated facsimile/ telex.
- At the cutoff time of settlement date, transfer instructions are matched centrally in the CMU.

If instructions do not match, for “Single Input and Confirmation” method, new transactions can be initiated by the sellers again. As for the “Matching at Centre” method, both seller and buyer are informed of the mismatch. Both seller and buyer have to amend the transfer instructions and send them again to the CMU. At the end of the day, all unmatched instructions are automatically deleted by the system.

Clearing house

The CMU is not a central counter-party of securities transactions and does not guarantee settlement.

4.1.3 Settlement

All debt instruments cleared through the CMU are either immobilized or dematerialized, and transfer of title is effected in computer book entry form.

The CMU service offers two types of settlement mode: 1) Delivery vs. Payment (DVP) and 2) Free of Payment (FOP). Through the seamless interface with the HKD and USD RTGS system, the CMU provides real time DVP settlement for its members. Members, which are direct participants of the HKD or USD RTGS system, can settle the transaction directly through their cash clearing account with the Settlement Institution. For those not participating in the RTGS system as direct participant, they have to appoint a settlement bank to effect their payment arising from the securities transaction.

For real time settlement, it is settled on a gross basis. The real time window opens at 9:00 till 15:00. Unsettled transactions are automatically converted into end-of-day transactions, which are settled on a multilateral netting basis. The end-of-day settlement run starts at 15:30 and completed before 16:00.

Settlement cycle

For OTC trades, the settlement cycle could be as short as T+0. For Exchange traded transactions, the settlement cycle is T+2.

Central Securities Depository (CSD)

The CMU acts as the CSD for EFBNs and provides members the following core facilities:

- A front-end system that allows users to transmit trade instructions, make enquiries and provide various levels of confirmation;
- A safe custody service for EFBNs and private sector debt securities;
- A collateral management system;
- A securities lending and borrowing program;
- A bilateral linkage system with the ICSDs such as Euroclear and Clearstream and CSDs in the region such as Austraclear in Australia, AclNZ in New Zealand and Korea Securities Depository in Korea.
- A tender allocation process that automates the processing of tendering;
- Interest payments and redemption processing through a link with the RTGS payment systems;
- Payment Agent services.

There are two types of membership:

a) **Recognized Dealers (RDs) and Market Makers (MMs):** In Hong Kong, a two-tier dealership scheme was set up when the EFBN Programmes were implemented. A number of RDs and MMs in EFBNs were appointed by the HKMA. In return for certain privileges, the RDs and MMs are obliged to support, with different degree of commitments, the development of the EFBN market. RDs are to participate actively in the primary market and to promote EFBNs in retail market. MMs, appointed from the pool of RDs, have the added responsibility of maintaining secondary market liquidity. Only the RDs and MMs are eligible to settle EFBNs through the CMU.

b) **CMU Members:** Those who can fulfil the following membership criteria can join the CMU as CMU Member to settle and clear private sector debt securities:-

- AIs in Hong Kong
- Members of the Hong Kong Capital Markets Association

At the end of December 2000, there are 203 CMU Members and 179 RDs/MMs. The rights and obligations of RDs/MMs and CMU Members using the CMU service are set out in the “Appointment Letter of Recognized Dealer/Market Maker” and “CMU Membership Agreement” respectively.

CMU Participants are required to maintain separate accounts for their own holdings and clients’ holdings. A client with substantial holdings may request the CMU Member to open a specific custody account under his name.

Risk management

The CMU is not a central counterparty of securities transactions and does not guarantee settlement. Settlement of transactions will be failed if either buyers have insufficient funds or sellers have insufficient securities. These failed transactions will be automatically cancelled from the system when the CMU system closes.

Besides, the CMU does not grant any credit facilities to its members for the purpose of settling the securities transactions. For bank members, they can obtain the necessary intraday liquidity through automatic intraday repo transactions entered with the Settlement Institutions of the payment systems. Therefore, the CMU is not exposed to any credit risk to its members.

The CMU system also does not create credit exposure between CMU Members arising from settling securities transactions through the CMU because the CMU provides both real-time and end-of-day DVP facilities to its members. However, since the settlement is not guaranteed, a CMU Member may bear the replacement cost if a securities transaction fails to settle. This replacement risk can be reduced by settling the transactions on real-time DVP basis.

With regards to the disaster arrangement, the CMU has a hot backup site that is located outside the central business district. Production data is copied to the site on a real-time basis. When a major operational disruption happens prohibiting operations at the production computer Centre, the hot backup site can be activated within half an hour. There is also a detailed contingency plan that covers the processing activities relating to clearing and data processing using the remote site. The contingency plan addresses a major operational failure at the production site and a failure of a participants' CMT.

The CMU maintains a comprehensive system of internal controls and procedure. This aims to minimize the operational risk. These internal controls and procedure are subject to examination of both internal and external auditors. The internal audit is conducted on continuous basis while the external audit is conducted annually.

The Audit Commission is the external auditor of the accounts of the Government. The objective of the Audit Commission is to provide independent, professional and quality audit services to the Legislative Council and public sector organizations in order to ensure the efficient and effective use of public resources and to enhance public sector accountability in Hong Kong.

The internal auditor of the HKMA is set up with the primary objective to assist the management of the HKMA in the effective discharge of its responsibilities and functions. This is achieved through comprehensive audit coverage sufficient to assure that assets and resources of the HKMA are appropriately safeguarded and accounted for, and that established procedures and guidelines are adhered to. The internal auditor assesses and reports on the effectiveness of the financial and accounting systems as well as the management reporting system.

Payment

Payments for transactions are done through the interbank payment system either on a real-time basis (RTGS) or through a batch of direct debit and credit transactions generated by the system at day end.

For those not participating in the interbank payment system as direct participants, they have to appoint a settlement bank to effect their payments arising from the securities transactions.

4.2 Equities

4.2.1 Trading

The demutualization and merger of SEHK and HKFE and their three associated clearing houses (HKSCC, HKFE Clearing Corporation Limited and SEHK Options Clearing House Limited) took place in March 2000 following the enactment of the Exchange and Clearing Houses (Merger) Ordinance. The new integrated exchange, HKEx, was subsequently listed on its own marketplace on June 27, 2000. To avoid potential conflicts of interest, arrangements were made for the HKEx to be regulated as a listed issuer directly by the SFC.

Market overview

Main Board

As at the end of the December 2000, there were 736 companies listed on the Main Board with a total market capitalization of HKD4,795 billion.

In May 2000, SEHK introduced the Pilot Program for trading US securities. Accordingly, NASDAQ and SEHK signed an agreement on exchange of regulatory information. Seven large established securities listed on NASDAQ were quoted on SEHK initially. Regulation of the Pilot Programme's issuers lies with the primary exchange/market and they are admitted to SEHK for trading only. These Pilot Program shares are traded and settled in HKDs, via the Hong Kong trading and clearing system, following the standard Hong Kong T+2 settlement period.

Trading activity in equities recorded a year total of HKD2,860 billion which represented 93.9% of the total trading turnover. Of this total, HKD272 million was contributed by trading in NASDAQ PP stocks.

Growth Enterprise Market (GEM)

The GEM commenced operations on November 15, 1999 to provide capital formation facilities for growth companies that are not qualified to list on the Main Board. 47 companies were newly listed in 2000. In total, they raised HKD14.8 billion of new capital. GEM's average daily turnover value in 2000 was HKD341 million. As of the end of 2000, 54 companies were listed on the GEM with a total market value of HKD67.3 billion.

Warrant market

The total number of warrants listed on the Exchange was 291 as at the end of 2000, compared to 192 in 1999. The turnover of warrants for 2000 increased to HKD167.4 billion, representing an increase of 28.6% compared with 1999's HKD130.2 billion.

Debt securities market

Twenty new debt securities were listed in Hong Kong in 2000, compared with 87 in 1999. The total number of debt securities expanded to 240 at the end of December 2000. Trading remained inactive with a year total of HKD58.7 million.

Unit trusts and mutual funds

There were 21 unit trusts listed on the Exchange as at the end of December 2000, compared to 23 and 27 in 1999 and 1998 respectively. As a result of the successful launch of the Tracker Fund of Hong Kong (TraHK) at the end of 1999, the total trading turnover of unit trusts listed on the Exchange increased substantially to HKD20 billion in 2000 compared to HKD12.5 billion in 1999 and HKD8.8 million in 1998.

Derivatives market

The total number of contracts traded in the HKEx derivatives market increased 8.6% to 9,260,570 in 2000. The average daily volume recorded 45,713 contracts. The growth was primarily contributed by the improved performance of the stock options market, which offset the decline in index options and futures.

Trading systems

AMS is the securities trading system owned by SEHK, a subsidiary of the HKEx. AMS/3, the newest version of AMS, was launched in October 2000 to enhance trading efficiency and straight through processing.

The current trading mechanism of AMS/3 is by auto-matching based upon a price-time priority algorithm. Orders are placed by brokers into AMS/3 through either AMS/3 trading terminals or broker-supplied systems connected to AMS/3 through open gateways. Investors may place orders via the Internet or by mobile phone through an order routing system to their selected brokers.

AMS/3 is connected to CCASS through a direct computer interface. Details of all trades concluded at SEHK are electronically and automatically transmitted to CCASS for clearing and settlement.

AMS/3 supports trading of securities in foreign currencies. SEHK specifies the acceptable currencies in its Rules. The current traded currencies denomination includes HKD and USD. Currently, AMS/3 runs three sessions daily, a pre-opening session from 9:30 to 10:00, a morning session from 10:00 to 12:30 and an afternoon session from 14:30 to 16:00, Monday to Friday.

Governance

The governance of SEHK, including its trading systems, is performed by the holding company – the HKEx. The HKEx Board comprises 15 directors, of which six of them are shareholders, eight directors appointed by the Government to represent the public interest and one ex-officio member, the Chief Executive of the HKEx, who is appointed by the HKEx Board with the approval from the SFC.

Participation

Exchange Participants of SEHK can be either an individual or a corporation. To be eligible as an individual exchange participant, the applicant must be a holder of a stock exchange trading right, a registered dealer under the Securities Ordinance, not less than 21 years of age, and born in Hong Kong or have been a resident in Hong Kong for 5 years preceding the application. As to a corporate exchange participant, the applicant must be a holder of a stock

exchange trading right and a registered dealer under the Securities Ordinance and a corporation limited by shares incorporated in Hong Kong. Detailed qualifications are stipulated in the Rules of SEHK.

4.2.2 Pre-settlement

Trade confirmation

The direct interface between AMS/3 and CCASS provides automated transmission of executed trade information for clearing and settlement processing. Details of all trades concluded at SEHK are electronically and automatically transmitted to CCASS on each trading day. Broker participants are not required to input or further confirm their trade details in CCASS. Broker participants receive provisional clearing statements of their stock and money positions through their CCASS terminals after 18:00 on the trading day for reconciliation. Final clearing statements are available to broker participants after 14:00 on the next business day for confirmation purposes.

Clearing house

CCASS clearing services determine the stock and money obligations of participants to a securities transaction to deliver or receive either cash or securities. CCASS also provides settlement services under which securities are credited or debited to participants' CCASS stock accounts and funds are recorded in the participants' money ledgers on settlement day.

Transactions are classified into two categories---Exchange trades (trades in eligible securities executed on the Stock Exchange) and non-Exchange trades (such as settlement instruction, clearing agency transactions and investor settlement instruction).

Exchange Trades: Continuous Net Settlement (CNS) and Isolated Trades Systems

CNS system

Exchange trades are settled under CNS system on a netting basis, unless isolated for settlement under the isolated trades system by the broker participants at the time of the transaction or by HKSCC for risk management purposes.

Under CNS system, HKSCC becomes the settlement counterparty to both the buying and selling broker through novation. The single market contract between the broker participants is novated into two market contracts, one between the selling broker and HKSCC; and the other between the buying broker and HKSCC. Acting as the settlement counterparty, HKSCC provides a form of settlement guarantee.

The stock transactions of a broker participant in the same security and on the same day are offset against each other, resulting in a single net stock position for the day. Any outstanding unsettled net stock positions of a broker participant at the end of a settlement day are carried forward to the next settlement day and continuously netted against any opposite stock positions due for settlement in the same security.

Isolated trades system

Isolated trades are settled on a trade for trade basis. HKSCC does not substitute itself as the settlement counterparty to isolated trades. The Company facilitates but does not guarantee settlement.

Non-Exchange Trades: Settlement Instruction (SI) , Clearing Agency Transactions and Investor Settlement Instruction (ISI)

SI Transactions

SIs facilitate broker-custodian transactions, stock borrowing and lending, stock pledging and portfolio movements. Settlement of SI transactions is conducted on a trade for trade basis. Input of SIs is required from both participants to effect settlement.

Clearing is effected by CCASS daily automatic batch matching of the details from two corresponding SIs, including the participants' identities, the settlement date, stock code, quantity and if applicable, the amount of payment. HKSCC facilitates but does not guarantee settlement of SI transactions.

ISI transactions

For transactions between investor participants and broker or custodian participants to be settled in CCASS, the broker or custodian participants must input ISIs, containing the relevant details required by HKSCC, into CCASS.

ISI transactions may include investor-intermediary transactions, stock borrowing and lending transactions, stock pledging transactions and portfolio movement.

Governance

The governance of HKSCC including its CCASS system is performed by the holding company – the HKEx. The HKEx Board comprises 15 directors, of which six of them are shareholders, eight directors appointed by the Government to represent the public interest and one ex-officio member, the Chief Executive of the HKEx, who is appointed by the HKEx Board with the approval from the SFC.

Participation

There are six categories of CCASS participants. They include:

1. Broker Participants (They must be exchange participants of SEHK and registered dealers under the Securities Ordinance.)
2. Custodian Participants (They must be an AI under the Banking Ordinance, or a trust company registered under the Trustee Ordinance, or registered dealers under the Securities Ordinance but not exchange participants of SEHK.)
3. Investor Participants (They must be individuals aged 18 or above, holding a Hong Kong identity card and not an undischarged bankrupt or be subject to any legal incapacity.)

4. Stock Lender Participants (They must have an established stock lending business in Hong Kong in securities listed on SEHK or that they have the financial and operational capacity to establish and operate a stock lending business in Hong Kong and have available a sufficient quantity of securities listed on the Exchange for lending.)

5. Stock Pledgee Participants (They must be an AI under the Banking Ordinance or a licensed money lender under the Money Lenders Ordinance and have an established business in Hong Kong of lending money to CCASS participants against the security of securities listed on SEHK, or otherwise have the financial and operational capacity to establish and operate such a business in Hong Kong.)

6. Clearing Agency Participants (They must be a body recognized and regulated in Hong Kong by the SFC or other similar regulatory organization or, in an overseas jurisdiction, by a governmental body or securities regulatory agency or an equivalent authority in respect of its business in operating a central securities clearing and settlement system and/or a central securities depository system or similar systems.)

All exchange participants of SEHK must become CCASS broker participants by virtue of the rules of SEHK.

Risk Management

HKSCC takes the following measures to manage its risk exposures:

a) Putting securities for which payment has not been confirmed on hold in the settlement process:-

All Exchange trades are due for settlement on the second trading day following the transaction (i.e. T+2). On T+2, HKSCC collects shares from the accounts of broker participants with net short stock positions and allocates shares to the accounts of broker participants with net long stock positions under the CNS. Money ledgers of participants would also be updated simultaneously. Money settlement by broker participants through their designated banks is generally confirmed in the morning on T+3.

Securities for which payment has not been confirmed are put on hold on T+2 and broker participants are not allowed to use or withdraw them. However, a broker participant can make a cash prepayment to HKSCC, or provide it with a bank guarantee, in order to have immediate delivery of the securities.

b) Unsettled positions are marked to market:-

As a central counterparty to the CNS trades, HKSCC is exposed to market risk as a result of unfavorable fluctuations of prices of the unsettled stock positions. HKSCC evaluates such risk by reference to the difference between the market value of the stock position and the original contract value. The difference is collected from broker participants in the form of marks, which reflects the level of risk expressed in money terms. All open positions are marked to market daily at the end of the day. Broker participants have to pay net unfavorable marks in cash or by using stock as collateral to HKSCC. The marking to market and collection of net unfavorable marks help to confine HKSCC's market risk to a single day's market fluctuations.

In addition, an intra-day marking to market on all open positions is performed at 11 daily. Broker participants are required to pay the intra-day marks if they are in excess of certain limit before 14:00.

c) Integrated surveillance system:

HKSCC has a real time surveillance system to monitor the trading activities and open positions of broker participants in order to examine their exposure to risk relative to their financial resources. Broker participants' positions are compared with their liquid capital and examined as to their degree of diversification in trading.

Moreover, broker participants will be selected for investigation if, for example, they have material open positions concentrated in a few stocks, trade beyond an acceptable level or have a sudden surge in turnover.

HKSCC has been working closely with the SFC and would inform each other promptly of any unusual trading and settlement activities, and broker participants with financial problems.

d) Collateral:

HKSCC may require broker participants to put up collateral if their financial strength is in question, or their pattern of trading is creating excessive risk. The amount of collateral is decided by taking into account the level of the broker participants' contributions to the Guarantee Fund and the clearinghouse's exposure to risk as central counterparty under the CNS system.

e) Guarantee Fund:

A Guarantee Fund is in place to cover risks resulting from losses incurred as a result of guaranteeing the trades of broker participants who become insolvent and the liabilities of HKSCC for defective eligible securities. The Fund will only be drawn on as a last resort.

The Fund is made up of contributions from broker participants, transfer from HKSCC's reserves and insurance cover. Broker participants contribute in proportion to their average daily positions for the previous month, subject to a minimum of HKD50,000 in cash for every trading right held in SEHK, with the balance in cash or bank guarantees. The amount of contribution is reviewed monthly and the size of the Fund is reviewed at least once a year.

Novation and role of central counterparty

For CNS trades, HKSCC becomes the central counterparty to both the buying and selling broker through a novation process, which takes place at the end of each trading day. The single market contract between the broker participants is novated into two market contracts, one between the selling broker and HKSCC and the other between the buying broker and HKSCC. Being the central counterparty, HKSCC provides settlement guarantee to the novated contracts.

STP capability

The direct interface between AMS/3 and CCASS provides an automated transmission of executed trade information for clearing and settlement processing.

4.2.3 Settlement

Settlement cycle

All Exchange trades are required to be settled on T+2. SI transactions are settled on the settlement day stipulated by both participants. Securities settlement is effected either by scheduled daily batch settlement runs or immediately on-line by the input of Delivery Instructions (DIs). Provided that there are sufficient stocks in the stock account of the delivering participants, settlement of ISIs will be immediately effected on the settlement day specified by the broker or custodian participants once the investor participants make the affirmation. Otherwise, the ISI transactions will be settled by multiple batch settlement-runs or the input of DIs.

Both methods enable CCASS to effect electronic book-entries to participants' stock accounts. During each batch settlement run, delivering participants' stock accounts are debited and the stock accounts of receiving participants' are credited; delivering participants may choose, or be requested by counterparties, to settle a position or transaction on-line by initiating DIs. Each DI takes immediate effect upon input, if there is sufficient stock balance available in the delivering participant's stock clearing account.

On-line enquiries on settled or unsettled positions are available to broker and custodian participants through CCASS terminals and to investor participants via CCASS phone system or the Internet to help them monitor their settlement activities.

Central Securities Depository (CSD)

Central counterparty

CCASS is the central counterparty for CNS trades through novation process.

Payment (including DVP)

HKSCC provides money settlement services for all transactions settled on a DVP basis, where delivery of securities occurs only if payment occurs. Trades settled under CNS system are always on a DVP basis. For isolated trades, SI and ISI transactions, participants can choose to settle them on a DVP or FOP basis. For transactions settled on a FOP basis, participants make their money settlement outside CCASS without involving HKSCC. Participants can also elect to settle SI and ISI transactions on a Real-time Delivery Versus Payment (RDP) basis. Under RDP system, shares are delivered to the stock account of paying participant upon receipt of payment confirmation from HKICL.

Each participant establishes an account at a designated bank and authorizes HKSCC to initiate electronic instructions to debit or credit its designated bank account. Book-entry money records are generated for a participant in its money ledger with respect to its settlement and other financial obligations due to or from HKSCC. Settlement is processed through the clearing system of HKICL against participants' designated bank accounts.

Broker and custodian participants may enquire about their money obligations for settled or unsettled positions through their CCASS terminals throughout the settlement day. Investor participant can make enquiry of such information via CCASS phone system or the internet.

The money positions arising from a broker participant's trades settled under CNS system in each stock position are netted, resulting in a single net amount due to or from the participant. This is settled by direct debit or credit instruction issued by HKSCC to the designated bank of the participant at the end of the settlement day.

HKSCC acts as a facilitator for isolated trades, SI and ISI transactions settled on a DVP and RDP basis, and issues electronic payment instructions to the designated banks of the participants concerned to effect money settlement.

4.3 Major projects and policies being implemented

4.3.1 *CMU modernization and two-way link with Euroclear*

In order to develop the international business of the CMU, the existing one-way link from Euroclear to the CMU will be extended to two-way. The new link will be a real time automated link from the CMU to Euroclear, enabling investors in Hong Kong and other parts of Asia to directly hold and settle Euroclear-eligible debt securities via their CMU accounts. Besides, the features of the CMU system will be modernized to cope with the changes. This new link will be completed for live operation by the end of 2002. This will not only facilitate cross border holding and trading of debt securities, but also further promote the usage of the USD clearing system by enlarging the scope of USD denominated debt securities that can be traded in the CMU.

4.3.2 *Implementation of CCASS/3*

To meet with future development, HKSCC is in process of upgrading CCASS to a new generation CCASS/3. CCASS/3 will provide efficient and dynamic clearing and settlement by adhering to international standards for securities messages and providing interactive communication with market participants through a standard-based application programming interface.

In addition to the technology upgrade, CCASS/3 will also include structural improvement in system functions. The system will support multi-market settlement, extended hours of market operation, and alternative settlement cycles. CCASS/3 will also support a common risk management system and common collateral management system for cash and derivatives markets.

The functional and technical design of CCASS/3 has been completed and development of the system is in progress. Subject to satisfactory testing, CCASS/3 is targeted to be rolled out in the second quarter of 2002.

5. Role of the HKMA

The HKMA was established on April 1, 1993 by merging the Office of the Exchange Fund with the Office of the Commissioner of Banking. The functions and objectives of the HKMA are:

- to maintain currency stability, within the framework of the linked exchange rate system, through sound management of the Exchange Fund, monetary policy operations and other means deemed necessary;

- to promote the safety and stability of the banking system through the regulation of banking business and the business of taking deposits, and the supervision of AIs; and
- to enhance the efficiency, integrity and development of the financial system, particularly payment and settlement arrangements.

These functions and objectives are generally common to central banks around the world. Unlike many other central banks, however, the HKMA does not carry out the following functions:

- Banknote Issue. This is currently undertaken by three commercial banks. They are the Hongkong and Shanghai Banking Corporation Limited, the Standard Chartered Bank and the Bank of China.
- Banker to the Government. Although the bulk of the fiscal reserves are held by the Exchange Fund, which is managed by the HKMA, the HKMA does not act as the banker to the Government, a function which has been carried out historically by commercial banks.

5.1 Provision of settlement accounts

All LBs in Hong Kong are required to maintain a settlement account with the HKMA. As stipulated in Section 3A(1) of the Exchange Fund Ordinance, the Financial Secretary may by notice require an AI in Hong Kong to open a settlement account with the HKMA. The account has to be maintained and operated on the terms and conditions that the Financial Secretary considers appropriate. The Financial Secretary has delegated this power to the HKMA. The Chief Executive will serve a Notice to all licensed banks to request them to open a Settlement Account which will be maintained and operated on the terms set out in the Conditions and the Operating Procedures attached to the Notice and the relevant provisions in the Clearing House Rules. In May 2000, the HKMA announced that the restricted licensed banks (RLBs) in Hong Kong were also allowed to access the HKD CHATS, provided that they have demonstrated a business need to do so.

5.2 Operation of payment systems

The operator of all RTGS systems in Hong Kong is HKICL, a company jointly owned by the HKMA and the HKAB (see section 3).

5.3 Operation of securities settlement systems

The CMU is a business unit of the HKMA specializing in the clearing and settlement of debt securities. The HKMA assumes no role in the settlement for equity securities (see section 4).

5.4 Oversight

The oversight of all interbank payment systems, including the CMU, is performed by the HKMA.

5.5 Other roles

The HKMA plays an active role in the development of new payment systems with a view to minimizing, and even eliminating, the settlement risk.

Hong Kong

STATISTICAL TABLES

Hong Kong

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (mid-year, in thousands)	6,435.5	6,489.3	6,543.7	6,606.5	6,665.0
GDP (HKD billions)	1,191.9	1,323.9	1,259.3	1,227.7	1,267.2
GDP per capita (HKD)	185,206	204,007	192,446	185,826	190,124
Exchange rate vis-à-vis USD:					
<i>year-end</i>	7.736	7.746	7.746	7.771	7.796
<i>average</i>	7.734	7.742	7.745	7.758	7.791

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	HKD billions 2000
Banknotes and coins on issue	76.5	80.6	81.2	99.5	91.8
Transferable deposits ¹⁾	121.8	107.5	97.1	105.8	112.2
Other	nap.	nap.	nap.	nap.	nap.
Narrow money supply (M1) ²⁾	198.3	188.1	178.3	205.3	204.0
<i>Memorandum items:</i>					
Broad money supply (M3) ³⁾	1,520.5	1,670.4	1,826.2	1,923.0	1,999.2
Transferable deposits in foreign currencies	19.1	20.0	19.4	19.8	39.9
Outstanding value on e-money schemes	nap.	nap.	nap.	nap.	nap.
of which:					
<i>on card-based products</i>	nap.	nap.	nap.	nap.	nap.
<i>on network-based products</i>	nap.	nap.	nap.	nap.	nap.

¹⁾ Customers' demand deposits placed with licensed banks.

²⁾ Sum of notes and coins held by the public plus customers' demand deposits with licensed banks.

³⁾ Sum of M1 + customers' savings and time deposits with licensed banks + negotiable certificate of deposits (NCDs) issued by licensed banks held outside the banking sector + customer deposits with restricted license banks (RLBs) and deposit-taking companies (DTCs) + NCDs issued by RLBs and DTCs held outside the banking sector.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	HKD billions 2000
Transferable balances held at central bank ¹⁾	0.5	0.3	2.5	8.0	0.7
of which:					
<i>required reserves</i>	nap.	nap.	nap.	nap.	nap.
<i>free reserves</i>	nap.	nap.	nap.	nap.	nap.
Transferable deposits held at other banks	nap.	nap.	nap.	nap.	nap.
<i>Memorandum item:</i>					
Institutions' borrowing from central bank ²⁾	0	0	2.7	0.6	9.6

¹⁾ Closing balance of the aggregate balance of settlement accounts.

²⁾ Discount window activities.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches ¹⁾	Number of accounts (thousands)	Value of accounts (HKD millions)
Central bank ²⁾	1	1	151	669
Licensed banks ³⁾	154	1,608	nav.	604,782
Restricted licence banks ⁴⁾	48	71	nav.	nav.
Deposit-taking companies ⁴⁾	61	131	nav.	nav.
Total	264	1,811	nav.	605,451
of which:				
<i>virtual institutions</i>	0	0	0	0
Branches of foreign banks				
<i>licensed banks</i>	123	567	nav.	nav.
<i>restricted licence banks</i>	20	20	nav.	nav.

¹⁾ Including the main office of the institution.²⁾ The HKMA has two overseas representative offices (London and New York).³⁾ Demand and saving deposits only.⁴⁾ Under Hong Kong's three-tier banking system, restricted licence banks and deposit-taking companies do not offer demand and saving deposits accounts.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	thousands 2000
CHATS ¹⁾					
-HKD ²⁾	2,927	3,322	3,156	3,151	3,410
-USD ³⁾	nav.	nav.	nav.	nav.	185
of which USD/HKD PVP ⁴⁾	nav.	nav.	nav.	nav.	2
Cheques					
-HKD	140,823	149,850	135,815	134,115	138,571
-USD ⁵⁾	nav.	nav.	nav.	nav.	1
ECG ⁶⁾					
-HKD	43,358	49,483	50,721	52,589	57,134
-USD	nav.	nav.	nav.	nav.	neg.
Total					
-HKD	187,108	202,655	189,692	189,855	199,114
-USD	nav.	nav.	nav.	nav.	186

¹⁾ CHATS is the acronym for Clearing House Automated Transfer System. It is a computer-based system designed for HKD inter-bank payments under the Real Time Gross Settlement System (RTGS).²⁾ RTGS was introduced for HKD interbank payments on December 9, 1996, with the HKMA as the settlement institution. Before the inception of RTGS, reported figures refer to the value of transaction in the account of the management bank of the Clearing House with the Exchange Fund.³⁾ CHATS for USD was introduced on August 21, 2000, following the launch of the US dollar RTGS system in HK.⁴⁾ Payment versus Payment (PvP) for settling USD/HKD foreign exchange transactions went live on September 25, 2000.⁵⁾ USD cheque clearing was introduced on December 18, 2000. Figures are December 18 to 31, 2000.⁶⁾ ECG means the various types of electronic payments to be cleared and settled through the Clearing House on a bulk clearing basis.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	HKD billions 2000
CHATS ¹⁾					
-HKD ²⁾	61,521	86,318	75,758	75,283	90,983
-USD ³⁾	nav.	nav.	nav.	nav.	1,888
of which USD/HKD PVP ⁴⁾	nav.	nav.	nav.	nav.	667
Cheques					
-HKD	12,563	12,288	5,890	5,348	6,092
-USD ⁵⁾	nav.	nav.	nav.	nav.	neg.
ECG ⁶⁾					
-HKD	4,673	8,685	6,330	5,528	8,608
-USD	nav.	nav.	nav.	nav.	26
Total					
-HKD	78,757	107,291	87,979	86,160	105,683
-USD	nav.	nav.	nav.	nav.	1,915

¹⁾ CHATS is the acronym for Clearing House Automated Transfer System. It is a computer-based system designed for HKD interbank payments under the Real Time Gross Settlement System (RTGS).

²⁾ RTGS was introduced for HKD interbank payments on 9 December 1996, with the HKMA as the settlement institution. Before the inception of RTGS, reported figures refer to the value of transaction in the account of the management bank of the Clearing House with the Exchange Fund.

³⁾ CHATS for USD was introduced on August 21, 2000, following the launch of the US dollar RTGS system in HK.

⁴⁾ Payment versus Payment (PVP) for settling USD/HKD foreign exchange transactions went live on September 25, 2000.

⁵⁾ USD cheque clearing was introduced on December 18, 2000. Figures are December 18 to 31, 2000.

⁶⁾ ECG means the various types of electronic payments to be cleared and settled through the Clearing House on a bulk clearing basis.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions

Instruments	1996	1997	1998	1999	millions 2000
Cheques	140.8	149.9	135.8	134.1	138.6
Payments by debit card	nav.	nav.	nav.	nav.	nav.
Payments by credit card	nav.	nav.	nav.	nav.	nav.
Credit transfers ¹⁾	nav.	13.5	14.8	15.5	16.6
Direct debits ²⁾	nav.	31.7	32.7	33.5	35.2
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Auto-credit instructions handled by the Clearing House.

²⁾ Auto-debit instructions handled by the Clearing House.

Table 8

Indicators of use of various cashless payment instruments: value of transactions

Instruments	1996	1997	1998	1999	HKD billions 2000
Cheques	12,563	12,288	5,890	5,348	6,092
Payments by debit card	nav.	nav.	nav.	nav.	nav.
Payments by credit card	nav.	nav.	nav.	nav.	nav.
Credit transfers ¹⁾	nav.	294	315	343	399
Direct debits ²⁾	nav.	47	49	48	52
Total	12,563	12,629	6,254	5,738	6,542

¹⁾ Auto-credit instructions handled by the Clearing House.

²⁾ Auto-debit instructions handled by the Clearing House.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	1996	1997	1998	1999	2000	thousands
CMU	nav.	63	32	47	52	
CCASS ¹⁾	15,731	40,048	22,116	28,564	45,170	

¹⁾ Exchange trades processed in CCASS.

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	1996	1997	1998	1999	2000	HKD billions
CMU	4,133	4,022	2,273	4,080	5,930	
CCASS ¹⁾	5,495	11,697	7,301	6,716	10,886	

¹⁾ Exchange trades processed in CCASS.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
Number of participants in the CMU					
a) Recognised dealers	224	224	204	188	179
of which:					
<i>Banks</i> ¹⁾	222	222	201	180	170
<i>Others</i>	2	2	3	8	9
b) CMU member	259	260	243	217	203
of which:					
<i>Banks</i> ¹⁾	243	242	225	200	187
<i>Others</i>	16	18	18	17	16
Number of participants in CCASS	556	568	564	563	570
of which:					
<i>Banks</i>	63	63	61	60	58
<i>Securities companies</i> ²⁾	493	505	503	503	512

¹⁾ Including licensed banks, restricted licence banks, and deposit-taking companies.

²⁾ Including broker, stock pledgee and clearing agency.

PAYMENT SYSTEMS IN INDONESIA

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Overview

Payment transfers in Indonesia are characterized by broad use of two different systems. One is operated by the commercial banks, and another is operated by the postal services administration (PT. Pos Indonesia). The commercial banks and PT. Pos Indonesia cooperate on transfers between the two systems but in other respects these two systems operate separately.

Paper-based instruments have hitherto predominated in the payment system. However, electronic services, especially for large value payments, are becoming very important with the introduction of Bank Indonesia RTGS system (BI-RTGS) in November 2000. Funds were traditionally transferred (e.g. for the payment of bills and other payments) by means of paper-based transfers, but increasing use is now being made of paperless electronic transactions. The use of EFTPOS payments are increasing at shopping centers and other retail outlets, and ATM withdrawals are replacing withdrawals at bank counters.

Low value fund transfers are mainly cleared by the clearing houses usually owned by Bank Indonesia (hereinafter called BI or Bank Indonesia alternately), with settlement across accounts at BI. Large-value transactions have to be channeled through the new BI-RTGS system.

1. Institutional aspects

1.1. Legal and regulatory framework

The principal pieces of legislation governing the Indonesian payment systems are the commercial code and the Central Bank Act of 1999. The commercial code sets out the rules governing specific payment instruments like cheques, promissory notes, bankers' acceptance etc. Whilst, the Central Bank Act No 23 Year 1999 puts the foundation for interbank clearing and settlement systems, the Act is also supplemented by Bank Indonesia decrees covering various aspects of payment systems.

Indonesian law referring to payments specifies the requirement for paper documents and evidence. For instance, the prevailing law on proof of transactions requires all interbank transfer instructions to be originated in paper instruments. Even though there is a law on company archives which states that financial documents may be stored in paperless form, the lack of a fund transfer act regulating paperless forms of payments forces the operation of interbank electronic (paperless) fund transfer system to base itself on contract law.

At present, there is no specific bank regulation directed at monitoring systems related to money laundering activities. However, at the request of authorized government agencies, Bank Indonesia may block a customer account in commercial bank, which might be associated with money laundering, such as corruptions. In addition, through its regulations, Bank Indonesia insists that commercial banks know their customers well.

Significant efforts to improve the current legal framework of the payment system are underway. These include plans to set up the draft Act of fund transfers and sound legal basis for payment systems, including providing for paperless payment services. One step that has been taken prior to the reporting period has been the enactment of the Capital Market Law of 1995, which incorporates provisions providing for paperless trading in the capital market.

1.2. Institutions

1.2.1 Providers for payment services

Institutions that provide payment services in Indonesia can be grouped into banks and other related institutions. Features of institutions involved in the national payment systems are as follows:

Bank Indonesia and commercial banks

The Indonesian banking system consists of Bank Indonesia (BI) as the central bank of Indonesia, commercial banks and rural banks. Nevertheless, only the first two institutions provide payment services.

At present, BI is the main provider of interbank clearing and settlement facilities. The system has electronic, automated, semi automated, and manual components. In towns where there is no BI branch, an office of a commercial bank having operation in the area becomes the clearing agent. BI provides settlement services to the commercial banks and payment services to the central and regional government through their accounts with BI. All BI offices are connected to an on-line fund transfer system.

The commercial banks are the largest group of financial institutions in Indonesia providing payment services, either through their accounts with BI, through bilateral correspondence, or through their own intra-bank on-line funds transfer networks. At present, only the major commercial banks have on-line intra-office fund transfer facilities. There are now 164 commercial banks with 5,379 offices.

Meanwhile, rural banks, even though they are a part of the Indonesian banking system, currently do not provide any interbank payment service to their customers. Even if some of them do provide these services, the volume and value is very small, and currently it is done outside clearing systems. By the prevailing law, these rural banks are not allowed to maintain customer cheque accounts and they are not allowed to open settlement accounts with BI. There are more than 8,000 rural credit banks and most of them operate locally. Their banking activities are normally limited to certain areas, although some rural banks have started opening branches in nearby cities.

Other payment system related institutions

Following financial liberalization, Non-Bank Financial Institutions (NBFI's) play an important role as a source of finance but at present they undertake very limited activities related to payment services. NBFI's include finance companies, insurance companies, pension funds, and pawnshops. Finance companies provide funds or capital goods and operate in leasing, consumer finance, factoring, and venture capital. Under current regulation, NBFI's may issue credit cards, and several have done so.

Activities of PT. POS Indonesia include providing payment services, namely "Giro Book" for credit remittances and tax collection. The remittance service is a self-contained system, which is separated from the banking system. PT. POS Indonesia maintains accounts at more than twenty commercial banks. In addition, since September 1995, PT. POS Indonesia has an agency relationship with Bank Negara Indonesia (BNI), a state-owned commercial bank, to deliver a new saving program through BNI's branches. Value transfer from PT. POS

Indonesia to the banking system is done by PT. POS Indonesia head office through its accounts maintained at commercial banks.

1.2.2 Providers for securities services

Based on the Finance Minister Decree of 1990, clearing and settlement of stock exchange transactions is done by PT. Kliring Deposit Efek Indonesia (PT. KDEI) and supervised by the Capital Market Supervisory Agency (BAPEPAM). PT. KDEI which has split into two entities namely PT. KPEI (Kliring Penjaminan Efek Indonesia or Indonesian Clearing and Guarantee Cooperation) and PT. KSEI (Kustodian Sentral Efek Indonesia or Indonesian Central Securities Depository) have the authority to regulate the clearing and settlement activities of securities transactions. Fund settlement of the stock exchange transaction is done through 3 commercial banks with which the brokerage companies maintain settlement accounts.

2. Payment methods

2.1. Cash payment

The Indonesian currency is Rupiah consisting of coins and bank notes. Bank Indonesia has the sole right to issue currency and coins. Notes are in circulation in denominations of IDR 100, 500, 1,000, 5,000, 10,000, 20,000, 50,000 and 100,000, while coins are issued in circulation in denominations of IDR 25, 50, 100, 500 and 1,000. Notes and coins in circulation reached IDR 72,371 billion in 2000, showing an increase of 19% compared with the figure in 1999.

2.2. Non-cash payment

Non-cash payments in Indonesia are mostly provided by the banking system. Commercial banks offer a variety of accounts (cheque, savings, time deposit, etc.) to their customers, while rural banks may offer only savings accounts. Most mediums to large commercial banks provide ATM access to saving accounts. Electronic direct credit and direct debit transfers are solely available for intra bank transactions. Payments using cards (debit and credit, ATM, and POS) are gaining larger popularity.

2.2.1 Credit transfer

Banks provide a variety of credit remittance services within their branch networks, including standing orders and electronic remittances. Interbank transfers over IDR 1 billion and other urgent interbank fund transfers are now settled through Bank Indonesia – Real-Time Gross Settlement System (BI-RTGS).

Fund transfers for bank customers may be made by banks via:

- intra bank electronic transfer;
- the paper based clearing system, for local transactions;
- correspondent bank networks, for cross-regional transfer; and
- RTGS system both for local and cross-regional transfers

In the area of clearing system in particular, Bank Indonesia also made certain improvements. In the city where there is no Bank Indonesia office, Bank Indonesia has delegated more authority to the local clearing agent to make important decisions in their respective local clearing areas, such as approving new membership.

2.2.2 *Cheque*

It is a common banking practice in Indonesia for banks to offer cheque account facilities. BI has a strict rule regarding dishonored cheques. If three small amount cheques are dishonored within six months period, or one check for a large amount, the customer is “blacklisted” and prohibited from holding a cheque account at any bank for a period of one year.

2.2.3 *Direct debits*

Usage of direct debits is still limited to intra bank usage. With the still lack of an interbank giro system, utility companies are forced to make banking arrangements with commercial banks for the purpose of bill payment collection.

2.2.4 *Payment cards*

A wide range of payment cards has emerged in the local market, including international credit and debit cards, ATM and Point-of-Sale (POS) debit cards, a number of private label cards (e.g. Supermarket cards) and some integrated circuit cards (smart card or chip card).

Credit cards and travel and entertainment cards

Major credit card brands such as VISA, Master, AMEX, and Diners are common and widely accepted especially in big cities of Indonesia. Card operations are generally provided by licensed banks, with VISA, Master and JCB being prominent along with private-label cards. American Express (AMEX) and Diners operate as non-bank under license from the Ministry of Finance. Certain banks also issue proprietary credit cards. The use of credit cards have grown very fast: 40% in year 2000, and 72% in year 1999. Approximately there are more than 35,000 merchant outlets accepting credit cards in Indonesia. There are about 2.73 million card holders in 2000 with total charges amounting to 37.3 million transactions in volume and total value of IDR 13,621 billion.

Debit and ATM cards

ATM services were introduced in the early 1990s. Since then the services have grown significantly from 171.8 million ATM transactions in 1998 to 474.9 million ATM transactions in 2000. Nevertheless, compared to the Indonesian population, the use of ATMs is still insignificant, averaging at 0.23% transaction per person per year in 2000. Five domestic shared ATM networks (ALTO, ATM BERSAMA, CAKRA, FLASH and BCA) and two international shared ATM Networks (CIRRUS and PLUS) exist now. These shared ATM networks are not yet linked to each other, forcing some banks to become members of more than one networks. ATM cards are used not only for withdrawals and account balance enquiries, but also to transfer fund to other accounts within the same bank, paying utilities such as telephone bills, credit card bills, etc.

Debit card at Point of Sale (EFTPOS) is getting more popular, again mostly in Jakarta and other big cities. Some banks are issuing debit cards under the Maestro and Visa Electron program. Other banks are issuing proprietary cards with a current proliferation of terminals

at the merchant site. The lack of business agreements between various parties seems a major obstacle to achieving a “one terminal per counter” vision, although shortcomings in common transaction switching infrastructure undoubtedly also contribute. There are now nine banks offering debit card facility to their customers. In 2000, there are about 12.1 million card holders with 19.4 million transactions and total amount reaches about IDR 4.7 billion.

Smart cards

Several banks have small smart card systems operating ATM or POS. Other banks plan to launch smart card products in the near future.

The Indonesian telecommunication company (PT. TELKOM) has for years issued magnetic prepaid (token) cards for use in public telephones, which are widely used in Indonesia. PT. TELKOM and a private company have formed a partnership and launched smart card style (protected memory) telephone cards.

2.2.5 *Postal instruments*

One particular significance with respect to the non-bank sector is the Giro service offered by Post Office (PT Pos Indonesia). PT Pos Indonesia issues a “Giro Book” for credit remittances, and provides a domestic and international money order service. Money orders are generally used to remit funds to individual persons who do not hold any bank account.

PT. Pos Indonesia also provides Postal Cheque account facilities to firms and individuals. Cheque accounts are used mostly by public institutions for collecting various types of tax, government employee payroll and retirement, utilities payments, and other individual payment transactions. PT. Pos Indonesia also issued Postal Traveler’s Cheque.

3. *Interbank settlement systems*

There are two interbank payment systems in Indonesia: interbank system for retail transaction and that for large value payments. Most cashless retail payments are executed by commercial banks using several instruments: cheques and bilyet giro (a paper instrument which is similar to cheque but can not be cashed out), transfer instruments (credit notes), and banker’s acceptance (bank draft).

Cheque and other non-cash paper-based payments are settled through clearing houses that are operated either directly by Bank Indonesia or by other commercial banks, granted the permission to do so by Bank Indonesia. All clearing houses use deferred multilateral net settlement method. On the other hand, ATM, EFT POS and credit card and other source of payments, like bilateral interbank remittance, are settled bilaterally, either bilateral net or gross.

Bank Indonesia Clearing System consists of 102 paper-based clearing house, of which 38 are directly operated by Bank Indonesia offices, and 64 by appointed commercial banks. The clearing system settles at the end of the day (same day settlement).

Unlike retail payments that are settled on net basis, BI-RTGS that has been implemented on November 17, 2000, processes and settles all interbank large value transactions

electronically on a gross basis. Currently, BI-RTGS accounts for around 90% of the total value of exchange payments nationwide.

Table 1: Interbank Payment System in Indonesia

Payment Type	Transfer System		Settlement at	
	System	Settlement Type	BI	Commercial Banks
Large Value Payments	BI-RTGS	Real Time Gross	BI-RTGS	-
Paper-based Retail Payments in Jakarta Cheques (and Bilyet Giro); Credit Note; Debit Note; WBUT; and SBPT	Jakarta Electronic Clearing system	Net	BI-RTGS	-
Paper-based Retail payments outside Jakarta	BI-Branch Clearing Systems	Net	Local accounting system at BI branches	-
Credit Card/Shared ATM	ATM Bersama,	Bilateral Net or gross	BI-RTGS, either directly or through netting scheme at Jakarta Electronic Clearing System	-
	ALTO, CAKRA, FLASH, ATM BCA	-	-	Commercial banks
Funds leg of Equities transactions	PT KSEI and its settlement banks	Net (T+4) and gross for Trade For Trade	-	3 appointed Commercial Banks

3.1 Bank Indonesia Real Time Gross Settlement (BI-RTGS)

The development of RTGS system in Indonesia was encouraged by the growing awareness of the need for managing systemic risks in large value funds transfer system. BI-RTGS provides speed, reliability and certainty in sending and receiving funds, which is an important feature to help facilitate the Indonesian financial industry recovery. For Bank Indonesia the system is very important in reducing payment system risks. In addition, the RTGS system can also be a source of accurate information for both bank supervision activities and the implementation of monetary policy.

3.1.1 Ownership

The BI-RTGS computer system is fully operated and governed by Bank Indonesia.

3.1.2 Participant in the system

Currently only commercial banks are participating in BI-RTGS and all banks operating in Jakarta have become RTGS members since the first implementation day. By November 2000, 123 banks have already participated in the system and would be followed by other banks when the regions outside Jakarta are linked to BI-RTGS.

3.1.3 Types of transaction handled

BI-RTGS allows banks to send credit transfer and requires all of them to have sufficient funds in their settlement accounts at Bank Indonesia (no money no game). If there is not enough funds in the account of the sending bank, transaction will be queued, and at every specified period of time gridlock detection and resolution will take place.

BI-RTGS system settles various types of transaction on a real time basis, such as inter-bank money market, rupiah leg of foreign exchange transactions, payment to government accounts with BI, transactions for depositing or withdrawing cash from Bank Indonesia, and transaction between bank customers.

3.1.4 Operation of system

Table 2: Window Time of BI-RTGS

No.	Activities	Window Time (Jakarta time)
1.	System Opening of RTGS Central Computer	6:30
2.	Operating time of BI-RTGS	
	a. Cash withdrawals	6:30 – 12:00
	b. Tax payment to government accounts	6:30 – 10:00
	c. Fund transfers on behalf of customer	6:30 – 16:30
	d. Interbank funds transfers	6:30 – 17:00
	e. Clearing interface	12:00 – 17:00
3.	Cut Off Warning	17:00
4.	Interbank Cover Position	17:00 – 18:00
5.	Pre Cut Off	18:00
6.	Bank Indonesia Cover Position	18:00 – 19:00
7.	Settlement for Intervention Window	18:00 – 19:00
8.	Cut Off Time	19:00

The daily value of BI-RTGS is around IDR 43 trillion (approximately USD 4.3 billion), with daily volume averaging at 3,200 transactions.

3.1.5 Settlement procedures

All transactions received at Bank Indonesia's RTGS central computer are executed in a real time basis as long as there are enough funds at the sending bank's settlement account. Settlement is considered final and irrevocable. The balances are updated by incoming and outgoing payments flowing in and out of the system.

The planned expansion of the BI-RTGS system to the regional offices of Bank Indonesia will bring about a centralized settlement account of commercial banks. With the integration, all commercial bank accounts currently residing in every Bank Indonesia regional office will be merged into one account residing in one location, which can be accessed by the participants which are located in various area in Indonesia.

3.1.6 Management of risk

The safety and public confidence of the banking system relies on the underlying good management of all the operational and financial components of the banking system. If settlement is deferred through the use of netting arrangements, then the identification of any bank level liquidity or credit risk is also deferred. During any such deferral, risks can be compounded and their resultant size may become greater than the resources and management capabilities of any one institution – apart from Central Bank – which would then be required to meet these risks. To reduce the risk in the clearing system, all credit transfers valued at a minimum of IDR 1 billion (equivalent to approximately USD 100,000) created by banks in Jakarta may not be processed through netting mechanism. These payments have to be processed in a real-time basis. Despite the minimum threshold, BI-RTGS system does not preset system minimum value. Therefore, it is possible for banks to send even lower value payments via the system if deemed urgent by the banks. Currently several banks have utilized BI-RTGS for this purpose.

On the other hand, with the implementation of BI-RTGS, a maximum per-transaction cap has been implemented in the clearing system. Therefore, no interbank transfer valued at IDR 1 billion or more can flow through the netting system.

To avoid gridlock in the system, BI provides an intra-day liquidity support, namely Intra-day Liquidity Facility (FLI). The FLI is given based on assessment of collateral owned by a bank requesting the FLI at T-1. The collateral of the FLI is Bank Indonesia Certificate (SBI), an instrument issued and used by Bank Indonesia in Open Market Operation mainly for monetary contraction, and/or Government Bonds.. Both instruments are administered in the Book Entry Registry at Bank Indonesia Head Office.

Other features such as queuing system and gridlock resolution mechanism have been put in place with the sole objective to avoid gridlock in the system. The participants have also understood the importance of gridlock avoidance and put in place a BI-RTGS bye-laws and regulations specifying certain interbank payment code of conduct for the purpose of avoiding gridlock.

The BI-RTGS system has been audited by an independent international security auditor to ensure its security. Bank Indonesia makes it a policy to have the system re-tested at least once every year.

Overall BI-RTGS has largely complied with the core principals for systemically important payment systems.

3.1.7 *Technical aspects*

Technical item	Description
1. Connection between the system and participant	CPU to CPU connection
2. Message format	Proprietary message format
3. Application Layer	Proprietary
4. Presentation and layers	Message oriented proprietary
5. Transmission layers	SNA (LU6.2)
6. Network layers	SNA
7. Data-link layers	SDLC
8. Physical layers	Leased line
9. Back up system at primary site	Hot standby
10. Back up system at back site	Hot standby
11. Time it takes to switch over from the production system to the backup system/site	Instantly/hour
12. Average online availability for last year (2000)	99.94%

3.1.8 *Pricing policies*

At this moment, BI has not used pricing policies to encourage the banks to use more of BI-RTGS system in place of other, more risky system, or to encourage the banks to send their transactions as early as possible. The system, however, is equipped with 8 slots of times ready to be used for different time-based pricing.

3.1.9 *Governance*

In order to ensure uniformity of interbank practices for interbank payments among BI-RTGS member banks, member banks have developed a set of interbank bye-laws and regulations. Member banks, when effecting payment through the BI-RTGS system, have to conform to the bye laws. The bye-laws was created by all banking association consisting of HIMBARA (Himpunan Bank Pemerintah or State Bank Association), PERBANAS (Persatuan Bank Swasta Nasional or Private National Bank association), Foreign Bank Association, Joint Venture Bank Association and ASBANDA (Asosiasi Bank Daerah or Regional Bank Association). Recently, as a follow up of the Bye Laws and Regulations, the banking associations have formed a Committee (Bye-Laws Committee) to resolve disputes and/or problems that may arise between BI-RTGS member banks with respect to RTGS transaction, and/or to resolve non-compliance actions of any bank. Furthermore, the committee is also responsible to make, repeal and/or amend the Bye-Laws and Regulation rules.

3.2 **Clearing systems**

There are currently many clearing houses in existence in Indonesia. The technologies applied among the clearing houses are varied from electronic to manual. Among all, the Jakarta Electronic Clearing System is the largest in terms of participants, volume and value of transactions. In Surabaya and Medan, there are automated clearing systems equipped with reader sorters, in other BI offices and several other towns where clearing is conducted by commercial banks, local clearing are done by manually sorting the paper instruments, while

the data from each participating bank is submitted, calculated, and distributed in the form of diskettes.

The net value cleared (calculated from the end-of-day net positions) throughout Indonesia (including Jakarta) before RTGS system was implemented (data till November 27, 2000) has been IDR 7.3 trillion daily (approximately USD 730 million). The volume cleared during the year is 75.1 million clearing transactions. After the implementation of BI-RTGS a significant portion of clearing value is shifted to BI-RTGS. The clearing system is based on end-of-day deferred net settlement.

Bank Indonesia is currently absorbing the risks arising from the inability of any bank to settle its net position. However, if at the end of the day a bank account with BI has gone overdraft due to lack of funds to settle its clearing position, and the overdraft is not squared until 9:00 Jakarta time next day, Bank Indonesia will suspend the bank from all clearing houses in Indonesia. Such bank can only resume its clearing operation after the bank supervision department of Bank Indonesia gives an approval for this bank to re-participate.

3.2.1 Ownership

Bank Indonesia fully governed all clearing systems and fully operates 38 out of the 102 operations throughout Indonesia. Meanwhile, commercial banks that are appointed, or that have been granted the approval, to become clearing agent own their computer system and Bank Indonesia supplies them with clearing system application.

3.2.2 Participants in the system

There are two different participations in the clearing system, i.e., direct participant and indirect participant. Direct participant sends and receives payments on its own behalf, while indirect participants can only send and receive payments via direct participants. Please note that the term “participants” refers to bank offices (i.e. branch and sub-branch of a bank). A direct participant can only send and receive payments on behalf of indirect participant from the same bank.

The number of participants in the clearing system in year 2000 fell to 1,973 participants from 2,178 in 1999. This drop was due to bank closures and mergers.

3.2.3 Types of transaction and volume handled

Paper-based instruments settled through the clearing system are “Nota Kredit” (inter-bank credit transfer or credit note) and several forms of debit instruments, such as “Cek” (cheque), “Bilyet Giro”, “Nota Debit” (debit note), “Wesel Bank Untuk Transfer (WBUT)”, and “Surat Bukti Penerimaan Transfer (SBPT)”.

Nota Kredit or Credit Note, is a document used to transfer funds from the submitting bank for the benefit of a receiving bank or the receiving bank’s customer.

Cheque is a debit instrument that follows international standard of cheque use and practice.

Bilyet Giro is a non-negotiable debit instrument, which is very similar in nature to cheque. The main differences are that bilyet giro can not be cashed by its holder and that it can be post dated.

Nota Debit or Debit Note is a document submitted by a bank for the purpose of collection from another bank. Since 1998 the value of interbank debit note has been limited to IDR 10 million (equivalent to USD 1,000)

WBUT is a bank draft issued by a bank for the purpose of funds transfer.

SBPT is a receipt of funds transfer, that is received by a non-account holder beneficiary from a commercial bank, which acts as an agent for a certain sending bank. The said beneficiary may submit the receipt to any bank of his choice, either his or her own bank or any other bank, for collection. This collection is channeled through clearing mechanism.

The two last clearing instruments (WBUT and SBPT) are no longer used in the business activity. Practically, only Credit Note, Cheque, Bilyet Giro and Debit Note that are cleared everyday.

Debit items (Cheque, Bilyet Giro and Debit Note) accounted for the biggest share of clearing volume (54.6%), while credit items accounted for 45.5% of clearing volume. Bilyet Giro is the most popular debit instrument with its share amounts to 48.2% of total items, followed by checks (6.1%). This shows that other debit instruments were rarely or have never been used anymore.

All these documents had to be expressed in Rupiah currency with 100% face value and had to have matured by the time of clearing.

The volume and value processed in all clearing houses in year 2000 are increasing parallel with the growth of the economic activity. As of year 2000, a total of approximately 35,650,000 clearing items amounting up to IDR 6,222 trillion in Jakarta and a total of 38,057,000 clearing items amounting up to IDR 1,082 trillion outside Jakarta were processed.

3.2.4 Operation of system

In the SKEJ (Sistem Kliring Elektronik Jakarta or Jakarta Electronic Clearing System), clearing mechanism is managed by Bank Indonesia through an electronic network. This system enables the clearing process to operate faster, more accurately, and with greater security. Transfer of information and processing of clearing notes, clearing data, and settlements take place at a relatively fast rate. The system also ensures greater accuracy in processing information while minimizing the risk of unprocessed clearing notes and providing faster access to information on clearing output.

SKEJ has two major components: the central clearing computer at the clearing house site and electronic clearing terminals for each participant. The two components are linked through dedicated communication lines.

Currently, all participating banks still have to also submit the papers, such as cheque, bilyet giro and credit note, as proofs of payments, which are processed in the reading and sorting machines.

3.2.5 Settlement

Bank Indonesia clearing system is settled on a multilateral net basis at end of same day (T+0). An “early warning” of net settlement position is produced by Bank Indonesia clearing system after all inputs have been initially processed – at approximately 15:30 –

16:00 in Jakarta and at 12:30 in small centers. Settlement is done at the end-of-day (deferred net settlement).

The clearing-house interfaces the clearing figures to the BI-Branch Accounting System for posting to banks' settlement account. However, in Jakarta, since the implementation of RTGS system, the Jakarta clearing figures are interfaced directly to RTGS Central Computer.

When the branches of Bank Indonesia is linked to BI-RTGS system, the settlement of clearing positions will have to be done directly to the RTGS system.

3.2.6 *Risks and risk management*

The design and operation of the clearing systems in Indonesia are based primarily on end of day settlement. In the absence of a single settlement account of each commercial bank (at this moment each bank has to maintain one account in each of the 38 BI offices throughout Indonesia), the settlement of clearing figures is done locally by interfacing the figures to the Bank Indonesia branch local accounting system. With this kind of mechanism, it is very normal that a particular settlement account in certain branch faces shortfalls or surpluses. Any bank that faces shortfalls in its account in a certain office of Bank Indonesia shall be able to cover it by either requesting a transfer from its other offices or to engage in the local interbank money market. The settlement of this money market transaction is effected through the paper clearing system in the relevant Bank Indonesia branch.

Currently, there is no failure-to-settle arrangement, and no collateral imposed on the participating banks. However, to avoid credit or liquidity risk, recently Bank Indonesia introduced clearing suspension policy. The enactment of the provision on suspension from the clearing system is intended to minimize payment system risks. This is achieved by restricting the obligations of Bank Indonesia to absorb the risks emerging from unsettled inter-bank transactions.

This clearing suspension policy is in line with the provisions in law No. 23 of 1999 that restricts credit extension by Bank Indonesia to the banking sector. Banks that at the end of the day fail to settle their inter-bank obligations, will be suspended from participation in the clearing process if, by the next morning working day (at 9:00) they do not return the overdraft provided by Bank Indonesia to settle their clearing obligations.

3.3 Major projects and policies being implemented

3.3.1 *Centralized Settlement Account*

After the implementation of the BI-RTGS system in its head office, Bank Indonesia will start linking Bank Indonesia branch offices to the system. The integration of the BI-RTGS system in Bank Indonesia head office and its branch offices will bring about a centralized settlement account, in which all commercial bank accounts currently residing in each Bank Indonesia branch office will be merged into one account residing in one location, which can be accessed from any point in Indonesia.

The merging of all accounts into one account per bank will benefit both Bank Indonesia and participating banks. It will help Bank Indonesia in conducting its task in monitoring commercial banks' compliance with the minimum reserve requirement. The combining of accounts will also be useful as an early warning tool to monitor if a bank has liquidity

problems. The participants, on the other side, benefit from the account merging in a way that it will help the banks manage their liquidity in their offices all over Indonesia.

The linking of Bank Indonesia branches with the BI-RTGS system will be done gradually, 12 to be linked in year 2001, another 12 to 15 in 2002, and by year 2003 all branches will be fully linked.

3.3.2 *Straight Through Process (STP)*

To increase efficiency at the participant level, and to enable bank to send more lower value payments through BI-RTGS system, Bank Indonesia plans to develop BI-RTGS STP capability, with planned implementation in year 2002.

3.3.3 *Intercity clearing*

Currently all clearing centers can only process local clearing items, leaving out-of-station items to be processed and collected by commercial banks through their own internal networks or through correspondent banks. Consequently, since it operates outside the clearing system, there is a lack of certainty as to when the funds will be received indefinitely by the beneficiary.

Intercity clearing project shall minimize the uncertainty, and give more confidence to the use of inter-regional cashless payments and payment system as a whole.

3.3.4 *Interbank giro*

The lack of an interbank giro system, which shall provide the economy with a mechanism to make bulk payments, either for the purpose of collection of bill payments or for credit transfers such as salary, dividends and coupons, causes an inefficiency in the marketplace. Utility companies and other companies requiring collection of their bills are pushed to make various arrangements with different commercial banks, forcing them to adopt and create different standards as well as develop expensive network. Employees of large corporations are pushed to open accounts in the same bank where the employers hold accounts.

The interbank giro project shall minimize the discrepancies and provide optimum efficiency and level-playing field to all commercial banks.

3.3.5 *Assessment of Systemically Important Payment Systems*

As the Core Principles For Systemically Important Payment Systems have been developed by the Bank for International Settlement, Bank Indonesia intends to assess carefully all Systemically Important Payment Systems in Indonesia. The result of the assessment shall give a clearer direction to Bank Indonesia on how to improve the national payment system in general, and systemically important payment system in particular.

3.3.6 Failure to settle scheme

The national payment system should be designed and operated to settle as often as possible each financial day in the interests of minimizing payment systems related credit risks and liquidity risks. Outstanding unsettled payment system risks should be observed, monitored, managed and minimized with all clearing arrangements which do not settle on an RTGS basis requiring sure and binding failure-to-settle arrangements.

Failure to settle arrangements should encourage the management and removal of payment system risks with the aim of ensuring that payment participants – and not Bank Indonesia – bear the costs of failure of a bank to settle its payment obligation. Bank Indonesia will initiate the set up of a failure to settle arrangements for the deferred net settlement systems that are operated by Bank Indonesia.

The first step is to study various schemes of failure to settle mechanism, and second step will be obtaining commitment from the payment participants. The scheme shall be implemented by the year 2003.

4. Securities settlement systems

4.1. Government bonds

Government Bonds are issued to overcome government budget deficit incurred in financing national development, including the cost of the government's financial participation in the Commercial Banks as part of the national program to restructure and revitalize the banking sector. Although these bonds were originally issued to the recapitalized banks, selected series are now available for purchase by the public.

Bank Indonesia has been given the responsibility to maintain the register of owners of the Government Bonds since February 2000 when the first bonds were traded. The Government Bonds are issued based on Government Regulation Number 84 of 1998 concerning the Bank Recapitalization Program, Presidential Decree Number 55 of 1998 concerning Domestic Borrowing in the form of Debt Instruments, and Republic of Indonesia Minister of Finance Decree Number 183/KK.017/1999 dated May 28, 1999 concerning the issuance of Debt Instruments in the context of the Banking Sector Recapitalization and Revitalization Program, as amended by Minister of Finance Decree Number 564/KMK.017/1999 dated December 24, 1999.

4.1.1 Trading

Market overview

There are three types of Government Bonds, i.e., Fixed Rate Bonds (FRB), Variable Rate Bonds (VRB), and Hedge Bonds (HB)/Indexed Bonds. FRB are bonds with a fixed interest rate and maturities up to ten years. Coupons are payable semi annually. VRB are bonds with a floating interest rate and maturities from three to ten years, with the coupon rate being set every three months. HB are bonds pegged to the US dollar exchange rate, the purpose of which is to cover the exchange rate risk of recapitalized bank's liabilities. Not all of the government bonds issued by the government can be traded in the market. Selected series of government bonds are now available for purchase by the public, and can be traded in the bond's market. The government bonds that are not eligible for transferring includes:

government bonds that are classified as non-tradable and government bonds held in recapitalized bank as “investment portfolio”.

As at end of December 2000, the government has issued IDR 430.4 trillion bonds, an increase of 52.7 % compared to previous issue of IDR 281.8 trillion as of December 1999 (see table 11).

Government bond’s trading has increased significantly. Compared to when the bonds were firstly traded in the secondary market (February 1, 2000), the volume of trading (daily average) in year 2000 increased from IDR 285.7 millions in February 1, 2000 to IDR 230,488.8 millions in December 31, 2000

Trading systems

The rights and obligations of participants are set out inter alia in the following documents:

- a. The Capital Markets Act 1995 No.8.
- b. Decree of The Minister of Finance concerning the Recapitalization Bonds No. 183/KMK.017/1999.
- c. Bank Indonesia Regulation No.2/2/PBI/2000 regarding the Administration and Trading of Government Bonds.
- d. Bank Indonesia Circular Letter No.3/24/DPM regarding the Administration of Government Bonds.
- e. Bank Indonesia Circular Letter No.2/2/DPM regarding the Appointment of Sub-Registries.

The regulations allow the following 5 types of participants to maintain securities registration account in Book Entry Registry, which are:

- a. Bank Indonesia
- b. Banks
- c. Market Makers
- d. Sub-Registries
- e. Other parties appointed by Bank Indonesia

All government bonds settlement are scripless. Bank Indonesia has established a two-tier system of administration consisting of the Central Registry and the Sub-Registries. Much of the day-to-day administration is undertaken by the Sub-Registries. Bank Indonesia administers the repayment of the principal of the bonds on maturity.

The trading of the government bonds is performed in two ways. Firstly, the government bonds are traded in primary market. Secondly, the recapitalized banks as the first owner of the government bonds can sell the bonds to domestic or foreign investor in the secondary market. Furthermore, the bonds can be bought and sold in the secondary market between the second investor and other investor.

Sellers and buyers can also trade over the counter (OTC), where prices (bid and offer), payment, settlement and other information are determined among themselves. In OTC market, only the ownership transfer has to be notified to the Central Registry.

There is no limitation on ownership, either for residents or non-residents of Indonesia. The bonds may therefore be held by banks, pension funds, foundation companies and general public, either individual or institutions.

4.1.2 Pre-settlement

Trade confirmation

All bondholders are registered in the Bank Indonesia System for Clearing, Registration and Information for Government Bonds (BI-SKRIP). All bonds issue are scripless, and transfer of bond's ownership will be registered in the Book Entry Register system.

After completing deal transaction with buyer, the seller submits the Securities Transfer Form (SPPR) to the Sub-Registry that the seller has appointed. The buyer, if not a bank, submits a Request for Payment (SPPP) to his/her bank and the bank will forward the customer's SPPP to the Central Registry.

The Central Registry matches the SPPP and the SPPR and also checks if sufficient securities are available for settlement in the seller's securities account through Book Entry Registry (BER) system. If the SPPP and the SPPR matched, and securities are available, the BER system will automatically send a payment message to the BI-RTGS terminal (that is located at the Central Registry).

The instructions (SPPR and SPPP) are sent to the Central Registry between 8:00 and 16:00 Jakarta time every working day.

Clearing house

Government bonds are settled on a gross basis by Bank Indonesia as the Central Registry. The BER system currently run by Bank Indonesia is not linked on-line to the market participants. It is in the plan of Bank Indonesia to replace the existing BER with more sophisticated system, linked on line to all market participants and seamlessly to BI-RTGS system to provide DVP.

STP capability

Since the frequency of bond trading in the market is still relatively low and since on line link to market participants is not yet available, there is currently no urgency to implement STP within the BER system. Moreover, Bank Indonesia plans to replace the BER system and will implement the Scripless Securities Settlement System (SSSS) in year 2003.

Settlement cycle

If sufficient cash is available for settlement in the account of the buyer or the buyer's bank, the transfer will be effected in the BER system by debits and credits to the securities accounts of the participants.

The settlement of transactions is done same day (T+0) for SPPR and SPPP forwarded to the Central Registry before 14:30 Jakarta time. Instructions received after 14:30 Jakarta time will be processed during the next business day. For settled transactions, the Central Registry will send a Confirmation or Registration Statement (KPS) on the same day to the Sub-

Registries acting for the buyer and seller, and a Cash Confirmation Statement (KPT) to the banks acting for the buyer and seller.

Central Securities Depositories

Bank Indonesia as the Central Registry also acts as the Central Securities Depositories (CSD) for government bonds. For that purpose, Bank Indonesia has implemented Bank Indonesia System for Clearing, Registration, Information and Administration (BI-SKRIP). BI-SKRIP is a system for registering and settling government bonds in Indonesia. The system provides electronic registry, clearing and settlement function.

BI-SKRIP comprises a Central Registry (BER) at Bank Indonesia and a number of licensed Sub-Registries. Bank Indonesia also acts as the paying agent for coupon interest and redemption of principal on government bonds. Withholding tax is applied to interest payment, and deducted at the sub-registry, and accounted for the taxation authorities.

Central counterparty

There is no central counterparty for government bonds. If a transaction fails to settle due to either lack of funds or lack of available bonds the transaction is reversed and void. At this point there is no mechanism to ensure that every transaction will be settled.

Payment

Payments for all government bonds transactions are currently settled through BI-RTGS system or via local clearing system using cheques or credit notes. The first method is classified as DVP in the BER system, while the latter is defined as Free-of-Payments (FOP), that is, where the transfer of bonds is not matched with the payment via BI-RTGS terminal residing at the Central Registry.

Coupon payment is calculated two working days before coupon maturity date based on the outstanding of the government bonds recorded in the Central Registry. The Central Registry and Sub-Registries print confirmations specifying coupon maturity and send the printed confirmations to each Register at T-2 at the end of day. Bank Indonesia as the paying agent pays coupon when it is due by crediting each bank that holds government bonds, and crediting the current accounts of banks that have been appointed by non-bank sub-registry, non-bank market maker and others non-bank bondholders as their bankers.

When the government bonds have matured, the principal amount of each bond will be repaid to the registered bondholder whose name is registered in BI-SKRIP, and the calculation is done at the end of the second business day before maturity (T-2). Payment will be made by direct credit to the bondholder bank accounts on the date of maturity, or on the next business day, if the maturity date is not a business day. The paying agent, which is Bank Indonesia, receives instructions at any time before the payment date regarding the bank account of bondholders, which shall be credited to this effect.

4.2. Corporate bond market

4.2.1 Trading

Market overview

Transactions of corporate bonds are conducted by Securities Companies at the Securities Exchange (over-the-counter basis). Currently, all corporate bonds are traded in Bursa Efek Surabaya (BES)/the Surabaya Stock Exchange.

Trading systems

The Surabaya Stock Exchange has developed an electronic system named OTC-Fixed Income Service (OTC-FIS), that enables participants to enter, withdraw, and amend bid or sell quotations before execution of transaction. The OTC-FIS is designed not only as a trade tool, but also for information, reporting and quotation purposes.

Bonds traded in the exchange consist of listed bonds and not listed bonds. Transactions may be done in *Repo* or *Outright*.

Trading hours (Monday to Thursday):

Session I: 9:30 – 12:00

Session II: 13:30 – 17:00

Friday Trading Hours:

Session I : 9:30 – 11:30

Session II : 14:00 – 17:00

Governance

Transactions are governed under Capital Market Law No.8 Year 1995 and OTC-FIS Surabaya Stock Exchange's Convention. Besides, there is an agreement between participant and the Surabaya Stock Exchange Company on the usage of OTC-FIS computer system.

Participants

Only companies that are registered as member of the stock exchange, or banks can participate in bonds market. To become a participant, member of stock exchange, or bank has to submit a proposal letter to Jakarta Stock Exchange and or Surabaya Stock Exchange.

4.2.2 Pre settlement

Trade confirmation

Confirmation of trade has to be sent through OTC-FIS before end of day. In the case that there is no confirmation, sell/buy order will be omitted from the system after trading hours.

Clearing house

Indonesian Clearing & Guarantee Corporation (KPEI) is a limited company owned by the Jakarta Stock Exchange (90 %) and the Surabaya Stock Exchange (10 %). Established on August 5, 1996, KPEI got its license from the capital market supervisory board, BAPEPAM, on June 1, 1998.

4.2.3 Settlement

Settlement of every transaction done through OTC-FIS will take place based on agreement between seller and buyer. For immobilized corporate bonds, settlement is done according to rules and procedure governed by the Indonesia Central Securities Depository (KSEI).

4.3. Stock market

4.3.1 Trading

There are two exchanges in existence, namely the Jakarta Stock Exchange (JSX) and the Surabaya Stock Exchange (SSX).

Trading can be conducted in the exchange as well as outside the exchange (non exchange transaction). The implementation of C-BEST (Central Depository and Book Entry Settlement) as of July 2000, a book entry settlement system for stock trading, has enabled KSEI to process both exchange transactions and activities outside the exchange.

Market overview

The total volume of securities transacted on the stock exchanges increased sharply by 107% from 92.69 billion shares in 1998 to 191.43 billion shares in 1999. The value of these transactions increased by 49% from IDR 100.03 trillion in 1998 to IDR 148.98 trillion in 1999.

In 1999, the volume of transactions settled by KSEI reached 108.68 billion shares worth a total of IDR 45.95 trillion, representing an increase of 126% and 68.64% respectively, from 48.12 billion shares worth a total of IDR 77.49 trillion in 1998.

As of December 2000, the number of eligible securities was 642.08 billion units from 108 issuers. The number of warrants in C-BEST was 1.32 billion units, from 22 warrants and 25 bonds with total value of IDR 4.9 trillion.

Trading systems

Initial Public Offering (IPO)

Confirmation on number of stocks one person gets out of the number of stocks one has ordered will take place approximately one week after the offering period. In the case of oversubscription, the issuer will make a refund one week after the allotment date.

4.3.2 Pre settlement

Trade confirmation

Instructions related to exchange transaction settlement will be processed in bulk. This kind of instruction will be given by KPEI to KSEI to conduct book transfer from Exchange Member Delivering Account of Securities Delivery to Exchange Member Receiving Account of Securities Receiving.

Meanwhile, the instruction for non-exchange transaction settlement will be conducted trade-per-trade and real time basis. Incoming instruction will be validated and matched. Matched instruction will result in a transaction.

Governance

The mechanism for trading and transaction settlement for exchange transactions are obliged to adhere to the rules or operational procedure stipulated by KSEI. In contrast, non-exchange transactions are not regulated and generally constitute agreements between parties undertaking such transactions. Founded in December 1997, KSEI is a non-profit securities central depository and settlement services institution with shareholders comprising of 11 custodian banks (46 %), 31 securities companies (33.5%), 5 share registrars (5%), the Jakarta Stock Exchange and the Surabaya Stock Exchange (9%), and Indonesia Clearing and Guarantee Corporation (KPEI : 6.5%).

Participants

Market enactors who are able to open accounts in KSEI are securities companies and custodian banks. Whereas, issuers are obliged to register in the C-BEST.

Risk management and role of central counterparty

Each transaction conducted at the exchange is “locked in”, meaning that such transaction must be settled on the designated settlement date. At the end of the day, trading data are sent to KPEI for netting. In the scripless exchange transaction settlement, KPEI will guarantee and act as central counterparty to prevent settlement failure. The mechanisms called *Alternate Cash Settlement (ACS)* requires KPEI to pay cash, or combination of securities and cash, to the receiving broker at as much as 125 % of the highest market price of the securities traded in the case that seller does not have sufficient securities on its account.

To minimize risk, KPEI undertakes assessment of each member’s liquidity to decide if the member can join the clearing. Beside, each clearing member has to pay “Guarantee Fund” (“Dana Jaminan”) that is reserved for covering member’s payment obligation and “Secure Fund” (Dana Pengaman) that is allocated to maintain member’s preliminary margin.

Transaction settlement outside the exchange is conducted by transferring securities and fund accounts at KSEI. Market enactor sends OTC transaction instruction, and at the designated time the system will conduct the matching process.

Trading limit for each clearing member, which is based on COLDS (collateral deposits), is another measure applied to minimize KPEI risk as the central counterparty.

STP capability

C-BEST was developed with STP capability which allows settlement straight to exchange member’s account.

4.3.3 Settlement

Currently, share and fund are settled simultaneously to KSEI member’s account at approximately 12:00 on T+4. Compare to clearing and settlement on scrip market, on which

share is settled at the end of day of T+4 while fund is settled at T+5, it can be seen that implementation of C-BEST has brought time efficiency,

While securities settlement takes place in the C-BEST, fund settlement takes place at payment bank. Currently there are 3 payment banks appointed by KSEI, namely: ABN Amro Bank, Lippo Bank, and Bank Mandiri. Settlement for bulk transactions are held twice per day, i.e. at 7:00 to 8:30 and 12:00 to 13:00.

4.4. Major projects and policies being implemented

4.4.1 *Scriptless Securities Settlement System for government bonds*

Bank Indonesia plans to replace the existing Book Entry Register System (BER system) with a new Scriptless Securities Settlement System (SSSS) in 2003, linking it seamlessly to BI-RTGS system to provide full DVP.

4.4.2 *Scriptless Securities Settlement System for equity and private papers*

In the effort to further reduce risks in the financial system, Bank Indonesia is currently discussing with PT KSEI to link C-BEST with BI-RTGS system, to provide DVP for Equity and Private Papers.

5. The role of the central bank

As mentioned above, Bank Indonesia is Indonesia's central bank. Its activities are authorized by the Act of April 23, 1999 on Central Bank. Under the Act, the single purpose of Bank Indonesia is to achieve and maintain the value of domestic currency. To help achieve this objective, it is the responsibility of Bank Indonesia to safeguard and ensure the smooth functioning of payment systems. As far as payments are concerned, Bank Indonesia:

- Has the sole right to issue notes and coins;
- Provides settlement services for commercial banks
- Provides payment services to several central government bodies, international institutions and some other parties.
- Operates clearing houses, although such operation can also be conducted by private parties which have gained approval from Bank Indonesia.
- Has the authority to oversee all matters pertaining to payment systems in Indonesia. In conducting such function, Bank Indonesia:
 - o issues rules and standards to be adopted by payment providers and monitor their adherence to the rules and standards;
 - o issues approval for clearing operators;
 - o proposes draft Act and other regulations pertaining to fund transfers and other payment system issues to be issued by related authority, such as the parliament.
 - o interacts with financial and other industries to develop certain payment systems that will help increase national payment system efficiency and robustness.

STATISTICAL TABLES

Indonesia

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (millions)	198.205	200.233	203.123	204.950	203.025
GDP (IDR billions)	413,798	433,246	376,374	379,558	397,666
GDP per capita (IDR thousands)	2,087.7	2,163.7	1,852.9	1,894.7	1,953.9
Exchange rate vis-à-vis USD: average	2,419	8,325	8,685	7,590	10,400

Source: Central Statistical Bureau.

Table 2

Settlement media used by non-banks

	1996	1997	1998	1999	IDR billions 2000
Banknotes and coins	22,487	28,424	41,394	58,353	72,371
Transferable deposits	41,602	49,919	59,803	66,282	89,815
Narrow money supply (M1)	64,089	78,343	101,197	124,633	162,186
<i>Memorandum items:</i>					
Broad money supply (M2)	288,632	355,643	577,381	646,205	747,028
Outstanding value on e-money schemes	nav.	nav.	nav.	nav.	nav.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	IDR billions 2000
Transferable balances held at central bank	8,056	12,095	27,110	27,859	32,374
Transferable deposits held at other banks	299,261	386,777	512,662	226,492	272,956
<i>Memorandum item:</i>					
Institutions' borrowing from central bank	nav.	nav.	nav.	nav.	nav.

Table 4

Institutional framework

(end of year)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (IDR billions)
Central Bank	1	37	nav.	nav.
Commercial Banks	164	5,379	nav.	nav.
Rural Credit Banks	8,919	14,133	nav.	nav.

Table 5

Payment instructions handled by selected interbank funds transfer systems: volume of transactions

	1996	1997	1998	1999	thousands 2000
Large-Value Payment	nav. ¹⁾	nav. ¹⁾	nav. ¹⁾	319	925
Retail Payment	nav. ¹⁾	nav. ¹⁾	nav. ¹⁾	77,664	74,593
Total	107,790	111,445	86,335	78,083	75,518
Bank Indonesia Real Time Gross Settlement	0	0	0	0	81,141 ²⁾

¹⁾ The numbers were not available since the statistics did not differentiate between large and retail payments.

²⁾ Start from November 17, 2000.

Table 6

Payment instructions handled by selected interbank funds transfer systems: value of transactions ¹⁾

	1996	1997	1998	1999	IDR billions 2000
Large-Value Payment	nav. ²⁾	nav. ²⁾	nav. ²⁾	1,933,006	1,842,408
Retail Payment	nav. ²⁾	nav. ²⁾	nav. ²⁾	4,223,002	5,480,890
Total	5,694,048	6,456,452	5,521,667	5,156,008	7,323,698
Bank Indonesia Real Time Gross Settlement	0	0	0	0	1,433,025 ³⁾

¹⁾ Value after multilateral netting.

²⁾ The numbers were not available since the statistics did not differentiate between large and retail payments.

³⁾ Start from November 17, 2000.

Table 7

Indicators of the use of various cashless payment instruments

	1996	1997	1998	1999	thousands 2000
Instruments					
Credit Card	nav.	nav.	15,395	26,578	37,300
Debet Card	nav.	nav.	11,935	16,002	19,383
ATM	nav.	nav.	171,802	408,766	474,972
Total	nav.	nav.	199,132	451,346	531,655

Table 8

Indicators of the use of various cashless payment instruments: value of transactions

	1996	1997	1998	1999	IDR billions 2000
Instruments					
Credit Card	nav.	nav.	4,943	10,411	13,621
Debet Card	nav.	nav.	2,635	3,216	4,741
ATM	nav.	nav.	20,527	85,374	153,611
Total	nav.	nav.	28,105	99,001	171,973

Table 9**Transfer instructions handled by securities settlement systems: volume of transactions**

	1996	1997	1998	1999	thousands 2000
Jakarta Stock Exchange	29,531,585	76,599,172	89,620,534	178,477,608	121,840,143
Surabaya Stock Exchange	1,547,585	4,985,585	2,227,538	7,029,280	9,245,819

Table 10**Transfer instructions handled by securities settlement systems: value of transactions**

	1996	1997	1998	1999	IDR billions 2000
Jakarta Stock Exchange	75,730	121,386	99,658	147,880	88,308
Surabaya Stock Exchange	4,100	10,843	3,118	13,199	3,855

Table 11**Number of participants in securities settlement systems**

	1996	1997	1998	1999	2000
Jakarta Stock Exchange					
Surabaya Stock Exchange					Figures not available

PAYMENT SYSTEMS IN JAPAN

Japan

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List of abbreviations

ANSER	Automatic answer Network System for Electrical Request
ATM	Automated teller machine
BANCS	Banks Cash Service
BCCS	Bill and cheque clearing system
BOJ-NET	Bank of Japan Financial Network System
CAFIS	Credit and Finance Information System
CAPTAIN	Character and Pattern Telephone Access Information Network
CAT	Credit authorization terminal
CCP	Central counterparty
CMS	Cash Management Service
CP	Commercial paper
CPU	Central processing unit
CSD	Central securities depository
DDX	Digital data exchange
DNS	Designated-time net settlement
DVP	Delivery versus payment
EFTPOS	Electronic funds transfer at point of sale
FB	Firm banking
FB	Financing bill
FSA	Financial Services Agency
FXYCS*	Foreign Exchange Yen Clearing System
IC	Integrated circuit
JASDAQ	Japan Securities Dealers Association Quotations
JB Net	Japan Bond Settlement Network
JSDA	Japan Securities Dealers Association
JASDEC	Japan Securities Depository Center
JGB	Japanese government bond
LIBOR	London Interbank Offered Rate
MAC	Message authentication code
MICR	Magnetic ink character recognition
MICS	Multi Integrated Cash Service
NCL	Net credit limit

* The abbreviation of the Foreign Exchange Yen Clearing System has been changed from FEYCS to FXYCS.

OTC	Over-the-counter
PIN	Personal identification number
PTS	Proprietary trading system
RC	Relay computer
RTGS	Real-time gross settlement
SPDC	Simultaneous processing of DVP and collateralization
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TB	Treasury bill
TBA	Tokyo Bankers Association
TIFFE	Tokyo International Financial Futures Exchange
Zengin System	Zengin Data Telecommunication System

Introduction

There are four major payment systems for clearing and settling interbank payments in Japan—three clearing systems in the private sector and a funds transfer system operated by the central bank. The three clearing systems are: the Zengin Data Telecommunication System (Zengin System) which clears retail credit transfers, the Foreign Exchange Yen Clearing System (FXYCS) which clears mainly yen legs of foreign exchange transactions, and bill and cheque clearing systems (BCCSs) which clear bills and cheques collected at regional clearing houses. The BOJ-NET (Bank of Japan Financial Network System) Funds Transfer System is the central bank's funds transfer system used to settle interbank obligations including those arising from the clearing systems.

There have been notable developments in the respective payment systems. Both the Zengin System and FXYCS have introduced measures against credit and liquidity risk involved in clearing procedures, while BCCSs are formulating a plan to implement truncation of bills and cheques. The BOJ-NET introduced a new real-time gross settlement (RTGS) system in January 2001.

Different central securities depositories (CSDs) exist for different types of securities. The Bank of Japan is the CSD for Japanese government bonds (JGBs). Delivery versus payment (DVP) for JGB transactions was introduced in 1994 by connecting the BOJ-NET JGB Services with the BOJ-NET Funds Transfer System, and DVP on an RTGS basis was achieved in 2001 with the introduction of a new RTGS system. There is no CSD for other types of bonds. Instead, designated banks act as registrars, and an online network operated by the Japan Bond Settlement Network (JB Net) links investors and registrars. DVP for non-JGB bond transactions was achieved in 1998 by connecting JB Net with the BOJ-NET Funds Transfer System. The Japan Securities Depository Center (JASDEC) is the CSD for stocks, and DVP was achieved in 2001 for exchange-traded stocks. There is no CSD for commercial paper (CP), but a book-entry system is being set up under the new law concerning dematerialized CP.

Other reforms related to the settlement of securities are also under way. A uniform legal framework that allows dematerialization and online book-entry settlement of various types of securities is expected to be instituted in 2002. Steps are being taken to establish book-entry systems that function effectively under the new framework, with the aim of achieving DVP and shorter settlement cycles for all types of securities.

In retail payments, the predominance of cash for small-value payments and the practically nonexistent use of cheques by individuals are the prominent features that distinguish payment practices in Japan. Electronic funds transfers, including services such as prearranged direct debits for the payment of utility bills and direct credits for the payment of payrolls, are widely used by both firms and individuals. Credit cards are commonly used while the use of electronic money and debit cards is limited. Postal accounts and postal giro services provided by the government-run Post Office are also popular.

With regard to access channels for various retail payment services, new channels such as the Internet and mobile phones, as well as existing channels such as bank windows and automated teller machines (ATMs), are used. Convenience stores have also become popular for paying utility bills.

1. Institutional aspects

1.1 Legal and regulatory framework

1.1.1 General legal and regulatory framework

There is no uniform or comprehensive law that governs payment and securities settlement systems as a whole in Japan. Rather, various laws listed in the sub-sections below together form the legal basis for payment and securities settlement.

With regard to the regulatory framework, most of the relevant laws specify the Prime Minister as the minister in charge of a variety of matters in the financial sector. These include regulation and supervision in the payment and securities settlement areas. The Prime Minister delegates authority to the Commissioner of the Financial Services Agency (FSA).

In addition, the Minister of Finance is in charge of matters related to JGBs. The Minister of Justice is also responsible for legal rules regarding the book-entry transfer of securities, because the rules constitute a part of civil and commercial law.

The Bank of Japan (the Bank) is authorized to conduct business contributing to the smooth settlement of funds under the Bank of Japan Law. Within the framework of authorization pursuant to the Bank of Japan Law, the Prime Minister and the Minister of Finance regulate certain businesses conducted by the Bank, including operation of the Foreign Exchange Yen Clearing System (FXYCS), the JGB Book-entry System, and the BOJ-NET.

While clearing systems in the private sector for interbank funds transfers are not licensed or supervised, institutions related to securities settlement such as the Japan Securities Depository Center (JASDEC) and stock exchanges are supervised by the Commissioner of the FSA and pertinent ministers. The Bank of Japan oversees these payment and settlement systems in order to achieve its objectives stipulated in Article 1 of the Bank of Japan Law.

1.1.2 Legal basis for payment

The following three categories of laws together constitute the legal basis for payment:

(1) Laws concerning providers of payment services

This category includes the Bank of Japan Law, the Banking Law, the Long-term Credit Bank Law, the Concurrent Trust Business Law, the Shinkin Bank Law, the Small Business Cooperatives Law, the Agricultural Cooperatives Law, and the Fishery Cooperatives Law.

(2) Laws concerning means of payment

This category includes the Bank of Japan Law, the Unit of Currency and Issuance of Coins Law, the Bill Law, the Cheque Law, and the Prepaid Card Law. The Postal Savings Law, the Postal Giro Law, and the Postal Money Order Law govern funds transfer via postal accounts and postal money orders.

(3) Laws concerning obligations between parties that utilize means of payment

At the core of this category are the Civil Code and the Commercial Code. Contracts made between parties, including rules for privately owned payment systems, also fall under this category.

1.1.3 Legal basis for securities settlement

The following three categories of laws together form the legal basis for securities settlement:

(1) Laws concerning the issuance of securities

The legal basis for issuance differs from security to security. The Law Concerning Government Bonds and the Commercial Code govern the issuance of JGBs, stocks, and corporate bonds. While CP has been issued in the form of bills under the Bill Law, it became possible to issue CP in the form of short-term corporate bonds under the Commercial Code and the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities from April 2002. The Securities and Exchange Law regulates the issuance of securities to protect investors.

(2) Laws concerning providers of securities settlement services

Different laws exist for different kinds of service providers. The Securities and Exchange Law and the Banking Law regulate such entities as securities companies and banks that provide securities settlement services to owners of securities. The Law Concerning Government Bonds, the Bank of Japan Law, the Law Concerning Central Depository and Book-entry Delivery for Share Certificates and Other Securities, the Law on Registration of Corporate and Other Bonds, and the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities govern central securities depositories (CSDs) and registrars for JGBs, stocks, corporate bonds, and CP.

(3) Laws concerning the transfer of rights in securities and the settlement of securities

The Civil Code, the Commercial Code, the Bill Law, and the Cheque Law stipulate how rights in securities are transferred with the delivery of securities certificates. For JGBs, stocks, and corporate bonds, settlement through book-entry and registration systems has been instituted to increase the safety and efficiency of settlement. The Law Concerning Government Bonds, the Bank of Japan Law, the Law Concerning Central Depository and Book-entry Delivery for Share Certificates and Other Securities, and the Law on Registration of Corporate and Other Bonds govern settlement through book-entry and registration systems. Book-entry settlement of dematerialized CP became possible based on the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities from April 2002. In addition, a law amending the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities is expected to be enacted in 2002, which will enable dematerialization and book-entry settlement of various types of securities, including JGBs and corporate bonds.

1.1.4 Enforceability of netting arrangements

Payment netting and novation netting are effective as agreements between relevant parties. The effect of novation netting is also considered to be enforceable under insolvency proceedings.

With regard to close-out netting, the Law Concerning Close-out Netting of Specified Financial Transactions Entered into by Financial Institutions, etc. was enacted in 1998 for the purpose of ensuring the enforceability of close-out netting. According to this law, close-out netting is legally enforceable in insolvency proceedings including bankruptcy and corporate reorganization proceedings, provided that: (1) a master agreement between the counterparties includes an automatic early termination clause which is to be effected when a petition for bankruptcy or corporate reorganization is filed; (2) the transaction is a specified type of financial transaction such as a derivatives transaction designated by a Cabinet Office ordinance; and (3) at least one party to the transaction is a financial institution.

1.2 Institutions

1.2.1 Central bank

The Bank of Japan, Japan's central bank, was founded in 1882. The Bank of Japan issues banknotes and accepts deposits from financial institutions holding current accounts at the Bank. At the end of 2001, 667 institutions, including banks, securities companies, and bankers' associations, held current accounts with the central bank. Funds transfers among financial institutions are settled through these current accounts. The Bank of Japan owns and operates the BOJ-NET, an online system for the transfer of funds and JGBs.

1.2.2 Providers of payment services

Banks

As well as offering a variety of payment services, banks, together with bankers' associations, cooperate in establishing and managing interbank clearing systems such as bill and cheque clearing systems, the Zengin Data Telecommunication System (Zengin System), and the Foreign Exchange Yen Clearing System (FXYCS). Also, to meet strong public demand for cash, banks provide a nationwide network of automated teller machines (ATMs). In addition, banks provide direct debit and direct credit services, and issue debit cards.

There were eight city banks, 64 regional banks, 56 member banks of the Second Association of Regional Banks, 84 branches of foreign banks in Japan, three long-term credit banks, 32 trust banks, 679 financial institutions for small businesses,¹ and 1,944 financial institutions for agriculture and fisheries² in Japan at the end of May 2001.

New types of banks

As use of the Internet and mobile phones has become more widespread and customer needs diversified, new types of banks have emerged such as Internet-only banks and a bank that specializes in ATM services.

The Financial Reconstruction Commission and the FSA responded to the establishment of these new forms of banks by formulating "Measures for Licensing and Supervision of New Types of Banks including Entry into Banking Business by Non-financial Entities (Operational Guidelines)" in August 2000. Also, the Banking Law was amended in November 2001 so as to govern the entry of non-financial entities into the banking business by regulating the major shareholders of banks.

Non-banks

In certain aspects, non-banks such as securities companies, insurance companies, credit card companies, consumer finance companies, and retailers compete with banks in providing payment services. For example, non-banks have installed ATMs and issue various cards. Retailers, public transportation companies, and telephone companies issue prepaid cards, and

¹ Financial institutions that focus on lending to small businesses, including Shinkin Central Bank, *shinkin* banks, Shoko Chukin Bank, Shinkumi Federation Bank, credit cooperatives, National Federation of Labor Credit Associations, and labor credit associations.

² Financial institutions that concentrate on lending for agriculture and fisheries, including Norinchukin Bank, agricultural cooperatives, and fishery cooperatives.

consumer finance companies and retailer-affiliated credit card companies issue credit cards.

At the same time, non-banks also cooperate with banks. Securities companies provide a service whereby once the balance of a customer's demand deposit account at a bank reaches a set level, any additional inflow of funds to the account will automatically be transferred to the customer's mutual fund investment account at a securities company. If the balance of the demand deposit account falls below the preset level, the shortage will automatically be made up by a transfer from the customer's mutual fund investment account.

Japanese Bankers Association

The Japanese Bankers Association consists of banks and regional bankers' associations. At the end of 2001, there were 141 full member banks, 46 associate member banks, and 72 special members (bankers' associations).³

One of the roles of the Japanese Bankers Association is to enhance the safety and efficiency of the industry's payment procedures by establishing market practices and standards. Examples of these market practices and standards are: (1) "Market Practices for Real-Time Gross Settlement" for money markets, including payment practices, (2) "model contracts" for customer accounts, remittances and letters of credit, (3) standard operating procedures for direct debit, domestic funds transfers, government funds and custody operations, (4) certificate formats for bills, cheques, bonds, and other securities, (5) formats for magnetic tapes, floppy disks, and smart cards (Zenginkyo IC Cash Card Specification), and (6) online data exchange protocols (Zenginkyo data transmission protocol).

Tokyo Bankers Association

The Tokyo Bankers Association, Inc. (TBA) is the largest of Japan's 72 regional bankers' associations. TBA is an incorporated entity and has full-time employees, while the Japanese Bankers Association is an unincorporated association for which TBA functions as the secretariat.

TBA operates clearing systems such as the Tokyo Clearing House, the Zengin Data Telecommunication System (Zengin System), and the Foreign Exchange Yen Clearing System (FXYCS). TBA is the secretariat for interbank ATM network systems such as the Banks Cash Service (BANCS) and the Multi Integrated Cash Service (MICS). Also, TBA chairs the Society for Worldwide Interbank Financial Telecommunication (SWIFT) user group in Japan.

Other regional bankers' associations

The other 71 regional bankers' associations conduct bill and cheque clearing among their member banks as their core business.

Post Office

The Japanese government started to provide postal services as governmental non-profit services in 1871. As a result of the reform of central government ministries and agencies in January 2001, the Postal Services Agency was established as an external agency under the Ministry of Public Management, Home Affairs, Post and Telecommunications to provide these postal services.

³ Membership dues for associate members are lower than those for full members, although there are some restrictions on voting rights.

Besides financial services such as postal savings, postal insurance and pensions, the Post Office provides payment services that utilize its transferable deposit accounts, with a nationwide network of approximately 24,000 post offices (versus approximately 14,000 branches of banks at the end of March 2001).

At the end of 2001, the outstanding amount of postal saving totaled JPY239 trillion (USD2.0 trillion), while the outstanding amount of bank deposit totaled JPY589 trillion (USD4.8 trillion).⁴

1.2.3 Providers of securities services

Securities companies

Securities companies provide various kinds of securities services such as dealing, brokerage, underwriting, and public offering and distribution of securities in the primary and secondary markets. Securities companies must be registered with the Prime Minister to engage in securities business. At the end of 2001, there were 291 securities companies including 50 foreign securities companies in Japan.

Banks

Banks are permitted to engage in certain securities services under the relevant laws such as the Banking Law. These include securities lending services, custody services, and underwriting and selling of government and other public debt securities. In addition, a number of banks function as designated registrars under the Law on Registration of Corporate and Other Bonds. Registrars also function as pre-settlement service institutions providing necessary services in advance for non-JGB bond settlement, such as examining the content of the instructions, rearranging the order of settlement instructions, checking the balances of sellers' accounts, and assigning bond serial numbers if necessary.

Japan Bond Settlement Network

Japan Bond Settlement Network Co., Ltd. (JB Net) operates an online network system, which links participants (investors and dealers), registrars, and the Bank of Japan, thereby facilitating the smooth transfer of non-JGB registered bonds, including corporate bonds, government-guaranteed bonds, and municipal bonds. JB Net functions as the intermediary in this online network system. JB Net was established by financial institutions including banks, securities companies, investment companies, and insurance companies in 1996, and started operation in 1997. There were 453 direct participants, 424 indirect participants, and 37 pre-settlement service institutions at the end of 2001.

Japan Securities Depository Center

The Japan Securities Depository Center (JASDEC) was established as the CSD for stocks and started operation in 1991, pursuant to the Law Concerning Central Depository and Book-entry Delivery for Share Certificates and Other Securities. At the end of 2001, JASDEC had 294 participating institutions, including securities companies, banks, stock exchanges, and TBA, and 3,594 Japanese companies entrusted JASDEC with the handling of their stocks. Based on the amendment of the law in 2001, JASDEC plans to change from an incorporated foundation into a joint stock corporation in 2002.

⁴ Deposits held with domestically licensed banks and *shinkin* banks.

Japan

Stock exchanges

There are five stock exchanges in Japan: the Tokyo Stock Exchange, Osaka Securities Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, and Sapporo Securities Exchange.

The Tokyo Stock Exchange and the Osaka Securities Exchange were originally founded in 1878 and re-established in 1949 after the war. Following the amendment of the Securities and Exchange Law that allows stock exchanges to transform their corporate structure, the Osaka Securities Exchange and the Tokyo Stock Exchange changed from a membership organization to a joint stock corporation in April and November 2001 respectively, with a view to improving their international competitiveness. The Nagoya Stock Exchange also became a joint stock corporation in April 2002.

The Tokyo Stock Exchange and the Osaka Securities Exchange predominate in terms of both volume and value traded. The Tokyo Stock Exchange dominates listed stock and convertible-bond trades, and the Osaka Securities Exchange lists Nikkei Average Futures, the most actively traded stock average futures in Japan. To establish markets for emerging businesses, the Tokyo Stock Exchange opened a new market called Mothers in 1999. The Osaka Securities Exchange opened the Nasdaq Japan Market in 2000, modeled on the US Nasdaq with which it has established cooperative ties.

Japan Securities Dealers Association

The Japan Securities Dealers Association (JSDA), formed under the Securities and Exchange Law, aims to ensure that purchases and sales of securities take place fairly and smoothly, thus contributing to the protection of investors. It established an OTC market for securities and serves as a self-regulatory organization. In addition, JSDA took the lead in establishing the Japan OTC Securities Co., Ltd.—the present Jasdaq Market, Inc.—to facilitate OTC securities trading. JSDA also coordinates OTC market practices, including settlement practices. For example, JSDA laid out “Guidelines for Real-Time Gross Settlement of Government Securities Transactions.” Furthermore, JSDA functions as the industry association for securities dealers. There were 291 securities company members, and 233 registered financial institutions, consisting of banks, insurance companies, money market brokers, and securities financing companies, as special members at the end of 2001.

JASDAQ market

The JASDAQ market is an OTC stock market managed by JSDA. Shares of stocks registered with JSDA that meet certain standards are traded in the JASDAQ market under JSDA regulations. In the JASDAQ market, stocks are traded over the JASDAQ (Japan Securities Dealers Association Quotations) system, which is a network system connecting securities companies, information vendors, JSDA, and Jasdaq Market, Inc., to which JSDA has consigned relevant operations. Jasdaq Market, Inc. started to function as the central counterparty (CCP) for the JASDAQ market from 2001.

Proprietary trading systems

In 1998, it became possible to conduct trading outside the exchanges following an amendment to the Securities and Exchange Law whereby dealers were no longer required to funnel orders to the exchanges. At the same time, the operation of a proprietary trading system (PTS)—an electronic system that has similar functions to the exchanges—was recognized as a form of securities business requiring approval from the regulator. Based on this amendment to the law, securities companies started to provide electronic trading services for JGB transactions in June

2000. At the beginning, only a limited number of PTSs were approved. With the revision of PTS approval standards, which came into effect in December 2000, some more PTSs were approved.

1.2.4 Other service provider

Tokyo International Financial Futures Exchange

The Tokyo International Financial Futures Exchange (TIFFE) was established in 1989 as a non-profit, membership-based organization under the Financial Futures Trading Law, mainly to provide trading instruments for short-term interest rate futures.⁵

Banks, securities companies, insurance companies, branches of foreign banks and foreign securities companies in Japan, and other financial institutions participate in TIFFE. There were 70 clearing members and 29 general (non-clearing) members as of December 2001. The former settle transactions on behalf of the latter.

TIFFE provides in-house clearing services, in which it functions as the CCP for futures transactions. Members' positions are marked to market every day, and the variation margin is settled the following day.

Procedural steps for the settlement of funds: (1) TIFFE calculates each clearing member's variation margin and notifies each designated settlement bank of the necessary information for the settlement of funds; (2) each settlement bank transfers funds from the accounts of clearing members with net debit positions to TIFFE's account, and transfers funds from TIFFE's account to those of clearing members with net credit positions; and (3) when funds transfers between the settlement banks are necessary, they are processed through the BOJ-NET Funds Transfer System on an RTGS basis at 12:00, transferring funds from the accounts of settlement banks in surplus to the account of TIFFE, and then from the account of TIFFE to the accounts of the settlement banks in shortage.

TIFFE requires its clearing members to make loss compensation deposits in addition to margin and membership deposits. If a non-clearing member fails to meet an obligation, the clearing member settles the transaction on its behalf; if a clearing member fails to meet an obligation, TIFFE provides liquidity to its account held with the settlement banks or the Bank of Japan in order to complete the settlement. TIFFE is compensated for the loss it incurred by: (1) the failed clearing member's margin and deposits with TIFFE; (2) TIFFE's reserves for default compensation; and (3) loss compensation deposits made by the survivor clearing members. For any loss in excess of these funds, the survivor clearing members are required to make additional loss compensation deposits.

2. Payment methods

Overview

This section describes payment media, instruction instruments, and access channels that are used for making retail payments in Japan. While bank deposits are the most widely used

⁵ The following products are currently listed on TIFFE: three-month Euroyen futures, three-month Euroyen LIBOR futures, US dollar-Japanese yen currency futures, options on three-month Euroyen futures, calendar spreads on three-month Euroyen futures, and LIBOR-TIBOR spreads. Among these, three-month Euroyen futures are the most actively traded.

payment media, cash is very frequently used as well, particularly for small-value payments. In addition, postal savings are also commonly used for payments. Electronic money is not practically in use, but prepaid cards, which have a function similar to electronic money, are very common.

The use of non-paper instruments for instructing banks to make payments using bank deposits, such as direct debits, credit transfers, credit cards, and debit cards, has been generally increasing. On the other hand, the use of bills and cheques has been declining.

Diversification of access channels has been remarkable in the past several years. In addition to ATM services and firm banking, services provided through new access channels, such as Internet banking, mobile banking, and convenience store banking, are making steady advances.

2.1 Cash and deposits

2.1.1 Cash

The Bank of Japan has the exclusive right and responsibility to issue and circulate banknotes. Banknotes are given legal tender status under Article 46 of the Bank of Japan Law and can be used for payment without limit. Four denominations of banknotes are currently issued under the Bank of Japan Law Enforcement Order: 1,000 yen, 2,000 yen, 5,000 yen and 10,000 yen.⁶

Coins are issued by the Japanese government and put into circulation by the Bank of Japan under the Unit of Currency and Issuance of Coins Law of 1988. Article 7 of the Law stipulates that coins must be lawfully accepted as legal tender in settlement of amounts up to twenty times the face value of the given denomination.⁷ Coins come in six denominations—1 yen, 5 yen, 10 yen, 50 yen, 100 yen, and 500 yen—in addition to coins that are specially issued on commemorative occasions.

Cash is used extensively in Japan compared with other industrial countries. The ratio of cash in circulation to nominal GDP, 13.2% at the end of 2000, was the highest among G10 countries. At the end of 2001, banknotes in circulation totaled JPY69 trillion (USD568 billion), and coins JPY4.3 trillion (USD35 billion). There are three reasons for the high preference for cash in Japan: (1) the cost of obtaining cash is not expensive due to highly developed nationwide ATM networks; (2) there is little risk in carrying cash because Japan is a comparatively safe country where crime rates are low; and (3) the public continues to have a high level of confidence in cash as payment media because anti-counterfeiting measures have been effective.

2.1.2 Bank deposits

The outstanding amount of demand deposits was JPY213 trillion (USD1.8 trillion) and the number of deposit accounts 421 million at the end of September 2001.⁸

⁶ In addition to these, there are six denominations of banknotes which are valid though they are not currently issued: 1 yen (USD0.008), 5 yen, 10 yen, 50 yen, 100 yen, and 500 yen.

⁷ According to the directives of the Ministry of Finance, there is no limit to the acceptability of coins for payments made to the government, such as taxes.

⁸ Demand deposit held with domestically licensed banks and *shinkin* banks.

Bank deposits are used as payment media for instruction instruments such as direct debits, credit transfers, credit cards, debit cards, and bills and cheques. Payments made using these instruments have been increasing, partly reflecting the development of a variety of access channels such as ATMs, the Internet, mobile phones, and convenience stores.

2.1.3 Postal savings

Postal savings are also used for making retail payments. The outstanding amount of postal ordinary deposit and postal transferable deposit was JPY42 trillion (USD0.3 trillion) and the number of deposit accounts 115 million at the end of March 2001. Payment services using postal accounts include funds transfers,⁹ prearranged direct credits, direct debits, debit cards and ATM services.

2.2 Electronic money

Various card-based and network-based e-money pilot projects such as VISA Cash have been conducted since 1997, all of which have been confined to specific geographical areas.

Some card-based products have been put into commercial use, although the volume and value of electronic money transactions are negligible compared to those of other payment media. Mondex has launched its service to certain firms since August 2000, which combines an employee ID function with e-money and can be used within an office building. E-money called Edy has been available on contactless smart cards since November 2001, and can be used within virtual malls on the Internet, a limited number of office buildings, shopping malls, and convenience stores.

2.3 Prepaid cards

Prepaid cards are cards that store data regarding the amount paid for the cards and the amount spent so far. They are used for specific services provided by the issuer, and the remaining balance is usually displayed on the card reader during use. The Prepaid Card Law, enacted in 1989, obliges card issuers to deposit funds equivalent to half of the unused value of issued cards with the legal affairs bureaus of the Ministry of Justice in order to protect cardholders, who are the issuers' creditors.

Prepaid cards have spread rapidly in Japan since the 1980s as payment media for public telephones and public transportation such as railways, subways, and buses. Originally, each company issued cards that could be used only for their own services; there are recently cases where a number of service providers share the same prepaid card scheme. For example, in October 2000, a number of railway companies and subway companies started to jointly issue a transportation card, which allows passengers to ride various railway lines using a single card. Telephone cards issued by Nippon Telegraph and Telephone Corporation were very common in the 1980s and early 1990s, but the number is declining due to the increasing popularity of mobile phones.

Most prepaid cards are magnetic cards, but smart cards have also appeared recently. In November 2001, a railway company introduced a contactless and reloadable smart card for the payment of train fares. This card facilitates the entrance process because passengers are able to pass through ticket gates by simply touching the card reader with the card.

⁹ The number of financial institutions that provide funds transfer services between their accounts and postal accounts was 33 at the end of 2001.

2.4 Direct debits

Pre-arranged direct debits are intrabank funds transfer arrangements used widely for making a broad range of recurring payments. They were first introduced in 1955 for the payment of telephone bills. They have expanded rapidly since the early 1960s and are now used extensively for the payment of public utility bills, credit card bills, taxes, school tuition, insurance premiums, and loan repayments.

Direct debit services are provided on the basis of a tri-party agreement between the payer, the payee, and their bank. The payee sends payment instructions to the bank on a paper basis, on magnetic tape, or through online transmission. On a designated day, the bank debits the amount instructed from the payer's ordinary deposit account¹⁰ and credits the payee's account.

2.5 Credit transfers

Credit transfers are popular for remitting funds to a payee in a remote location, or for sending large amounts of funds where physical delivery of cash would entail risks. Most credit transfers use electronic funds transfer systems for making intrabank or interbank payments. Interbank credit transfers are processed through private clearing systems such as the Zengin System (see Section 3.2).

Regarding credit transfer services, prearranged direct credits are used for the payment of salaries and pensions. It is based on a tri-party agreement among the payer, the payee, and the payee's bank. In the case of salaries, the firm using the service sends payroll data to its bank, and the bank transfers funds according to the data on the day assigned by the employer.

2.6 Credit cards

Since the issuance of the first card in 1960, credit cards have become increasingly popular in Japan. The number of credit cards and the value of payments made using credit cards have almost doubled in the past ten years. There were 223 million cards at the end of March 2000, and the value of payments made by credit cards amounted to JPY21.8 trillion (USD179 billion) in 2000. Major issuers of credit cards include bank affiliates,¹¹ consumer credit companies, and retailers.

In most cases, the Credit and Finance Information System (CAFIS), a system established in 1983 primarily by bank-affiliated credit card companies, carries out data processing. When a customer presents a credit card to a member merchant, the information on the magnetic stripe is read by a credit authorization terminal (CAT) and sent to the computer of the credit card company via the CAFIS center. The computer checks for lost or stolen cards, verifies credit limits, and automatically processes the purchase.

The use of credit cards over the Internet for shopping online started to increase with the development of business-to-consumer electronic commerce, although the volume and value are still very small. Many of the credit card companies are starting to issue cards that have a wider variety of applications such as financing, cash dispensing, and revolving credit facilities.¹²

¹⁰ An ordinary deposit is a type of demand deposit against which cheques cannot be drawn. It is estimated that most households in Japan have at least one ordinary deposit account.

¹¹ Until 1983, banks were not allowed to issue credit cards themselves.

¹² Revolving credit facilities enable cardholders to make installment payments.

Bank-affiliated issuers are also planning to replace traditional magnetic stripe credit cards with smart cards from 2003, for the purpose of preventing credit card skimming.

2.7 Debit cards

In 1984, Japanese banks began offering the same type of service as today's debit card service under the name "Bank POS." It was not really successful, however, because the service was not so practical for users; debit card users had to apply to the financial institution before using their cash cards as debit cards, and it took 30 to 50 seconds to process one payment.

Advances in telecommunications technology in the 1990s and deregulation in July 1997 laid the groundwork for the development of today's debit card service. The Japan Debit Card Promotion Council started to provide a debit card service called "J-Debit" in January 1999, which expanded nationwide in March 2000. Although its use is limited compared to other instruments, the value of debit card transactions more than doubled from 2000 to JPY305 billion (USD2.5 billion) in 2001. At the beginning of October 2001, there were 1,765 financial institutions participating in J-Debit, and 1,173 merchants participating as direct participants. There were also 344 million cash cards that could be used as debit cards. As of July 2001, more than 170,000 terminals had been installed.

When a customer purchases goods or services using a debit card, the customer inserts the card into a CAT terminal and enters the personal identification number (PIN) from a keypad attached to the terminal. The transaction data are sent from the terminal to the customer's bank via the CAFIS Center. Upon receiving the data, the bank debits the customer's account. The CAFIS Center then sends the transaction data to the clearing center, where net positions between banks are calculated on the day after the transaction. Interbank net positions are cleared again with other interbank payments through the Zengin System or through other smaller clearing systems operating within each group of the same type of financial institution, two days after the transaction. The member merchant's account is credited three days after the transaction or later.

2.8 Bills and cheques

Bills are used for payments in the business sector and can be discounted by banks. Cheques are widely used by government agencies and firms, but rarely used for the payment of salaries or by individuals, including the payment of credit card bills and public utility bills. Both bills and cheques are collected and exchanged between banks at regional bill and cheque clearing houses (see Section 3.1). Recently, the volume of transactions using these paper-based instruments has been declining. The value of bills and cheques cleared to nominal GDP declined from 8.6 times in 1991 to 1.7 times in 2001, mainly because firms are shifting to credit transfers.

2.9 ATMs

Automated teller machines (ATMs) were first introduced by several city banks in 1969, and spread rapidly as many banks adopted online computer systems in the 1970s. ATMs were initially installed in bank lobbies, but began to appear at other easily accessible locations in 1973. ATMs provided cash withdrawal services only at the initial stage, but began to provide cash deposit services as well from 1977. Today they accept both banknotes and coins and process credit transfers and loans. Throughout the past couple of decades, banks have increasingly installed ATMs and as of the end of March 2001 116,984 machines were deployed.

The Post Office and non-banks such as life insurance companies and securities companies also have their own ATMs. The number of ATMs installed by the Post Office totaled 25,520 at the

end of March 2001.¹³ Securities companies had installed 516 ATMs by the end of June 2001, and ten major life insurance companies 640 ATMs by October 2001.

Since 1980, banks have linked their in-house ATM systems with other banks' systems to enable customers to withdraw banknotes from ATMs of peer banks. To date, nine major online networks exist, each operated within each group of the same type of financial institution.¹⁴ The Multi Integrated Cash Service (MICS), established in 1990, serves as the relay center for the nine networks, and provides nationwide ATM data transmission and clearing services. MICS had 2,132 financial institutions as members at the end of March 2001, linking virtually every financial institution in the private sector. The interbank credit and debit positions resulting from the use of the ATM networks are calculated at the end of each business day. Interbank net positions are cleared again with other interbank payments through the Zengin System or the groups' own clearing systems, and then settled through the accounts held with the Bank of Japan or with the groups' central organizations.

Several banks plan to strengthen security and increase the efficiency of their services by replacing traditional magnetic stripe cash cards with smart cards. Using a single multi-functional smart card, customers will be able to access various types of services such as cash card, debit card, credit card, and e-money services.

2.10 Firm banking

Firm banking (FB) is an online banking service for corporate customers. Firms are able to obtain information including their account balances and transaction records, and initiate credit transfers and direct debits by accessing their banks via telephone, facsimile, FB terminal, or personal computer. With the widespread use of the Internet, the use of personal computers as an access channel and the types of services offered through the Internet have been increasing.

Firms using FB services are usually linked to their banks via the Automatic answer Network System for Electrical Request (ANSER) network or shared cash management service (CMS) centers. ANSER is a data-transfer system, provided by NTT Data Corporation since 1981, which links banks with firms.

The shared CMS centers, the first of which began operation in 1987, connect firms with multiple banks in a single session. Shared CMS centers offer services such as multi-bank reporting (which enables firms to check their account balances at more than one bank simultaneously) and batch file transfer (which enables firms to send payment instructions including those related to payroll and direct debit to multiple banks at one time).

2.11 Home banking

Home banking allows individuals to access banking services online. It began with a telephone inquiry service and a pay-by-phone service in the early 1980s. An experiment for placing funds transfer orders by telephone using Nippon Telegraph and Telephone Corporation's Character and Pattern Telephone Access Information Network (CAPTAIN) System started in 1984. From

¹³ The number of financial institutions that have connected their ATMs with the ATMs of the Post Office has been increasing rapidly since such connections were first established in 1999, and reached 2,084 in January 2002.

¹⁴ City banks, regional banks, member banks of the Second Association of Regional Banks, trust banks, long-term credit banks and the Shoko Chukin Bank, *shinkin* banks, credit cooperatives, labor credit associations, and agricultural cooperatives.

that time until about 1997, various home banking services were offered using terminals such as game machines and touch-screen phones. Today, customers are able to access services including credit transfers and account balance inquiries by telephone, personal computer, mobile phone, and digital TV.

Until around 1997, the majority of users remained corporate customers, and home banking was not widespread among households. However it has expanded rapidly with the prevalence of personal computers and easy access to the Internet.

2.11.1 Internet banking

Banks started providing Internet-based banking services including account balance inquiries and credit transfers in 1997. An internet-only bank, which uses the Internet as the only access channel without physical branches, first appeared in 2000.

2.11.2 Mobile banking

Mobile banking is a type of Internet banking using mobile phones as terminals. This became possible from 1999 as many mobile phones became equipped with text-based Web interfaces. As of end-March 2001, 320 financial institutions offered this type of service.

2.11.3 TV banking

With the launch of “broadcasting satellite digital TV” services in December 2000, several banks have started to provide banking services via BS digital TVs. In one of the schemes, customers are able to view account and transaction information on their digital TV screens. Customers use remote control units to select services and enter information such as account number, PIN, name, and transaction value. Transaction data are sent to the broadcasting company through telephone lines, and then to the bank through proprietary lines.

2.12 Convenience store banking

Convenience stores collect bill payments from customers for public utilities and telecommunications companies, and send them to the receiving companies by credit transfers. This payment acceptance service started in 1987 and has been growing. Since 1999, convenience stores have also installed ATMs that have access to the ATM services of various banks, some of which machines provide consumer finance services. In 2001, a bank that has no branches and relies heavily on convenience store ATMs started operation. The number of in-store ATMs reached more than 10,000 as of March 2002.

Such services are becoming popular due to the fact that convenience stores are more easily accessible than banks in terms of both location and opening hours. Convenience stores are to be found everywhere and are open 24 hours a day, seven days a week, while bank windows are generally available only during banking business hours on weekdays.

3. Interbank payment systems

Overview

There are four major interbank payment systems in Japan: (1) bill and cheque clearing systems (BCCSs); (2) the Zengin Data Telecommunication System (Zengin System); (3) the Foreign

Exchange Yen Clearing System (FXYCS); and (4) the BOJ-NET (Bank of Japan Financial Network System) Funds Transfer System. The first three systems are privately owned clearing systems. Net settlement positions for financial institutions, which are calculated by these clearing systems, are settled through current accounts held with the Bank of Japan.

In general, BCCSs and the Zengin System are used mainly for smaller value transfers, and FXYCS and the BOJ-NET Funds Transfer System for larger value transfers. In 2001, the average value per transaction for bills and cheques cleared by the Tokyo Clearing House was JPY9 million (USD74,000), for the Zengin System JPY2 million (USD16,000), for FXYCS JPY720 million (USD6 million), and for the BOJ-NET Funds Transfer System JPY3.8 billion (USD31 million).

3.1 Bill and cheque clearing systems

Bill and cheque clearing systems (BCCSs) provide clearing services mostly for bills and cheques, which are exchanged between financial institutions located within the same geographical area.

The first clearing house in Japan was set up in Osaka in 1879; the Tokyo Clearing House was established in 1887. As of December 2001, there were 540 bill and cheque clearing houses throughout Japan, of which 173 were designated by the Minister of Justice. More than 70% of the total value of bills and cheques exchanged in clearing houses throughout Japan is cleared by the Tokyo Clearing House, where a daily average value of JPY2.6 trillion (USD21.3 billion) was cleared in 2001.

3.1.1 Ownership

Clearing houses are established and managed by their respective regional bankers' association. For example, the Tokyo Clearing House is managed by the Tokyo Bankers Association (TBA).

3.1.2 Participation

Large and medium-sized financial institutions, including banks and branches of foreign banks in Japan, participate directly. Small financial institutions participate indirectly through direct participants. As of December 2001, 421 institutions participated in the Tokyo Clearing House, of which 121 were direct participants.

3.1.3 Types of transaction

BCCSs mainly handle bills and cheques used for commercial transactions between firms. They also handle those used for asset transactions including securities transactions and foreign exchange transactions.

3.1.4 Operation of the system

Bills and cheques are cleared in the following manner: (1) bills and cheques are presented by payees at payees' banks; (2) these items are passed on to clearing houses; (3) the net positions of participating banks are calculated at the clearing houses; and (4) payers' banks bring back bills and cheques from the clearing houses.

3.1.5 Settlement

The net positions of participants calculated by each clearing house are settled at the settlement banks designated by each clearing house.

In the case of 34 clearing houses, settlement of participants' net positions takes place through the current accounts that their respective regional bankers' association holds with the Bank of Japan. Funds are first transferred from the accounts of participants with net debit positions to the account of the regional bankers' association and, after completion of such transfers, the funds are then transferred from the account of the regional bankers' association to the accounts of participants with net credit positions. This process is performed through the BOJ-NET Funds Transfer System on an RTGS basis at 12:30. Interbank settlement is final once the net positions of participants are settled through the BOJ-NET Funds Transfer System. In general, however, the payee cannot withdraw funds until 11:00 on the day after interbank settlement, because dishonored bills or cheques can be returned from the payer's bank to the payee's bank until that time.

3.1.6 Risk management

There is no system of limits to control each participant's obligation arising from bill and cheque clearing. Should a participant fail to settle its net obligation, the clearing house excludes the transactions involving the defaulting participant and then recalculates the net positions of the remaining participants.

3.1.7 Technical aspects

The Tokyo Clearing House began automation of the clearing process in 1971 with the incorporation of computers and facilities that read and sort bills and cheques. All processing of "magnetic ink character recognition"-printed (MICR-printed) bills and cheques presented at banks has since been automated, including sorting of these items by payers' banks and calculation of receipts, payments, and the net position of each bank. Meanwhile, most clearing houses process bills and cheques manually.

The Japanese Bankers Association is currently conducting feasibility studies for introducing truncation of bills and cheques. In this scheme, bill and cheque exchange will be processed without the physical movement of certificates by utilizing their digital images and the relevant electronic information, such as payers' account numbers and amounts to be paid.

3.1.8 Pricing policies

In the case of the Tokyo Clearing House, a participant that is not a member of TBA pays an admission fee when it becomes a participant in the Tokyo Clearing House. Direct participants bear the operational cost of the Tokyo Clearing House in proportion to the value of their transactions the previous year.

3.1.9 Governance

Although each clearing house sets its own rules, clearing houses have been encouraged to harmonize their rules to enhance the efficiency of financial institutions' cash management. For example, the standard settlement time of 12:30 has been adopted. Any revision to the rules of the clearing houses that use the central bank accounts for settlement requires the approval of the Bank of Japan.

3.2 Zengin Data Telecommunication System

The Zengin Data Telecommunication System (Zengin System), an interbank clearing system for domestic funds transfers, started operation in 1973. In 2001, the system handled a daily average volume of 5 million, while the daily clearing value averaged JPY 10 trillion (USD 82 billion).

Small financial institutions, i.e. *shinkin* banks, credit cooperatives, labor credit associations, agricultural cooperatives, and a group of regional banks, have their own interbank clearing systems. The structure of each of these systems is similar to that of the Zengin System.

3.2.1 Ownership

The Zengin System is owned and managed by TBA.

3.2.2 Participation

Financial institutions such as banks and branches of foreign banks in Japan participate directly in the Zengin System. Small financial institutions participate in the system through their respective clearing systems which are linked with the Zengin System. As of December 2001, 2,021 institutions participated in the system, of which 154 were direct participants. End-users include firms and individuals. The Zengin System is not linked with the postal funds transfer system.

3.2.3 Types of transaction

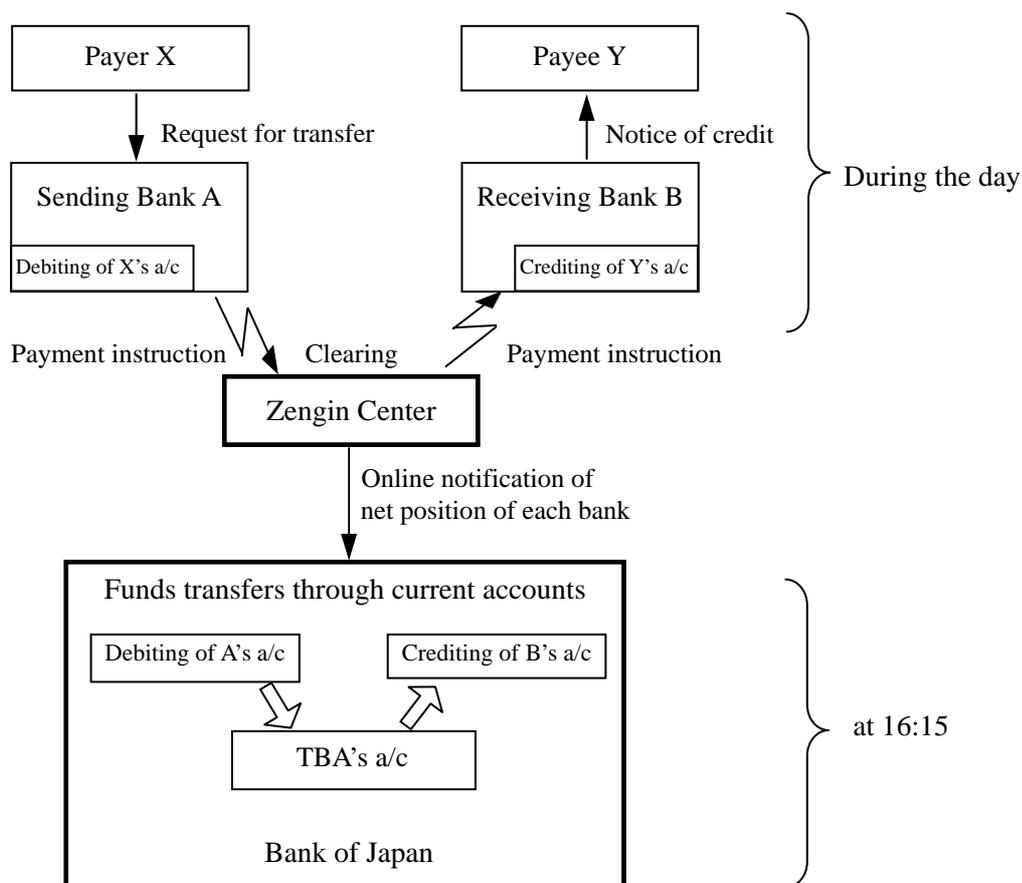
The Zengin System clears domestic funds transfers for third-parties, where not only sending banks and receiving banks but also payer customers and/or payee customers are involved. Transactions of this type include remittances, direct credits such as the payment of salaries and pensions, and payments resulting from the inter-regional collection of bills and cheques.

3.2.4 Operation of the system

Payments are processed through the Zengin System in the following manner (see Chart 1):

- (1) The payer requests the sending bank to make a funds transfer.
- (2) The sending bank sends a payment instruction to the Zengin Center, which, in turn, sends the instruction to the receiving bank between 8:30 and 15:30. At the same time, the obligation between the sending bank and the receiving bank is replaced with an obligation between the sending bank and TBA and another between the receiving bank and TBA on a transaction-by-transaction basis.
- (3) Upon receiving the instruction, the receiving bank credits the payee's account.
- (4) Net debit or credit positions between each bank and TBA are calculated within the system.
- (5) The Zengin Center sends information on the net positions to the Bank of Japan using the Zengin System network.

Chart 1: Zengin Data Telecommunication System



3.2.5 Settlement

The net positions of participants of the Zengin System are settled through the BOJ-NET Funds Transfer System on an RTGS basis at 16:15.¹⁵ Funds are first transferred from the accounts of participants with net debit positions to the account of TBA and, after completion of such transfers, the funds are then transferred from the account of TBA to the accounts of participants with net credit positions.

Interbank settlement is final once the net positions of participants are settled through the BOJ-NET Funds Transfer System. Funds may become available to payees before interbank settlement takes place, because a receiving bank usually credits a payee's account upon receipt of a payment instruction from the Zengin Center.

3.2.6 Risk management

In January 2001, the Zengin System introduced a set of new risk management measures to accommodate the Bank of Japan's introduction of a new RTGS system. Under the new scheme, TBA acts as the central counterparty (CCP), and the obligations among participants are replaced with those between participants and TBA.

¹⁵ Due to heavy traffic of instructions in the Zengin System, on the last business day of each month settlement takes place at 17:15, and on the last business day of the year at 16:45.

Each participant is required to deposit collateral with TBA equivalent to its sender net debit cap. Each participant can substitute all or part of the collateral with guarantees from other participants (“guarantor banks”). Guarantor banks must deposit collateral with TBA to cover the two largest guarantees they give.

Should a participant fail to settle its net obligation, TBA will obtain necessary liquidity from banks assigned in advance as “liquidity provider banks,” and complete settlement. Under this scheme, 25 banks designated as liquidity provider banks will be able to cover the default of the two participants with the largest sender net debit cap. In order to repay liquidity provider banks the funds provided in an emergency, TBA can sell in the market the collateral deposited by the defaulting participant. When the defaulting participant’s collateral is substituted by guarantees, the guarantor banks for that participant will provide funds to repay liquidity provider banks.

3.2.7 *Technical aspects*

Participants in the Zengin System exchange payment instructions electronically via relay computers (RC), which are installed either by participants or by joint centers for certain groups of financial institutions including various cooperatives. The Zengin Center and the Bank of Japan are linked through the network of the Zengin System.

The computer facility of the Zengin System has been updated to meet the need for increased capacity. The current computer facility, in use since 1995, is the fourth generation. A fifth generation computer facility is scheduled to start operation in November 2003. For operational resiliency, separate computer systems have been operating in both Tokyo and Osaka since 1987, and function as mutual backup facilities.

3.2.8 *Pricing policies*

Each participant pays an admission fee to TBA upon joining the Zengin System. The operational costs of the Zengin Center, communication costs, and 20% of the operational costs of each relay computer (RC), are borne by participants proportionately to the volume and value of transactions. The remaining 80% of RC costs are borne by each participant using its RCs.

3.2.9 *Governance*

The Organization for the Management of Domestic Fund Transfers, established by TBA, sets rules that govern the clearing procedures of the Zengin System. The Organization is required to consult with the Bank of Japan if any revisions are needed to the rules that are related to settlement or membership criteria of the Zengin System.

3.3 Foreign Exchange Yen Clearing System

The Foreign Exchange Yen Clearing System (FXYCS) was established in 1980 to facilitate clearing of yen payments for cross-border financial transactions. Originally, the system operated on a paper basis. To cope with the rapid growth of transaction volume, TBA automated the system and consigned operation to the Bank of Japan in 1989. Clearing has since been conducted through the BOJ-NET. In 2001, the system handled a daily average of 39,000 transactions, while the daily clearing value averaged JPY28 trillion (USD230 billion).

3.3.1 *Ownership*

FXYCS is owned by TBA. The automated system is a part of the BOJ-NET.

3.3.2 Participation

At the end of 2001, 244 financial institutions, including 73 branches of foreign banks in Japan, participated in FXYCS. Of these, 41 were direct participants who access the BOJ-NET directly, and the other 203 were indirect participants which participate in the system through direct participants.

3.3.3 Types of transaction

FXYCS handles yen payments resulting from cross-border financial transactions including foreign exchange transactions, yen-denominated bond transactions, and export-import payments.

3.3.4 Operation of the system

The following shows how payments are processed through FXYCS (see Chart 2):

- (1) The payer in a foreign country instructs the payer's bank to make a yen payment to the payee in Japan.
- (2) The payer's bank requests a funds transfer, using SWIFT or telex, to its correspondent bank (sending bank) in Japan.
- (3) The sending bank sends a payment instruction to the BOJ-NET, which, in turn, sends the instruction to the receiving bank between 9:00 and 13:45. At the same time, the obligation between the sending bank and the receiving bank is replaced with an obligation between the sending bank and TBA and another between the receiving bank and TBA on a transaction-by-transaction basis.
- (4) Upon receiving the instruction, the receiving bank credits the account of the payee.
- (5) On behalf of TBA, the Bank of Japan calculates the daily net positions between each bank and TBA using the BOJ-NET.

3.3.5 Settlement

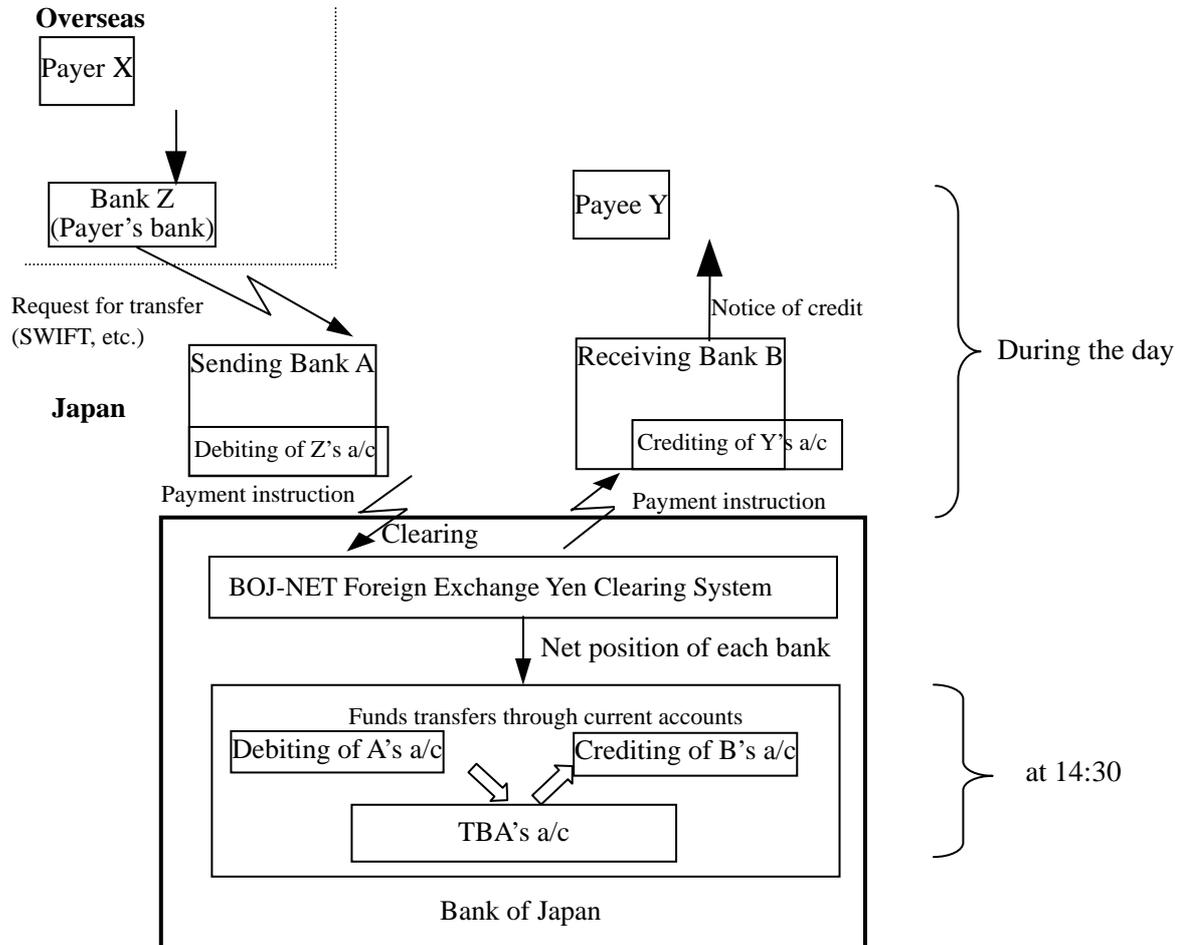
The net positions of participants of FXYCS are settled through the BOJ-NET Funds Transfer System on an RTGS basis at 14:30. Funds are first transferred from the accounts of the participants with net debit positions to the account of TBA and, after completion of such transfers, the funds are then transferred from the account of TBA to the accounts of the participants with net credit positions.

Interbank settlement is final once the net positions are settled through the BOJ-NET Funds Transfer System. Funds may become available to payees before interbank settlement takes place, because a receiving bank usually credits a payee's account upon receipt of a payment instruction from the BOJ-NET.

RTGS mode is also available for participants' individual payments from 9:00 to 17:00,¹⁶ although use of this mode is rather limited. In this mode, instructions sent to the Bank of Japan are processed immediately upon receipt for settlement through current accounts held with the Bank.

¹⁶ Since May 2002, the closing time for RTGS mode has been extended from 17:00 to 19:00 for participants who applied for access to FXYCS until that time.

Chart 2: Foreign Exchange Yen Clearing System



3.3.6 Risk management

In December 1998, a set of new risk management measures was introduced to FXYCS. Under the new scheme, TBA acts as the CCP, and the obligations among participants are replaced with those between participants and TBA. Each participant is required to set a net credit limit (NCL) against every other participant on a bilateral basis. The sender net debit cap, placed to limit the total net amount of payments on each participant, is 4.73% of the total amount of NCLs that the other participants set against that participant.

Should a participant fail to settle its net obligation, the FXYCS loss-sharing rule requires the remaining banks (“survivor banks”) to bear the net obligation of the defaulting participant in order to cover the shortfall in funds for the settlement. That is, the survivor banks must provide TBA with funds allocated proportionately to their share of NCLs set for the defaulting participant. In order to be prepared for such a contingency, each participant is required to deposit collateral with TBA in advance. The amount of collateral required for each participant is set at the larger of (1) 5.1% of the largest NCL each participant has set against the other participants, or (2) JPY100 million (USD822,000).

Should a survivor bank be unable to provide the allocated amount in a timely manner, it may ask TBA for a postponement of the provision of the fund. TBA will then obtain necessary liquidity from banks assigned in advance as “liquidity provider banks,” and complete settlement. Ten banks designated as liquidity provider banks will be able to cover the default of the participant with the largest sender net debit cap. Should a survivor bank that has postponed provision of the fund fail to provide it to TBA by 14:00 of the next business day following default, TBA can sell in the market the collateral deposited by the survivor bank if necessary and repay the liquidity provider banks.

3.3.7 Technical aspects

The whole clearing process is performed electronically via the BOJ-NET Foreign Exchange Yen Clearing System, which is a part of the BOJ-NET. Direct participants of FXYCS access the system through BOJ-NET terminals installed on their premises. Direct connection between participants’ host computers and the host computer of the BOJ-NET (CPU-to-CPU connection) is also available.

3.3.8 Pricing policies

Financial institutions other than members of the Japanese Bankers Association pay admission fees to TBA. Regarding annual operational costs, direct participants bear a large part, of which 20% is borne equally among them and 80% in proportion to the value of their transactions the previous year. Indirect participants bear the remaining part of the costs equally. In addition to the above costs, each direct participant pays JPY60 (USD0.5) per transaction as the transaction fee for using the BOJ-NET.

3.3.9 Governance

TBA lays down rules for FXYCS that stipulate membership criteria, procedures for entry to and withdrawal from FXYCS, and clearing procedures. Any revision to the rules requires the Bank of Japan’s approval.

3.4 BOJ-NET Funds Transfer System

The BOJ-NET (Bank of Japan Financial Network System) Funds Transfer System is an online electronic funds transfer system introduced in 1988. The BOJ-NET comprises two systems: a system for funds transfers (BOJ-NET Funds Transfer System) and a system for the settlement of JGBs (BOJ-NET JGB Services). Although the BOJ-NET Funds Transfer System offered both DNS mode and RTGS mode for the settlement of funds from its introduction, the Bank of Japan abolished DNS mode and made RTGS the only settlement mode at the beginning of 2001. Daily volume and value of transactions settled through the BOJ-NET Funds Transfer System averaged 21,000 transactions and JPY77 trillion (USD634 billion) in 2001.

3.4.1 Ownership

The BOJ-NET Funds Transfer System is owned and operated by the Bank of Japan.

3.4.2 Participation

At the end of 2001, there were 383 participants in the BOJ-NET Funds Transfer System, including 162 banks, 72 branches of foreign banks in Japan, 83 *shinkin* banks, five central organizations of cooperatives, 46 securities companies, three money market brokers, and other

institutions such as stock exchanges. Sufficient operational reliability is required for the Bank's current account holders to participate in the system.

3.4.3 Types of transaction

The BOJ-NET Funds Transfer System serves most of the payment services provided by the Bank of Japan, which are: (1) funds transfers among financial institutions stemming from interbank money market and securities transactions; (2) funds transfers between different accounts of the same financial institution;¹⁷ (3) settlement of net positions arising from privately owned clearing systems; and (4) funds transfers between financial institutions and the Bank of Japan, including those for monetary policy operations. Most funds transfers made through the BOJ-NET Funds Transfer System are credit transfers, but in the case of in-house funds transfers, debit transfers can also be made. A sending bank can transmit a payment instruction with information regarding its and/or the receiving bank's customer.

3.4.4 Operation of the system

Almost all interbank transactions settled through the current accounts held with the Bank of Japan are processed on an RTGS basis.¹⁸ Net positions stemming from privately owned clearing systems are settled on an RTGS basis at the following times: 12:00 for TIFFE; 12:30 for BCCS; 14:30 for FXYCS; and 16:15 for the Zengin System.

Part of BOJ-NET participants' payments to and receipts from the Bank of Japan are netted out on a bilateral basis between participants and the Bank, and the resulting net settlement positions of participants are credited to or debited from their current accounts with the Bank simultaneously and independently at designated times. This settlement mode, called "simultaneous settlement," takes place at 9:00, 13:00, 15:00, and 17:00. The BOJ-NET Funds Transfer System operates from 9:00 to 17:00.¹⁹

3.4.5 Settlement

Settlement is final once made through the BOJ-NET Funds Transfer System.

The Bank of Japan started to provide an intraday overdraft facility in January 2001 in order to facilitate smooth settlement on an RTGS basis. Intraday overdrafts are available to all current account holders without charge if repaid by the end of the day. Intraday overdrafts are also available as part of a simultaneous processing of DVP and collateralization (SPDC) scheme (see Section 4.1.2).

¹⁷ Financial institutions are able to hold current accounts with different offices (head office and regional branches) of the Bank of Japan.

¹⁸ The only exception is settlement of the cash legs of non-JGB bond transactions, which takes place on a gross basis at 15:00 simultaneously.

¹⁹ Since May 2002, the closing time of the BOJ-NET Funds Transfer System has been extended from 17:00 to 19:00 for participants who applied for access to the system until that time. On days when settlement for the Zengin System takes place at 16:45 or 17:15, the closing time of the BOJ-NET Funds Transfer System is extended to 17:30 or 18:00 respectively for all participants, and the end-of-day simultaneous settlement, which usually takes place at 17:00, takes place at 17:30 or 18:00.

3.4.6 Risk management

To reduce systemic and other risks inherent in DNS, the Bank of Japan abolished DNS mode in January 2001 and made RTGS the only settlement mode for funds transfers through its current accounts. The intraday overdraft is fully collateralized with eligible assets pledged with the Bank. Collateral is weekly marked to market with a haircut, which varies according to the type of security and residual maturity. No quantitative limit is currently imposed on the amount of intraday overdraft.

Contingency measures are in place to cope with hardware and software malfunctions. The host computer systems at the BOJ-NET Center are duplicated to ensure safety. Both systems, system A and system B, use identical equipment, and each system comprises an active machine and a hot standby machine. In other words, four host computers are always ready for operation. Most peripheral equipment, such as the communication control unit and database, is also duplicated. A backup center for the BOJ-NET has also been set up in Osaka. Operation of the BOJ-NET is constantly monitored at the computer center to detect problems at the earliest possible stage. The Bank also uses passwords, ID cards, and data encryption to ensure security of the information passed over the network.

3.4.7 Technical aspects

The Bank of Japan offers BOJ-NET participants several ways to access the BOJ-NET, and participants can choose the way that best suits their operations. The majority of participants access the BOJ-NET through dedicated BOJ-NET terminals. In order to streamline participants' operations with respect to a large volume of transactions, in addition to the NTC²⁰ file transfer function and floppy disk data exchange function using BOJ-NET terminals, CPU-to-CPU connections are also available. Most major financial institutions use CPU-to-CPU connections for their operations.

The system network is based on leased lines and "digital data exchange" (DDX) packet-switching lines, which are provided by the NTT Group, a Japanese common carrier. These two types of lines are connected with CPUs at the BOJ-NET Center; leased lines are used for CPU-to-CPU connections, while DDX packet-switching lines are used for linkages with BOJ-NET terminals. To ensure continuity of service, lines connecting the BOJ-NET Center and participants for CPU-to-CPU connections are duplicated. Lines connecting the BOJ-NET Center and telephone exchanges for linkages with BOJ-NET terminals are also duplicated. (See Chart 3)

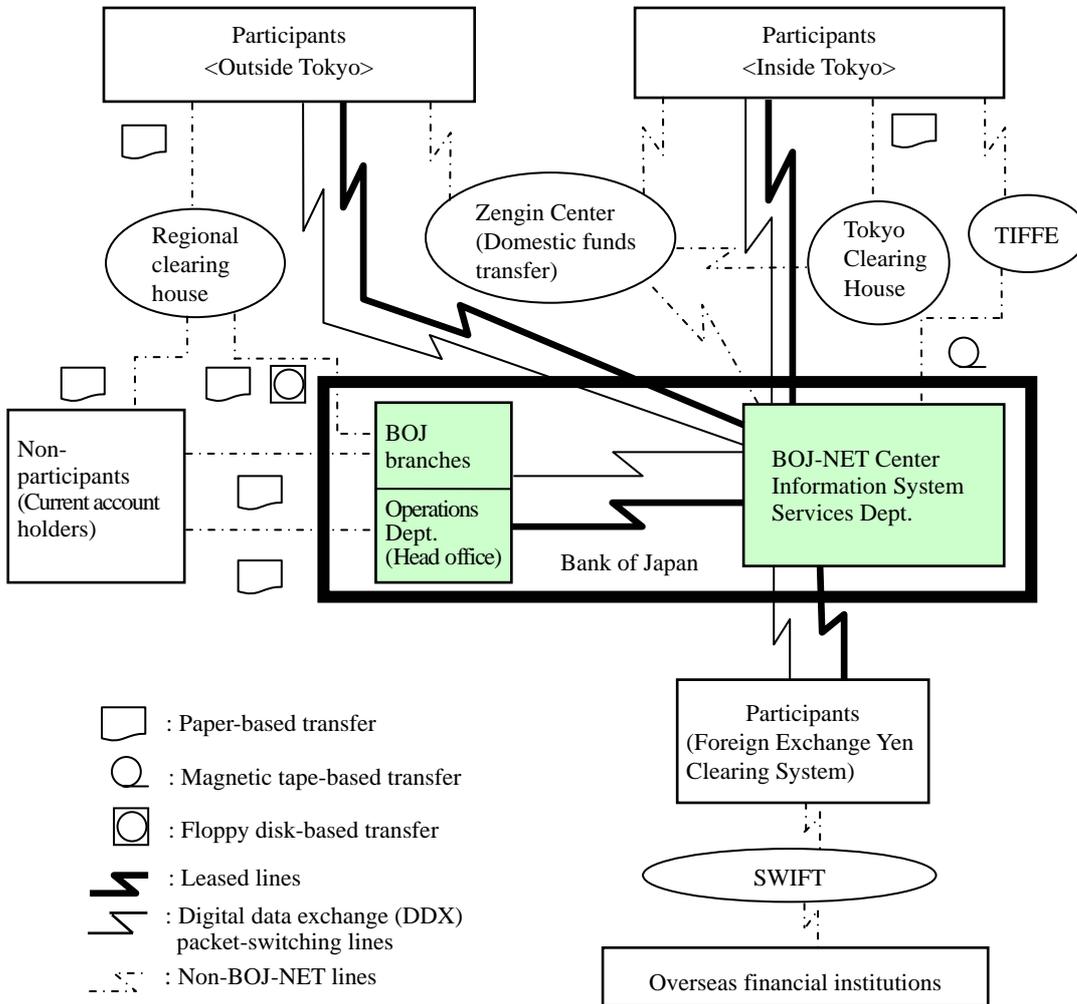
3.4.8 Pricing policies

Regarding costs for the BOJ-NET, the cost of linkage with the BOJ-NET and for using circuits is borne by participants, which benefit from online processing through the BOJ-NET. On the other hand, the Bank of Japan bears other costs such as the purchasing/leasing costs of CPUs and programming costs, which improve the Bank's operational infrastructure.

The cost of using the BOJ-NET incurred by participants in the system comprises two parts: a monthly fixed charge and transaction fees. Participants pay a fixed charge for linkage with the BOJ-NET: JPY5,000-10,000 (USD40-80) per line for connection via terminals and JPY800,000 (USD6,600) per line for CPU-to-CPU connection. Transaction fees for the BOJ-NET Funds Transfer System are JPY40 (USD0.3) for ordinary funds transfers and JPY60 (USD0.5) for third-party funds transfers.

²⁰ *Nichigin* terminal control equipment.

Chart 3: Bank of Japan Financial Network System



3.4.9 Governance

The Bank of Japan reviews the design and operation of the BOJ-NET on the basis of international standards such as “Core Principles for Systemically Important Payment Systems” drafted by the Committee on the Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries. Based on review findings, the Bank of Japan develops an improvement plan for the BOJ-NET and implements it following approval by the Policy Board, the governing body of the Bank. The Bank of Japan makes the plan public and seeks comment from system participants where necessary. The Operations Department and the Information System Services Department are in charge of the BOJ-NET operations. The Bank’s Executive Auditors and the Internal Auditors’ Office audit and examine the Bank’s operations, including issues relevant to the BOJ-NET.

4. Securities settlement systems

Overview

There are central securities depositories (CSDs) for Japanese government bonds (JGBs) and stocks, but not for other types of bonds or commercial paper (CP). JGB transactions are settled on a real-time delivery-versus-payment (DVP) basis through the BOJ-NET JGB Services. Transactions in stocks deposited at the Japan Securities Depository Center (JASDEC) are settled on a book-entry basis, and DVP is available for stocks traded through exchanges. Non-JGB bonds such as corporate bonds and municipal bonds are registered and transferred on the books of a number of registrars. An online network system called JB Net links participants (investors and dealers), registrars, and the Bank of Japan, and enables settlement of these registered bond transactions to be processed on a DVP basis. No CSD exists for CP, and online processing of the settlement of CP transactions has not yet been achieved.

Settlement cycles vary depending on type of security. T+3 rolling settlement is the norm for corporate bonds, municipal bonds, stocks, and JGBs, although settlement of JGBs for monetary policy transactions²¹ takes place T+0, T+1, T+2 and T+3. The settlement cycle for CP is T+1 or T+2.

4.1 Japanese government bonds and bills

4.1.1 Trading

The outstanding balance of securities issued by the Japanese government was JPY461 trillion (USD4.0 trillion) at the end of 2001, of which JPY387 trillion (USD3.8 trillion) comprised Japanese government bonds (JGBs), JPY31 trillion (USD255 billion) being treasury bills (TBs) and JPY43 trillion (USD354 billion) financing bills (FBs). The value of JGB transactions in the over-the-counter (OTC) market reached JPY3,863 trillion (USD31.8 trillion) during 2001, accounting for 95% of cash bond transactions.²² Almost all cash bond transactions are made in the OTC market. The volume of JGB transactions effected through a variety of screen-trading systems began to grow from mid-2000.

Repo transactions²³ are actively made between various entities including securities companies, banks, insurance companies, investment trusts, and other corporations. There have been two types of repo transactions in the Japanese repo market, namely *gensaki* and *cash-collateralized bond lending*.

The JGB lending market has grown tremendously since the abolition of restrictions on *cash-collateralized bond lending* in 1996, and *cash-collateralized bond lending* is currently the predominant transaction in the repo market. At the end of 2001, the outstanding amount of bond lending transactions totaled JPY46.4 trillion (USD382 billion), of which the bulk (JPY40.2 trillion [USD331 billion]) comprised *cash-collateralized bond lending*.

In addition to the two types of repo transactions above, a new type of repo transaction (*repurchase agreement*), which is almost the same as repos in the US and European markets, was introduced to replace *gensaki* in April 2001. After the introduction of *repurchase agreements*, *gensaki* transactions were abolished in March 2002.

²¹ Includes treasury bill (TB) and financing bill (FB) transactions.

²² Includes *gensaki* transactions, which are similar to sell-buyback transactions.

²³ Transaction exchanging securities for funds for a certain period.

4.1.2 Clearing and settlement

There is no major trade confirmation system or clearing system for JGB transactions in the OTC market. Establishment of a major trade confirmation system and a government bond clearing system, the latter which will function as the central counterparty (CCP) to JGB transactions between financial institutions, is now being considered in the securities industry.

There are two arrangements for the settlement of JGBs without physical delivery: the JGB Registration System and the JGB Book-entry System (see Chart 4). Physical delivery of certificates is also possible, but rarely occurs.

The JGB Registration System was introduced in 1906 with the Bank of Japan as the registrar, based on the Law Concerning Government Bonds. In this system, registrations are made on the book kept at the registrar, so that JGBs are transferred without physical delivery. Participants are not limited to financial institutions; any JGB holder can use the system. In recent years, participants have been shifting their holdings of JGBs from the JGB Registration System to the JGB Book-entry System, due largely to the relevant tax reforms.²⁴

The JGB Book-entry System was introduced in 1980 in response to the rapid growth of the volume of JGB transactions and their settlement. It is a tiered system, consisting of direct participants, indirect participants, foreign indirect participants, customers, and the depository, namely the Bank of Japan.²⁵ There are requirements set by the Bank of Japan for participation in the JGB Book-entry System (see Section 5.2.2). Direct participants, indirect participants, and foreign indirect participants include financial institutions such as banks and securities companies. The deposit rate²⁶ in the JGB Book-entry System was 99% at the end of 2001.

The daily average volume and value of transactions settled during 2001 were 11,500 transactions and JPY42 trillion (USD346 billion) for the JGB Book-entry System, and 94 transactions and JPY60 billion (USD494 million) for the JGB Registration System.

JGB settlement under the JGB Registration System and the JGB Book-entry System is processed through the BOJ-NET JGB Services, an online system owned and operated by the Bank of Japan. The BOJ-NET JGB Services began operation in 1990, and the DVP mechanism was introduced in 1994 by connecting the BOJ-NET JGB Services with the BOJ-NET Funds Transfer System.

Participants in the JGB Registration System or the JGB Book-entry System can give instructions concerning JGB delivery to the Bank of Japan either in paper form or through the BOJ-NET JGB Services. At the end of 2001, the number of users of the BOJ-NET JGB Services was 360 for the JGB Book-entry System and 398 for the JGB Registration System. Operating hours of the BOJ-NET JGB Services are from 9:00 to 16:30.

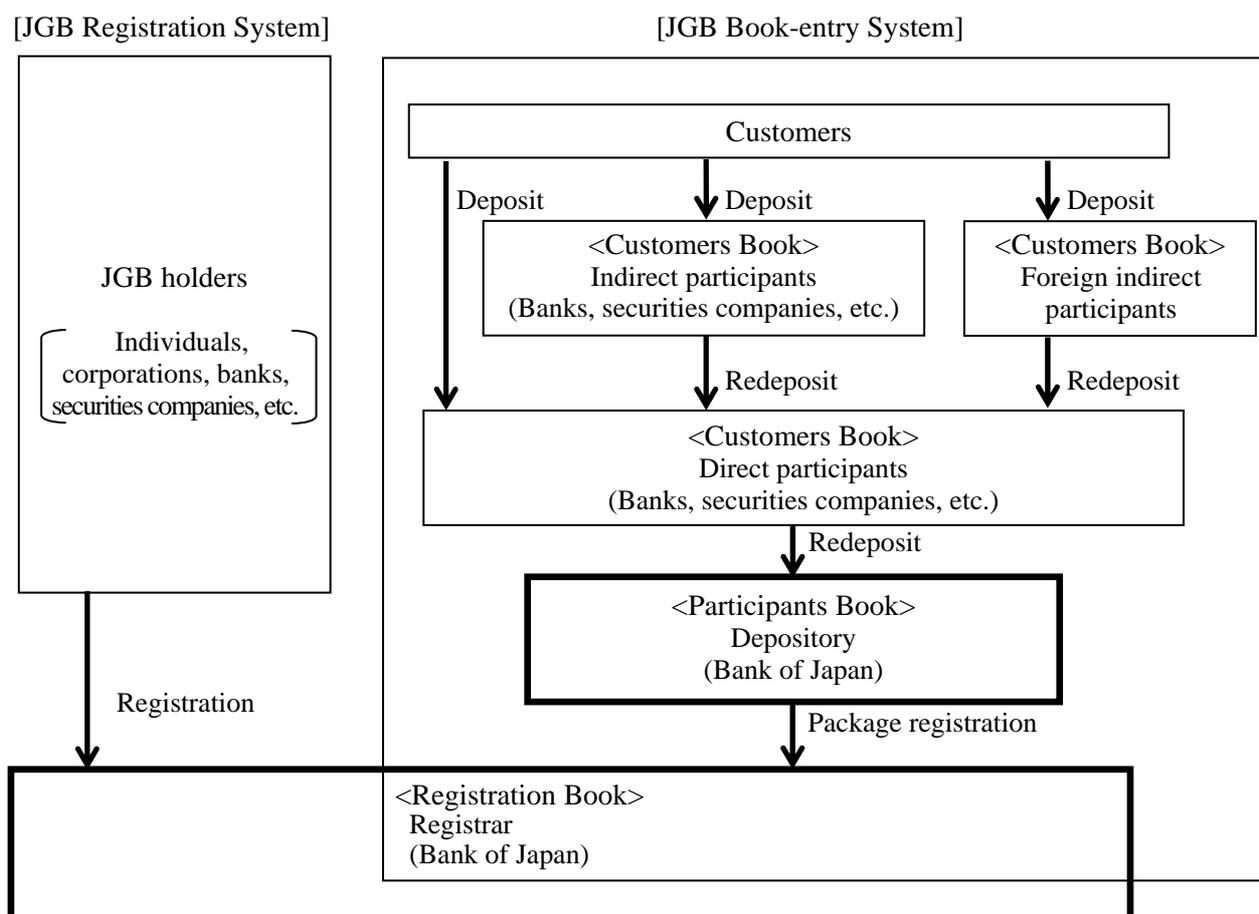
²⁴ The exemption of withholding tax on interest payments on JGBs is granted only to book-entry JGBs (JGBs on the Participants Book) held by designated financial institutions, and non-residents of Japan and foreign corporations.

²⁵ The Bank of Japan registers deposited JGBs on the JGB Registration Book under the Bank's name ("package registration"), and establishes a Participants Book to manage the amount of JGBs deposited by each participant.

²⁶ The ratio of the outstanding amount of book-entry JGBs, TBs, and FBs to the total outstanding amount of JGBs, TBs, and FBs. That of registered JGBs (JGBs on the Registration Book) was 0.7%. Both TBs and FBs are required to be held in the JGB Book-entry System.

Since 1997, settlement of JGB transactions has been taking place on a T+3 basis.²⁷ Before rolling settlement was introduced in 1996, JGBs were settled in principle on the 5th, 10th, 15th, 20th, 25th, and the last business day of every month as a market practice in which the average period between trade and settlement was around seven days.

Chart 4: JGB Registration System and JGB Book-entry System



Changeover to the RTGS system

The Bank of Japan provided two different modes for settlement of JGBs—real-time gross settlement (RTGS) and designated-time net settlement (DNS)—until January 2001 when it abolished DNS mode and made RTGS the only mode for settlement at the Bank of Japan. Since the changeover, settlement through the BOJ-NET JGB Services has taken place on an RTGS basis with the following three exceptions, which continue to be settled by DNS mode at 15:00. The exceptions are: (1) transactions of JGBs kept in custody with the Bank of Japan by foreign central banks and international organizations, (2) issuance of JGBs for which payments are made online, and (3) transactions of JGBs involving the Bank of Japan or the government as the buyer or borrower, and transactions of TBs/FBs for outright purchase/sale operations. The Bank of Japan published “Schedule for Additional Measures Relating to Real-Time Gross Settlement of Japanese Government Securities Transactions” in April 2001, showing a schedule for shifting

²⁷ T+3 is the norm for outright transactions. Most repo transactions are settled on a T+2 or T+3 basis.

to RTGS for these types of transactions. Among these exceptions, delivery of book-entry JGBs by foreign central banks, which falls under (1), moved to an RTGS basis in December 2001. In addition, JGB issuance for which payments are made online is scheduled to move to an RTGS basis from June 2002.

Liquidity-saving facility

To facilitate smooth settlement of a large volume of transactions on a real-time DVP basis, the Bank of Japan started to provide a liquidity-saving facility, or simultaneous processing of DVP and collateralization (SPDC), with the changeover to the RTGS system in January 2001.

Using SPDC, a participant in the BOJ-NET JGB Services may post or receive the securities traded in DVP transactions as collateral to or from the Bank of Japan to obtain or repay intraday funds needed for payments for the transactions concerned. For example, in the case of JGB purchases, a buying participant is able to do the following at the same time: (1) receive JGBs from a seller, (2) pledge these JGBs to the Bank as collateral for an intraday overdraft, (3) draw the intraday overdraft from the Bank, and (4) pay the seller funds for the JGBs received. A selling participant is able to do the following at the same time: (1) receive the pledged JGBs from the Bank, (2) deliver these JGBs to a buyer, (3) receive from the buyer funds for the JGBs sold, and (4) repay the intraday overdraft to the Bank. These two sets of processes take place at the same time when both the buyer and the seller of the JGBs use SPDC.²⁸

To use SPDC, a participant in the BOJ-NET Funds Transfer System must open a special current account at the Bank of Japan, separate from its ordinary current account. A participant may transfer funds between the ordinary current account and the special current account for SPDC. The use of special current accounts is limited to the operating hours of the BOJ-NET JGB Services that are shorter than those of the BOJ-NET Funds Transfer System (see Section 3.4.4). Participants are required to return the balance of their special current accounts to zero prior to closing time.

4.2 Non-JGB bonds

4.2.1 Trading

Non-JGB bonds, including corporate bonds, government-guaranteed bonds, municipal bonds, bank debentures, and yen-denominated foreign bonds, are mainly traded in the OTC market, as in the case of JGBs. The outstanding amount of non-JGB bonds was JPY191 trillion (USD1.6 trillion) at the end of 2001, and the total trading value of OTC non-JGB bonds during 2001 was JPY188 trillion (USD1.5 trillion).²⁹

²⁸ For more details, see “The Framework for Restructuring BOJ-NET JGB Services,” Bank of Japan, September 1998 (available on the Bank’s Web site).

²⁹ The total value of corporate bonds, government-guaranteed bonds, municipal bonds, bank debentures, and yen-denominated foreign bonds.

4.2.2 Clearing and settlement

Under the Law on Registration of Corporate and Other Bonds, almost 80%³⁰ of the outstanding amount of non-JGB bonds is held in the form of registered bonds at registrars. The registrars differ from issue to issue, and about 160 banks currently act as registrars. Physical certificates of non-JGB bonds are brought to the registrars and registered in non-paper form. The serial numbers assigned to every physical certificate are recorded on the registration books of the registrars, and registered non-JGB bonds are managed and handled according to these numbers. Delivery of registered non-JGB bonds is processed by changing the holders' names on the registration books kept by the registrars (transfer registration), based on the requests of both sellers and buyers.

Japan Bond Settlement Network Co., Ltd. (JB Net) operates an online network system that links participants (investors and dealers), registrars, and the Bank of Japan. Settlement of registered non-JGB bonds on a DVP basis is achieved using the network in the following way: (1) when a seller agrees to sell a bond to a buyer, the buyer produces the "message authentication code" (MAC)³¹ and transmits it to the seller; (2) the seller submits a delivery instruction with the buyer's MAC to JB Net; (3) JB Net checks the data in the instruction and transmits necessary information to the registrar;³² (4) JB Net separately produces data on the cash leg of the settlement and sends it to the BOJ-NET; (5) based on this information, the Bank advises the buyer or seller of the net amount to be credited to or debited from their current accounts at the Bank; (6) the buyer notifies the Bank of its acceptance of payment, and settlement of the cash leg takes place at 15:00³³ on the settlement day; (7) when the settlement of the cash leg is completed, the Bank transmits the settlement result to JB Net, which transmits the result to the registrar who makes transfer registration of the corresponding security.

Non-JGB bond transactions have been settled on a T+3 basis since 1999. Before rolling settlement was introduced for non-JGB bonds in 1997, they had been settled on the 10th, 20th, and the last business day of every month.

4.3 Commercial paper

4.3.1 Trading

The commercial paper (CP) market has significantly grown since its inception in 1987. The deregulation of 1998, which enables CP issuance by banks and direct issuance of CP by corporations to end-investors (known as *direct issuance*), contributed significantly to growth of the CP market. The outstanding amount of CP was JPY16.5 trillion (USD136 billion) at the end of 2001. Financial institutions such as banks, securities companies, and money market brokers actively engage in *gensaki* transactions of CP, accounting for almost all the transactions in the

³⁰ This refers to the ratio of the outstanding balance of registered non-JGB bonds (or non-JGB bonds that are held in non-paper form) to the outstanding balance of non-JGB bonds, which was 79% at the end of March 1997.

³¹ A numerical code produced by using a special encryption method for confirmation of the intent of the counterparties to execute the transaction.

³² JB Net transmits information about each delivery instruction to registrars via pre-settlement service institutions. The institutions examine the content of instructions, rearrange the order of instructions, check the balance of the sellers' accounts, assign a bond serial number if necessary, and transmit the delivery instructions to the registrars on the settlement day.

³³ All payments for DVP of non-JGB bond transactions are settled at 15:00 simultaneously through the BOJ-NET Funds Transfer System.

secondary market.

4.3.2 Settlement

There has been no CSD for CP. CP is usually issued without a named payee (known as *blank bills*) and is traded in the secondary market. In *gensaki* transactions, delivery of CP is normally effected by means of deposit receipts prepared by the seller, and CP certificates are physically held at dealers until redemption. Settlement of most CP transactions currently takes place on a T+1 or T+2 basis.

It is planned that the amendment of the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities will be made in 2002. Dematerialized CP is expected to be issued and settled using a book-entry system from next year under the new law.

4.4 Stocks and convertible bonds

4.4.1 Trading

Most stocks and convertible bonds are traded on stock exchanges. While there are five stock exchanges in Japan, the Tokyo Stock Exchange handles most of the transactions in listed stocks. In 2001, total trading value on the exchanges was JPY225 trillion (USD1.9 trillion), of which the Tokyo Stock Exchange accounted for 90%. Direct access to stock trading on the exchanges is limited to securities companies that are approved by the exchanges based on their requirements. Participating securities companies must have adequate capital and must deposit guarantee funds. At the end of 2001, the total market value of listed stocks was JPY301 trillion (USD2.5 trillion), which was about half the value at the end of 1989 reflecting the decline in stock prices.

In addition to the usual OTC market, there is another OTC market (the JASDAQ market) managed by the Japan Securities Dealers Association (JSDA). Stock trading on this OTC market is processed and price information provided through the JASDAQ (Japan Securities Dealers Association Quotations) system. Since 1998, a market maker system, in which trading is made based on the quoted prices published by securities companies, has been gradually introduced to the JASDAQ market.

With regard to stock lending, the market has been rapidly expanding since the introduction of a new type of stock lending in 1998, whereby market participants are allowed to make lending transactions without the intermediation of securities financing companies which had previously been necessary. The outstanding amount of such lending transactions totaled JPY3.3 trillion (USD27.2 billion) at the end of 2001. Major participants in this market include securities companies, institutional investors, and trust banks.

4.4.2 Clearing and settlement

Settlement of stock transactions currently takes place on a T+3 basis. A large portion of the settlement of stocks for trades among financial institutions mainly takes place using the book-entry system provided by JASDEC. Daily average volume of transactions over JASDEC was 141,100 in FY2000. Following are the procedures for the clearing and settlement of stock transactions.

Exchange trading

Stock exchanges provide pre-settlement services such as trade confirmation and netting for transactions that are conducted on the exchanges.

For stock transactions on the Tokyo Stock Exchange and the Osaka Securities Exchange, these exchanges act as respective central counterparties (CCPs). These two exchanges bilaterally offset obligations vis-à-vis their respective participants, thereby achieving multilateral netting among participants. In this process, obligations to deliver stocks are netted by issue, and obligations to transfer funds are netted across all issues. DVP³⁴ was introduced in May 2001 by linking the delivery of stocks at JASDEC with the settlement of funds at the Bank of Japan via each CCP. DVP settlement takes place in the following manner: (1) participants with net debit balances in securities are required to deliver securities to the account of the exchange held at JASDEC by 13:00; participants with net debit balances in funds are required to transfer funds to the account of the exchange held at settlement banks³⁵ by 14:15; (2) after the exchange confirms receipt of securities and funds, it transfers securities and funds to participants with net credit balances in securities or funds.

With regard to stock transactions made on other exchanges, obligations to deliver stocks are netted on a multilateral basis by issue, and obligations to transfer funds are netted on a multilateral basis across all issues. In a legal sense, however, these exchanges do not function as CCPs. The delivery of stocks traded on these exchanges is also made through the book-entry system of JASDEC, but DVP is not available.

Trading in the JASDAQ market

Stock transactions on the JASDAQ market are confirmed by Jaspdaq Market, Inc., the operator and the CCP of the JASDAQ market.

Transfers of both securities and funds take place on a gross basis, but DVP has not yet been achieved. Stocks are delivered from the seller to the buyer through the account of Jaspdaq Market, Inc. held at JASDEC. Funds are transferred from the buyer to the seller through the account of Jaspdaq Market, Inc. held at a designated settlement bank.

Other transactions

Securities companies trade stocks with other entities than financial institutions as well, including institutional investors and foreign investors, which are not direct participants in the exchanges or the JASDAQ market.

For confirmation of these transactions made outside the exchanges or the JASDAQ market, JASDEC developed a pre-settlement matching system, which started operation in September 2001. Users of this system include investment managers that are not participants of JASDEC. In addition to stock transactions by domestic institutional investors, the system started to handle cross-border transactions and trades in convertible bonds from February 2002.

DVP is not available for these transactions.

³⁴ Transfer instructions for both securities and funds are settled on a net basis, with final transfers of both securities and funds taking place at the end of the processing cycle.

³⁵ The Bank of Japan is one of the settlement banks.

4.5 Use of securities infrastructure by the central bank

The BOJ-NET JGB Services is used for such JGB-related services as the issuance and payment of principal and interest, as well as for settlement of JGB transactions between financial institutions. The BOJ-NET JGB Services provides online processing of JGB issuance, from announcement of auction to initial deposit of newly issued JGBs, enabling relevant funds transfers between the government and financial institutions to be processed efficiently. In addition, for the Bank of Japan's monetary policy transactions to be settled smoothly, the BOJ-NET JGB Services is connected with the Bank's operation systems for monetary policy, which handle such services as announcement of offer, acceptance of bids, and notification of results.

The BOJ-NET JGB Services is also utilized for managing securities pledged by financial institutions as collateral for the Bank's credit extension.³⁶ The majority of the pledged securities are JGBs, while other various securities, including corporate bonds, municipal bonds, asset-backed securities, and CP, are also eligible as collateral under certain conditions. In their daily operations, for example, financial institutions pledge their book-entry JGBs to the Bank as collateral for an intraday overdraft, and receive the pledged JGBs against repayment of the overdraft to the Bank. Financial institutions process and manage this series of operations efficiently by using the BOJ-NET Credit-Collateral Management System, which was introduced in January 2001. This system is connected with the BOJ-NET JGB Services to facilitate the real-time centralized management of collateral and credit extended by the Bank, including intraday overdrafts, electronic loans, and purchase of bills.

Online systems for securities settlement other than the BOJ-NET JGB Services are not currently used for the Bank's monetary policy operations or management of collateral for the Bank's credit extension.

4.6 Reform of securities settlement systems

4.6.1 Need for reform

It has been recognized that there is room for improvement in Japan's securities settlement systems in terms of safety and efficiency.

First, securities settlement has been conducted based on different laws for different types of securities, and there is no rule that uniformly covers settlement of all types of securities and allows securities to be dematerialized and settled by book-entry. This has brought about a complexity of systems for securities settlement, and has been an impediment to improving settlement of securities such as CP and corporate bonds.

Second, DVP has not been available for some types of securities such as CP and stocks traded outside the exchanges. Given the significance of the systemic implication of settlements with respect to those securities and the corresponding payments, implementation of DVP for those securities is essential.

³⁶ The Bank made public in October 2000 "Guidelines on Eligible Collateral" that states principles, categories, and prices of collateral, and eligibility standards for its collateral management. Eligibility of collateral is based on the following principles: (1) maintaining the soundness of the Bank's assets; (2) ensuring smooth business operation of the Bank and efficient use of collateral; and (3) utilizing market information. Categories of eligible collateral include various securities including JGBs, government-guaranteed bonds, municipal bonds, corporate bonds, bills, CP, and loans on deeds.

Third, the move towards shorter settlement cycles and further progress in straight-through-processing, which is useful for the realization of shorter settlement cycles, has been slow compared to other major markets. This may lead to a delay in reducing market exposure and counterparty risk related to securities transactions.

4.6.2 Recent developments

With respect to the legal framework, the Law Concerning Book-entry Transfer of Short-term Corporate Debt Securities was enacted in June 2001, permitting the establishment of a book-entry system without a tiered structure (i.e. direct holding system without intermediaries) for dematerialized CP from April 2002. In addition, preparations have been made to establish a new law that enables dematerialization and book-entry transfers in a tiered structure system for various types of securities including CP, corporate bonds, and JGBs. The new law is expected to be enacted in 2002.

In addition to the legal aspect above, steady efforts have been exerted with respect to the following by the relevant parties: (1) organizational transformation of JASDEC into a joint stock corporation, (2) establishment of a book-entry system for CP, (3) introduction of a DVP mechanism for transactions in CP and stocks traded outside the exchanges, (4) establishment of the CCP for exchange-traded stocks and other securities, and (5) implementation of straight-through-processing by introducing systems for trade or pre-settlement confirmation.

5. Role of the central bank

Article 1 of the Bank of Japan Law of 1997 stipulates that the Bank's objectives are to issue banknotes, to carry out currency and monetary control, and to ensure smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system. The Bank of Japan, pursuant to the law, provides various payment and settlement services such as the provision of payment media (i.e. banknotes and current deposits) and the operation of payment and settlement systems. The Bank of Japan also oversees payment and settlement systems which it does not operate. Following are the responsibilities of the Bank of Japan in the payment and settlement field.

5.1 Issuance of banknotes

The Bank of Japan Law stipulates that banknotes shall be used for payment as legal tender without limit, in other words, they are legally defined payment media that should not be refused by any creditor in satisfaction of any debt.

Under the Bank of Japan Law of 1942, the Bank of Japan was required to hold prime assets equivalent to the outstanding amount of banknotes, and a maximum limit was set for the issuance of banknotes. These two restrictions were abolished under the Bank of Japan Law of 1997. This change was made based on the consideration that the stability of the value of banknotes should be maintained through the Bank's appropriate conduct of monetary policy.

Banknotes issued by the Bank of Japan incorporate various anti-counterfeiting features. In recent years, however, counterfeiting has increased sharply in major countries. The Bank thus actively exchanges information and conducts joint studies with other central banks, and is strengthening its ties with relevant authorities within and outside the country.

5.2 Provision of payment and settlement services

5.2.1 Payment through current accounts

Financial institutions' current deposits with the Bank of Japan are used for a number of purposes including serving as settlement assets for interbank obligations. The Bank of Japan has been operating an online payment system, the BOJ-NET Funds Transfer System, since 1988 to process funds transfers between financial institutions through central bank accounts (see Section 3.4).

The Bank of Japan provides current account services to financial institutions that meet certain criteria, which were made public in 1998. Under the criteria, to open a current account with the Bank, applicants need to be in sound financial condition in terms of capital adequacy, have appropriate operational procedures in place, and enter into a contract with the Bank regarding on-site examinations under Article 44 of the Bank of Japan Law. In addition, for securities companies, sufficient standing in securities markets is required.

The Bank of Japan has been providing intraday overdrafts to facilitate the smooth settlement of funds through central bank accounts on an RTGS basis since the beginning of 2001 under Article 33 of the Bank of Japan Law. Separately, the Bank of Japan may extend loans to financial institutions experiencing liquidity needs as the lender of last resort under articles 33, 37, and 38 of the Bank of Japan Law.

5.2.2 Settlement of JGB transactions

The Bank of Japan has provided services for registration of JGBs since 1906, as the sole registrar under the Law Concerning Government Bonds. In 1980, the Bank of Japan established the JGB Book-entry System in which the Bank serves as the depository, to promote the sound development of the JGB secondary market. In 1990, the Bank of Japan introduced an online system, the BOJ-NET JGB Services, to process transfer registrations and book-entry transfers of JGBs (see Section 4.1).

The Bank of Japan drafted "Requirements for Admission as a Participant in the JGB Book-entry System" and made it public in 2001 from the viewpoint of further enhancing the transparency of administration of the JGB Book-entry System. Under the requirements, to be participants in the Book-entry system, applicants need to be in sound financial condition in terms of capital adequacy, and have appropriate operational procedures in place.

5.3 Oversight

Major private clearing systems play an important role in Japan's overall payment system. For instance, while the daily average of transactions settled in the BOJ-NET Funds Transfer System was JPY77 trillion (USD634 billion) in 2001, the value of transactions handled by FXYCS and the Zengin System averaged JPY28 trillion (USD230 billion) and JPY10 trillion (USD82 billion) respectively.

In view of the systemic importance of the major clearing systems, the Bank of Japan recognizes that its oversight activities directed to them are essential for promoting the safety and efficiency of the nation's payment and settlement systems. Also, due to their close relationship with payment systems and their size in both volume and value terms, the Bank of Japan has also been overseeing securities settlement systems, not least their funds clearing aspects.

To ensure the safety and efficiency of Japan's payment and settlement systems, the Bank of Japan collects and analyzes relevant information including statistical data, reviews and evaluates the design and operation of each system, and encourages payment and settlement systems to make improvements. The Bank of Japan, where necessary and appropriate, accommodates the improvement of each system by making changes to the BOJ-NET.

The Bank of Japan currently oversees those payment and settlement systems based on international standards set forth in "Core Principles for Systemically Important Payment Systems" by the Committee on the Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries, and "Recommendations for Securities Settlement Systems" by the CPSS and the Technical Committee of the International Organization of Securities Commissions (IOSCO), both of which were made public in 2001. In addition, the Bank participates in central banks' cooperative oversight activities where relevant for the safe and efficient settlement of the currency it issues.

In recent years, for example, the Bank of Japan encouraged FXYCS and the Zengin System to introduce the necessary risk reduction measures on the basis of the Lamfalussy Standards³⁷ as a part of its oversight activities (see Section 3). The Bank also encouraged the introduction of a DVP mechanism for transactions in non-JGB bonds and exchange-traded stocks based on the Group of Thirty's 1989 standards³⁸ (see Section 4).

5.4 Examination and monitoring

The Bank of Japan conducts on-site examinations and off-site monitoring of the financial institutions that hold current accounts with it. In on-site examinations, in addition to analyzing various issues such as asset quality and profitability of financial institutions, the Bank carries out examinations concerning computer systems and management of settlement risk, arising from participation in payment and settlement systems or provision of settlement services to other financial institutions. Also, a number of issues associated with settlement activities, including daily liquidity management of financial institutions and the amount of securities eligible as collateral, are covered in off-site monitoring. These functions are valuable for the Bank's variety of other activities including the conduct of monetary policy, as well as for ensuring smooth functioning of the overall payment and settlement system.

5.5 Treasury funds operations

The Bank of Japan receives and disburses treasury funds on behalf of the government, pursuant to the Bank of Japan Law and the Accounting Law. For example, the Bank receives payments of national taxes and social security premiums from the general public either indirectly via commercial banks as its agents³⁹ or directly at its offices, and the collected funds are deposited in government accounts. The Bank also disburses treasury funds including payments for public works and pensions in a similar manner vis-à-vis the general public.

³⁷ *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries*, BIS, 1990.

³⁸ *Clearance and Settlement Systems in the World's Securities Markets*, Group of Thirty, 1989.

³⁹ With the approval of the government, the Bank of Japan makes agency contracts with financial institutions, allowing designated branches of these institutions to act as its agents for the collection and disbursement of government funds.

Japan

The Bank of Japan provides accounting services for government deposits held with it. The Bank also sorts and calculates receipts and disbursements of treasury funds for government agencies and specific government accounts.

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Osaka Securities Exchange: <http://www.ose.or.jp/e/>

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Japan Securities Dealers Association: <http://www.jsda.or.jp/>

Tokyo International Financial Futures Exchange: <http://www.tiffe.or.jp/>

Center for Financial Industry Information Systems (FISC): <http://www.fisc.or.jp/english.htm>

Electronic Commerce Promotion Council of Japan (ECOM): http://www.ecom.or.jp/ecom_e/

STATISTICAL TABLES

Japan

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (thousands) ¹⁾	125,864	126,166	126,486	126,686	126,926
GDP (JPY billions)	510,802	521,862	515,835	512,530	511,836
GDP per capita (JPY thousands)	4,058.4	4,136.3	4,078.2	4,045.7	4,032.6
Exchange rate vis-à-vis USD:					
<i>year-end</i>	115.98	129.92	115.20	102.08	114.90
<i>average</i>	108.81	120.92	131.02	113.94	107.78

¹⁾ As of October 1.

Sources: Ministry of Public Management, Home Affairs, Posts, and Telecommunications; Bank of Japan.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	2000
					JPY billions
Banknotes and coins on issue ¹⁾	49,084.0	52,732.8	54,310.6	59,404.8	61,947.7
Transferable deposits ²⁾	139,062.6	151,550.4	160,093.2	180,133.5	185,911.6
Other	nap.	nap.	nap.	nap.	nap.
Narrow money supply (M1)	188,146.6	204,283.2	214,403.8	239,538.3	247,859.3
Memorandum items:					
Broad money supply ³⁾	575,298.1	597,493.8	621,493.6	638,010.6	649,863.1
Transferable deposits in foreign currencies ⁴⁾	nav.	nav.	nav.	932.5	718.0
Outstanding value on e-money schemes	nav.	nav.	nav.	nav.	nav.
of which:					
<i>on card-based products</i>	nav.	nav.	nav.	nav.	nav.
<i>on network-based products</i>	nav.	nav.	nav.	nav.	nav.

¹⁾ Notes and coins held by private corporations, individuals and local governments ("non-banks").

²⁾ Demand deposits held by non-banks, domestically licensed banks (city banks, regional banks, regional banks II, trust banks, long-term credit banks, etc), branches of foreign banks, *shinkin* banks, Shinkin Central Bank, Norinchukin Bank, and Shoko Chukin Bank.

³⁾ M1+ time and savings deposits held by non-banks + foreign currency deposits + non-resident yen deposits + certificates of deposits (CDs) held by non-banks; all held at the same financial institutions as in M1.

⁴⁾ Demand deposits in foreign currencies held at domestically licensed banks.

Source: Bank of Japan.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	2000
					JPY billions
Transferable balances held at central bank ¹⁾	3,404.3	3,602.9	3,822.0	9,686.1	4,239.7
of which:					
<i>required reserves</i>	3,358.0	3,553.8	3,752.9	3,944.2	3,931.6
<i>free reserves</i>	46.3	49.1	69.1	5,741.9	308.1
Transferable deposits held at other banks ²⁾	4,237.5	3,879.7	3,536.5	10,521.5	4,343.8
Memorandum item:					
Institutions' borrowing from central bank ³⁾	1,983.3	4,634.2	1,878.0	1,771.5	693.5

¹⁾ Balances held by financial institutions subject to the reserve requirement system; average for December.

²⁾ Demand deposits held at domestically licensed banks and *shinkin* banks.

³⁾ Bank's total borrowings from the Bank of Japan consisting of bills discounted and loans.

Source: Bank of Japan.

Table 4

Institutional framework

(end-March 2001, except as noted)

Categories	Number of institutions	Number of branches	Number of accounts (thousands)	Value of accounts (JPY billions) ¹⁾
Central bank	1	34	2 ²⁾	4,539
Domestically licensed banks ³⁾	165	13,980	336,672	162,731
Cooperatives and rural banks	2,586 ⁴⁾	25,927 ⁴⁾	80,615 ⁵⁾	21,334 ⁵⁾
Postal institution	1	24,168	115,441 ⁶⁾	42,066 ⁶⁾
Total	2,753	64,109	532,700	229,370
of which:				
<i>virtual institutions</i>	1	1	nav.	nav.
Branches of foreign banks	79	121	nav.	1,214

¹⁾ Average for March, except Postal institution.²⁾ When one institution holds several accounts at the head office and other branches of the Bank of Japan, these accounts are counted separately.³⁾ Includes city banks, regional banks, regional banks II, trust banks, and long-term credit banks.⁴⁾ Includes *shinkin* banks, Shinkin Central Bank, Norinchukin Bank, Shoko Chukin Bank, Shinkumi Federation Bank, National Federation of Labor Credit Associations, credit cooperatives, labor credit associations, agricultural cooperatives and fishery cooperatives.⁵⁾ Includes *shinkin* banks.⁶⁾ Figures for ordinary deposit accounts and transferable deposit accounts.

Sources: Center for Financial Industry Information Systems; Bank of Japan; other national data.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
Bill and cheque clearing systems	296,030	283,373	260,067	239,320	225,868
Zengin System	995,646	1,056,143	1,094,176	1,119,406	1,167,596
Foreign Exchange Yen Clearing System	9,403	10,434	11,155	9,995	9,298
BOJ-NET Funds Transfer System	4,417	5,005	5,307	4,810	4,715

Source: Bank of Japan.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
Bill and cheque clearing systems	1,745.0	1,585.0	1,296.2	1,138.6	1,052.3
Zengin System	2,139.6	2,297.6	2,269.6	2,186.3	2,240.2
Foreign Exchange Yen Clearing System	8,573.0	10,357.5	10,694.8	7,108.6	6,247.0
BOJ-NET Funds Transfer System	39,892.5	41,493.2	43,136.4	34,500.2	35,398.2

Source: Bank of Japan.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions

Instruments	millions				
	1996	1997	1998	1999	2000
Cheques ¹⁾	296.0	283.4	260.1	239.3	225.9
Payments by debit card ²⁾	0.6	0.5	0.5	0.4	3.2
Payments by credit card ³⁾	1,131.7	1,275.2	1,497.0	1,517.4	2,007.4
Credit transfers ⁴⁾	1,042.8	1,105.5	1,143.2	1,166.9	1,215.4
Direct debits	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Transactions handled by bill and cheque clearing systems.

²⁾ Figures for 1999 and thereafter are not consistent with those up to 1998. Figures up to 1998 are for the local POS services, which are no longer available. Figures for 1999 and thereafter are for the nation-wide debit card service launched in January 1999.

³⁾ Based on a survey by Japan Consumer Credit Industry Association (estimated).

⁴⁾ Interbank and customer transactions handled by the Zengin System, the Foreign Exchange Yen Clearing System, the BOJ-NET Funds Transfer System, and other small retail payment networks.

Sources: Japan Debit Card Promotion Association; Japan Consumer Credit Industry Association; Japanese Bankers Association; Bank of Japan.

Table 8

Indicators of use of various cashless payment instruments: value of transactions

Instruments	JPY trillions				
	1996	1997	1998	1999	2000
Cheques ¹⁾	1,745.0	1,585.0	1,296.2	1,138.6	1,052.3
Payments by debit card ²⁾	0.002	0.004	0.004	0.011	0.147
Payments by credit card	16.8	18.1	19.0	20.2	21.8
Credit transfers ³⁾	47,109.3	50,630.2	52,131.3	40,596.4	38,269.5
Direct debits	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ See footnote 1 in Table 7.

²⁾ See footnote 2 in Table 7.

³⁾ See footnote 4 in Table 7.

Sources: Japan Debit Card Promotion Association; Japan Consumer Credit Industry Association; Japanese Bankers Association; Bank of Japan.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	thousands				
	1996	1997	1998	1999	2000
BOJ-NET JGB Services	1,262	1,880	1,993	2,005	2,216
- Book-entry System	480	702	774	1,049	2,073
- Registration System	782	1,178	1,219	956	143
Japan Securities Depository Center ¹⁾	21,418	21,406	20,715	34,491	34,710

¹⁾ Figures for the year ending March of the following year.

Sources: Japan Securities Depository Center; Bank of Japan.

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	JPY trillions				
	1996	1997	1998	1999	2000
BOJ-NET JGB Services	4,676.5	7,033.9	8,479.1	9,060.5	10,841.4
- Book-entry System	2,567.1	3,616.9	4,297.9	6,179.9	10,395.6
- Registration System	2,109.4	3,417.0	4,181.2	2,880.6	445.8
Japan Securities Depository Center	nav.	nav.	nav.	nav.	nav.

Source: Bank of Japan.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
BOJ-NET JGB Services					
- Book-entry System	371	384	383	377	371
of which:					
<i>Banks</i> ¹⁾	214	219	222	222	225
<i>Securities companies</i>	105	110	104	95	86
<i>Others</i>	52	55	57	60	60
- Registration System	436	449	453	440	421
of which:					
<i>Banks</i> ¹⁾	264	269	275	270	262
<i>Securities companies</i>	120	125	121	110	99
<i>others</i>	52	55	57	60	60
Japan Securities Depository Center ²⁾	277	282	285	290	296
of which:					
<i>Banks</i> ³⁾	46	48	51	51	52
<i>Securities companies</i>	211	213	210	217	222
<i>Others</i>	20	21	24	22	22

¹⁾ Includes domestically licensed banks, branches of foreign banks, *shinkin* banks, Shinkin Central Bank, Norinchukin Bank, Shoko Chukin Bank, Shinkumi Federation Bank, and National Federation of Labor Credit Associations.

²⁾ As of end-March of the following year.

³⁾ Includes domestically licensed banks, branches of foreign banks, Norinchukin Bank and a credit cooperative.

Sources: Japan Securities Depository Center; Bank of Japan.

PAYMENT SYSTEMS IN KOREA

Korea

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List of abbreviations

ATM	automated teller machine
BOK	Bank of Korea
BOK-Wire	Bank of Korea Financial Wire Network
CD	cash dispenser
CMS System	Cash Management Service System
EFTPOS System	Electronic Funds Transfer at the Point of Sale System
FSC	Financial Supervisory Commission
FSS	Financial Supervisory Service
FTC	Fair Trade Commission
GBM	General Bond Market of the KSE
IDM	Inter-dealer Market of the KSE
IFT System	Interbank Funds Transfer System
KFTC	Korea Financial Telecommunications and Clearings Institute
KOSDAQ	Korea Securities Dealers Association Automated Quotation
KOSPI	Korea Composite Stock Price Index
KSD	Korea Securities Depository
KSDA	Korea Securities Dealers Association
KSE	Korea Stock Exchange
KSFC	Korea Securities Finance Corporation
MPC	Monetary Policy Committee of the BOK
MSB	Monetary Stabilization Bond issued by the BOK

Overview

Payment services in Korea are provided by various kinds of institutions including banks and non-bank financial institutions. Banks are the most important provider of payment services since they have the legal and institutional advantage in receiving deposits from the public. Bank deposits provide the basis for most payment transactions. Post offices and credit unions also offer payment services to a limited extent. All interbank obligations resulting from retail payments such as cheques and electronic funds transfers are cleared on a multilateral net basis by the Korea Financial Telecommunications and Clearings Institute (KFTC), a non-profit organization which is owned by member banks, and are finally settled across banks' accounts at the Bank of Korea (BOK). Large-value payments between banks are directly settled on a real-time gross basis through BOK-Wire, a large-value funds transfer system operated by the BOK.

All electronic retail payment systems in Korea feature nationwide interbank shared networks, which enable customers to use any bank for their retail payments such as bank giro and funds transfers, irrespective of the banks at which they themselves do business. This is largely due to the early establishment of the Financial Sector Informationalization Promotion Committee, in which all banks participate.

As in many other countries, the payment and settlement arrangements in Korea have been changing significantly in recent years. Payment arrangements previously based almost exclusively on cash and paper-based payment instruments have been changing to electronic payment arrangements at a rapid rate, especially since electronic networks for small-value funds transfers were introduced in the late 1980s. Furthermore, in December 1994 the launch of BOK-Wire, an RTGS system for large-value funds transfers, substantially transformed the structure of the Korean payment systems. As a result, electronic payments during 2001 made up more than 60% by volume of all non-cash payments.

In 1998, the framework of monetary and financial supervisory policies in Korea changed greatly in the face of financial crisis. According to the amended *Bank of Korea Act*, the Bank of Korea was given full responsibility for monetary policy. In addition, the BOK took explicit responsibility for operating and managing the payment systems although it had managed payment and settlement arrangements in Korea prior to amendment of the Act. On the other hand, the BOK's responsibility for supervising banking institutions was transferred to the Financial Supervisory Commission (FSC) and the Financial Supervisory Service (FSS), newly consolidated financial supervisory institutions.

Meanwhile, the Korea Stock Exchange market, established in 1956, experienced a rapid growth in the 1970s as a result of the government's policy of encouraging companies to go public. This expansion led to demands for more efficient securities settlement arrangements, replacing the existing physical delivery system. To this end, the Korea Securities Depository (KSD), a central securities depository, was established in 1974, and began operation of the securities settlement system based on book-entry transfers and centralized deposits. KSD is currently in charge of settlements for all transactions in the Korean securities markets – the Korea Stock Exchange (KSE), Korea Securities Dealers Association Automated Quotation (KOSDAQ) and over-the-counter markets.

Two organized exchanges – the KSE and KOSDAQ markets – use multilateral net settlement to reduce participants' settlement amounts. Settlements of stock trades on the exchanges occur two days after the trade dates, while bonds are settled on the trade dates. Bonds traded

in the over-the-counter market, featuring wholesale trades between large institutional investors, are settled on a trade-by-trade basis on the trade date.

1. Institutional aspects

1.1 Legal and regulatory framework

1.1.1 Payment instruments and systems

In Korea, various areas of payment and settlement are governed by a number of separate laws and regulations. In December 1997, the sixth amendment to the *Bank of Korea Act* explicitly provided the Bank of Korea with a legal basis for its operation and management of national payment systems. Under the Act, the Monetary Policy Committee of the BOK formulates the basic policy on oversight of payment systems and operation of BOK-Wire. The Bank of Korea operates the BOK-Wire system, oversees payment systems and develops new payment arrangements to ensure the safety and efficiency of payment and settlement in Korea. In addition, the *Bank of Korea Act* stipulates that the Bank of Korea has the sole right of issuing banknotes and coins and can provide settlement accounts for banks and non-bank institutions.

The *General Banking Act* is the basic law regulating banking institutions. The Act regulates all aspects of banking business such as authorization to conduct banking business, ceilings on securities investment and scope of business. The Act also stipulates that only commercial banks may provide chequing accounts for customers.

As the laws governing the most popular paper payment instruments in Korea, the *Bills of Exchange and Promissory Notes Act* and the *Cheques Act* set out the ways in which bills of exchange, promissory notes and cheques are to be issued, accepted and paid. The *Specialized Credit Financial Business Act* regulates all aspects of credit, debit and prepaid cards. Bank giro and other interbank funds transfers are regulated by institutional arrangements among KFTC member banks.

As electronic payments have rapidly become popular with technological advances, there has recently been a need for legislation to support construction and promotion of safer and more reliable electronic payment arrangements. The *Framework Act on Informationalization Promotion* was enacted in 1995 to set the development of an information-oriented society as a national strategic priority. Under the Act, the Financial Sector Informationalization Promotion Committee, encompassing the banking, securities and insurance industries, was established to facilitate the introduction of various electronic payment services and to formulate safety measures for the financial network. In addition, the *Framework Act on Electronic Commerce* and the *Digital Signature Act* were signed into law in 1999, giving legal certainty to paperless electronic documents and digital signatures used in e-commerce.

There are several laws which ensure fair competition and customer protection. In accordance with the *Act Concerning the Establishment of the Financial Supervisory Organization*, the Financial Supervisory Service (FSS) has the responsibility for consumer protection related to the provision of all financial services, as well as for arbitrating financial disputes between individual consumers and financial institutions.

The *Monopoly Regulation and Fair Trade Act*, stipulating prohibition of collusive practices and anti-competitive transactions in all kinds of business, is also applied to payment transactions. The Act prohibits conduct restricting fair competition such as price agreements and monopolies in the area of payment and settlement services. In addition, according to the *Regulation of Standardized Contracts Act*, financial institutions are prohibited from having unreasonably unfair clauses in their standardized contracts prepared in advance for customers to whom they provide payment services such as deposit, payment cards and electronic banking.

1.1.2 Securities settlement

The *Securities and Exchange Act*, enacted in 1962, is the basic law governing the securities market in Korea. The Act deals with securities issuances, trading, settlement and risk controls, and regulates the business activities of securities companies and conduct of securities-related institutions. Under the Act, the Korea Securities Depository (KSD) is given the sole right of settling securities on a book-entry transfer basis. In order to enhance the efficiency of securities deposit and settlement, securities companies, futures companies and investment trust companies are required to deposit with KSD not only their own securities holdings but also those of their customers.

The practical operations of trading, clearance, settlement, access to systems, and risk control arrangements are mostly delegated to self-regulatory institutions and settlement system operators such as the Korea Stock Exchange, the Korea Securities Dealers Association and KSD. Nevertheless, the *Securities and Exchange Act* stipulates that these institutions and operators are required to obtain prior approval from the Financial Supervisory Commission when they establish, amend or abolish their internal regulations on practical operations.

1.2 Institutions

1.2.1 Providers of payment services

Payment services generally comprise payment instrument access services, clearing services, and settlement services. Instrument access services in Korea are provided mostly by banks, although there are other financial institutions providing them as well. Clearing services for cheques and electronic payments are performed by the Korea Financial Telecommunications and Clearings Institute (KFTC), owned by member banks. Settlement services are provided by the Bank of Korea.

In the wake of the financial crisis of 1997, the Korean government initiated a policy of closing down financial institutions which were no longer viable due to accumulated non-performing loans, which was considered to have partly caused the crisis. As a result, the total number of banks in Korea was reduced by eleven between 1998 and 2000, through exit or merger, and 500 other financial institutions were also closed down, as shown in Table 1. The institutions remaining have undertaken restructuring efforts to achieve large cost reductions. In the field of payment services, many financial institutions are currently encouraging a movement in transactions away from costly tellers' services to less costly automated services such as Internet banking and automated teller machines, through policies of service fee discrimination.

Table 1: Change in the Number of Financial Institutions during 1998-2000

	End of 1997 ¹⁾	January 1998 ~ December 2000			End of 2000 ¹⁾
		Exit ²⁾	Merger ³⁾	Newly established	
Banks	33	5	6	-	22
Merchant banking corporations	30	18	3	1	10
Mutual savings banks	231	71	25	12	147
Credit unions	1,666	257	101	9	1,317
Securities companies	36	6	1	14	43
Investment trust companies	31	6	1	3	27
Insurance companies	45	5	6	-	34
Total	2,072	368	143	39	1,600

1) Excluding branches of foreign institutions.

2) Including revocation of license, bankruptcy and liquidation.

3) Number of institutions ceasing to exist following mergers.

Banks

There are two types of banks operating in Korea: commercial banks and specialized banks. Commercial banks are operated according to the *General Banking Act*, while specialized banks are regulated by their own individual acts.

Commercial banks focus on the businesses of deposit taking, lending, payment and settlement. Payment services in Korea are mostly provided by commercial banks: provision of chequing accounts; issuance of cashier's cheques; interbank funds transfers; credit and debit card services; bank giro, etc. Foreign bank branches are generally specialized in the wholesale banking business; however, in accordance with gradual deregulation, some foreign bank branches are expanding their operations into retail banking. Commercial banks in Korea consisted of nine nationwide commercial banks, six regional banks, and 62 foreign bank branches as of the end of December 2001.

Specialized banks were established mostly in the 1960s to support special sectors given priority in Korea's economic development – exports, social infrastructure construction, housing, etc. With subsequent changes in the financial environment, however, some specialized banks have been changed to commercial banks, and the others have expanded their scopes of business into commercial banking areas. Most specialized banks now provide much the same payment services as commercial banks do. As of the end of December 2001, there were five specialized banks in Korea.

Mutual savings banks / Credit unions

Mutual savings banks were created to help channel small depositors' funds from the unregulated private market into the organized financial market. As of December of 2001, the

number of mutual savings banks has fallen from 231 in 1997 to 122 in accordance with the government policy of closing down ailing financial institutions.

Credit unions were organized in order to help facilitate financing for their members and to promote mutual economic benefits. As of the end of December 2001, there were 1,268 credit unions in Korea.

In September 2001, mutual savings banks and credit unions acquired approval from KFTC to participate in some retail payment networks, such as the Interbank Funds Transfer, CD/ATM, Bank Giro and Electronic Banking Systems. Accordingly, mutual savings banks and credit unions are able to directly offer some retail payment services to their customers without firm-banking arrangements with banks. Mutual savings banks and credit unions, however, do not provide credit and debit card services, and do not issue their own cheques (cashier's cheques). As mutual savings banks and credit unions are not allowed to provide chequing accounts for their customers either, customers are unable to draw cheques on their accounts with these institutions.

Credit card companies

There are three bank-affiliated credit card companies and four specialized credit card companies in Korea. All banks in Korea offer services such as issue of cards, settlement of card bills and maintenance of merchant networks, under arrangements with credit card companies. Credit card companies also provide cardholders with cash advance services up to limited lines of credit.

Post Office

As the Post Office has participated in most interbank payment systems since 1995, it provides much the same payment services as banks through its 2,800 branches across the nation. The Post Office issues its own cheques (cashier's cheques) and postal money orders, and provides interbank funds transfers, giro and CD/ATM services. The Post Office does not provide chequing accounts.

1.2.2 Providers of securities services

Securities companies

Securities companies deal securities for their own accounts, and provide securities brokerage and underwriting services, acting as intermediaries for their customers. Subject to obtaining prior permission from the Financial Supervisory Commission (FSC), securities companies also conduct the businesses of lending funds or securities, providing investment advisory services and guaranteeing payment of corporate bonds. Most securities companies provide their customers with interbank funds transfer services under firm-banking arrangements with major banks.

Since direct participation in organized exchanges in Korea is principally allowed to securities companies only, other institutions and individual customers must trade, settle and deposit securities through securities companies. As of the end of December 2001, there were 64 securities companies operating in Korea.

Investment trust companies / Securities investment companies

Investment trust companies (ITCs) in Korea operate contractual-type investment funds. ITCs sell their beneficiary certificates to customers through their own branches or securities companies, and invest in stocks and bonds. As of December 2001, there were 30 ITCs in Korea.

Securities investment companies (SICs) manage corporate-type investment funds, similar to US mutual funds. SICs sell their own shares to customers through distributors such as securities companies and banks, and invest in diversified portfolios of securities. Currently, only closed-end funds are permitted, with open-ended funds scheduled to be introduced in 2003. Both ITCs and SICs trade and settle securities in the exchanges through the brokerage of securities companies.

Korea Stock Exchange

The Korea Stock Exchange (KSE), established in 1956, is a self-regulatory organization owned and operated by its members to maintain a fair and orderly market. The KSE sets up rules for trading, settlement and member supervision in the KSE market. As of the end of December 2001, the KSE had 53 members including 14 foreign securities companies.

The KSE operates three cash markets, for stocks, government bonds and other bonds, along with two derivatives markets for KOSPI (Korea Composite Stock Price Index) 200 futures and KOSPI 200 options¹. Securities traded in each sub-market are settled separately through its respective settlement system.

In accordance with the *Securities and Exchange Act*, the KSE acts as a central counterparty in the KSE market and has a legal responsibility for clearance and settlement of all KSE market transactions. However, the KSE has entrusted the operation of its settlement systems to the Korea Securities Depository (KSD), the central securities depository in Korea, under an agreement on settlement agency services between the two institutions since 1975. Accordingly, settlements in the KSE markets have actually been handled by KSD, while the KSE is in charge of the clearing process only.

Korea Securities Depository

The Korea Securities Depository (KSD) was established as a special purpose company under the *Securities and Exchange Act* in 1974. KSD is owned by about 100 institutions including the KSE, the Korea Securities Dealers Association, securities companies, banks, insurance companies, etc. The largest shareholder is the KSE, which holds more than 70% of total shares.

As the sole central securities depository in Korea, KSD provides depository and settlement services for stocks and bonds in all Korean markets - the KSE, KOSDAQ and OTC markets. In addition, KSD provides services such as bond registration, and brokerage of securities lending.

¹ The KOSPI 200 is a market value weighted index which consists of 200 stocks selected from the KSE market. It is used as an underlying index for futures and options transactions in the KSE market.

1.2.3 Other service providers

Korea Securities Finance Corporation

The Korea Securities Finance Corporation (KSFC) engages in securities financing in the primary and secondary securities markets. The KSFC lends funds for underwriting, working capital and stock purchases, and provides loans and securities for margin transactions. For the protection of customers' interests, securities and futures companies are required to deposit customers' deposits at the KSFC, in accordance with the *Securities and Exchange Act* and the *Futures Trading Act*.

Korea Securities Dealers Association

The Korea Securities Dealers Association (KSDA) is a self-regulatory body operated by its members, or securities companies. The KSDA manages the KOSDAQ and OTC markets, and ensures fair trading practices. The KOSDAQ Committee established in the KSDA makes basic policies related with access, trading, settlement, risk control and disclosure in the KOSDAQ market.

1.2.4 Role of other private and public sector bodies

Financial Supervisory Commission / Financial Supervisory Service

In accordance with the *Act on Establishment of Financial Supervisory Organizations*, the Financial Supervisory Commission (FSC) was established in 1998 as the nation's sole financial supervisor, whose responsibility encompasses all financial institutions and other related institutions in Korea. The FSC has taken over almost all supervisory powers from former industry-specific supervisors to create a consolidated financial supervision system.

The FSC sets up the basic policies related with supervision of financial institutions and the securities markets. The FSC is additionally responsible for the special task of implementing and overseeing the restructuring process in the Korean financial and corporate sectors, in order to create a more competitive and sounder financial system.

In order that the supervisory role of the FSC is effectively carried out, the Financial Supervisory Service (FSS) was established within the FSC's jurisdiction as the executing body. The FSS performs inspection and examination of all financial institutions in Korea, and, under approval from the FSC, can request dismissal of an institution's management or suspension of the institution's business. The FSS also acts as an arbitrator in disputes between financial institutions and their customers. The Financial Dispute Settlement Committee (FDSC), established in the FSS, is the supreme mediation body for resolving financial disputes. Its arbitration proposal has the same effect as a judicial compromise made by a court of law, if the parties concerned accept it. The FDSC, chaired by one of the Deputy Governors of the FSS, consists of members from various consumer groups and legal circles.

Fair Trade Commission

The Fair Trade Commission (FTC) is Korea's competition regulator. It is responsible for removing anti-competitive regulations and lowering economic concentration in all areas of the economy including payment and settlement. It prohibits financial institutions from making collusive pricing policy and imposing unfair terms in their service contracts. It also has the authority to order corrections and to impose penalty charges on violators.

Financial Sector Informationalization Promotion Committee

In accordance with the *Framework Act on Informationalization Promotion*, the Financial Sector Informationalization Promotion Committee, one of 23 sub-committees under the government's Informationalization Promotion Committee, supports construction of the nationwide financial networks.

The Committee, chaired by the Deputy Governor of the Bank of Korea, consists of delegates from the banking, insurance and securities industries. It sets up basic policies, selects joint projects, evaluates performance, and formulates safety measures for the effective promotion of financial electronic networks. Most electronic payment arrangements in Korea, such as the interbank shared networks, cheque truncation and K-CASH (e-money), were introduced by initiation of the Committee.

Korea Financial Telecommunications and Clearings Institute (KFTC)

The Korea Financial Telecommunications and Clearings Institute (KFTC) is a non-profit organization which was set up on a joint-ownership basis by member banks including the Bank of Korea in June 1986.

KFTC is the operator of all retail payment systems in Korea. Retail payments such as cheque and CD/ATM transactions are netted out on a multilateral basis for the operational efficiency of the systems. KFTC verifies retail payment information, calculates the interbank net obligations of members and makes a request for final settlement to the Bank of Korea. In addition, KFTC operates a SWIFT (Society for Worldwide Interbank Financial Telecommunication) Access Point, connecting financial institutions in Korea to the SWIFT network and acting as a national secretariat for National Member Groups and User Groups. KFTC is also committed to the standardization of message formats, banking codes and communication protocols related with electronic banking.

KFTC has three classes of membership: general, associate and special. Both general and associate members are entitled to participation in all retail payment systems operated by KFTC. General members, however, have voting rights in the General Meeting, the KFTC's supreme decision-making body, while associate members are unable to participate in the decision-making process. Only banks are eligible for general and associate membership. The Bank of Korea is also a general member of KFTC. Financial institutions that want to join one or more specific systems are able to obtain special memberships under approval of the General Meeting. The costs of running KFTC are met by members' admission fees, annual basic fees and transaction fees based on their usage.

As of the end of December 2001, there were 12 general members, 12 associate members, and 14 special members.

2. Payment methods

Introduction

There are various payment instruments and services used in Korea today. However, recent trend shows that credit cards and electronic funds transfers have become more popular, while cheque usage has been decreasing. As shown in Table 2, the share of electronic funds

transfers among non-cash retail payments in Korea has increased from 8% to 41% while the share of cheques and bills has decreased from 75% to 25% in the last ten years. Considering that the efficiency of a payment system depends on how rapidly and cost-effectively payments and settlements are completed, it would appear that the expanded use of payment cards and electronic funds transfers has contributed greatly to the efficiency of payment systems in Korea.

Table 2: Share of Non-cash Retail Payments

(percentage of total volume)

	1991	1995	1997	1998	1999	2000	2001
Paper-based payments	87.3	67.1	59.5	52.1	47.4	41.7	36.4
<i>Cheques & bills</i>	74.6	50.1	45.0	39.0	35.9	30.8	24.9
<i>Funds transfers</i>	12.7	17.0	14.5	13.1	11.5	10.9	11.5
Electronic payments	12.7	32.9	35.8	40.5	47.9	52.6	63.6
<i>Funds transfers</i>	7.5	22.5	25.9	30.7	37.1	39.4	40.7
<i>Payment cards</i>	5.2	10.4	9.9	9.8	10.8	13.2	22.9

2.1 Cash

Cash is still widely used in Korea, owing to its intrinsic convenience for small-value transactions as well as to Koreans' traditionally strong preference for cash. Banknotes and coins are issued solely by the Bank of Korea and cannot be refused, as legal tender, in any transactions. In Korea, banks are allowed to include their banknote holdings as part of their required reserves against customers' deposits.

Currently, the BOK issues banknotes in three denominations – KRW 1,000, KRW 5,000, and KRW 10,000, and coins in six denominations – KRW 1, KRW 5, KRW 10, KRW 50, KRW 100, and KRW 500. At the end of 2001, the total value of banknotes and coins issued amounted to KRW 22 trillion (about USD 17 billion), and KRW 1 trillion (about USD 0.8 billion), respectively. By value, around 85% of banknotes and coins are circulating outside banks.

2.2 Cheques and bills

Cheques and bills were the most popular non-cash payment instruments until the mid-1990s, and virtually the only means of non-cash payment until the 1980s. Cheques and bills still remain a common payment instrument, even though their share in total payments has been decreasing due to the recent expansion of electronic payments. In 2001, cheques and bills cleared through the clearing houses nationwide totaled KRW 5,803 trillion (around USD 4.5 trillion) by value and 1,094 million by volume, representing 67% by value and 25% by volume of all non-cash retail payments.

Various types of cheques and bills are currently used in Korea, namely cashier's cheques, current account cheques (corporate cheques), household cheques, promissory notes, etc. Among these cheques, cashier's cheques drawn by a bank on itself are most widely used, like cash, because they can be both cashed instantly at any bank and the highest denomination of banknote in Korea is only KRW 10,000, worth less than USD 10. There are four types of preset-value cashier's cheques used in Korea, among which the KRW 100,000-denomination

is the most popular as a substitute for banknotes. By volume, cashier's cheques account for 98% of all cheques and bills cleared through the clearing houses, and the KRW 100,000-denomination cashier's cheques make up around 80%.

Current account cheques and promissory notes drawn by companies on their chequing accounts are used mainly for large-value business transactions. In 2001, the clearing value of current account cheques and promissory notes totaled KRW 3,574 trillion (around USD 2.7 trillion), representing more than 60% of all cheques and bills by value. Promissory notes cause problems of the deferred payments and the default risk and aggravates small companies' financial burden. The BOK and the banking industry have established substitute payment schemes such as corporate procurement loans and corporate purchase cards in order to reduce the use of promissory notes (see section 3.9.2).

Household cheques for individual customers were first introduced in 1981 to reduce cash usage and to substitute for cashier's cheques, but their use has decreased substantially in recent years due to the development of electronic payment instruments as well as the default risk. In 2001, household cheques represent only 0.4% of all cheques and bills by volume.

2.3 Funds transfers

A fund transfer enables a payer to transfer funds to a payee's account without any exchange of cash or cheques. Funds transfers in Korea include credit transfers and debit transfers in which funds are transferred on the payment order of the payer and payee, respectively.

In Korea, credit transfers are available through various retail payment systems. Credit transfers with regular frequency, such as installment sales, tax, and public utilities payments, are made through the Bank Giro System. It takes two or three days for a payee to receive funds transferred under the Bank Giro System. Credit transfers for general-purpose payments, with irregular frequency between individuals, are executed through the interbank shared networks, such as the IFT (Interbank Funds Transfer), the CD/ATM and the Electronic Banking Systems. In the Electronic Banking Systems, payments are made using telebanking, Internet banking and mobile banking. In contrast to the Bank Giro System, the shared networks enable payees to receive cash instantly after payers transfer funds. In year 2001, credit transfers totaled 1,968 million, with a value of around KRW 2,549 trillion (about USD 2 trillion), which represented around 45% of all non-cash retail payments by volume, and 30% by value.

Debit transfers for public utilities and insurance payments, which are pre-authorized by the payer, are currently available through the Bank Giro System only. In year 2001, debit transfers totaled 329 million by volume and KRW 23 trillion (approximately USD 18 billion) by value, representing 7.5% by volume and 0.3% by value of all non-cash retail payments, respectively.

2.4 Payment cards

Credit cards

Credit cards, which were first introduced in 1969, are used widely in small-to-medium-value transactions in Korea. Most cards are affiliated with VISA and MasterCard for international use. With the credit cards, cardholders can purchase not only goods and services with an interest-free billing period of up to 56 days, but also obtain cash advances instantly up to the pre-arranged limits via CD/ATM.

The share of credit cards among non-cash retail payments has increased significantly, by about 4 times, over the last ten years. This result has come mainly from the credit card companies' aggressive expansion strategies such as offering exemptions from annual fees and loyalty reward programs. In addition, the government introduced tax deductions and a lottery scheme for credit card purchases in 1999, to encourage credit card usage and obtain the exact sales records of merchants for taxation purposes.

During the year 2001, the total value of credit card purchases was about KRW 176 trillion (about USD 135 billion), and the cash advances totaled KRW 268 trillion (about USD 205 billion). As of the end of 2001, there were 89 million credit cards issued in Korea, which indicates that each person aged 18 or over, who is eligible to be issued a card in Korea, holds 2.5 cards on average.

Debit cards

Debit cards, which were introduced in 1996, allow their holders to purchase goods and services in affiliated retail shops. Payments are debited immediately from the accounts of the cardholders and are credited on the next business day to the accounts of retailers through the point-of-sale (POS) terminal. Debit cards are also used for cash withdrawals from cash dispensers (CDs) and automated teller machines (ATMs).

Debit cards are not widely used in Korea mainly because most applicants, irrespective of their creditworthiness, have no difficulty obtaining credit cards, a close substitute for debit cards. Owing to the intensive competition among credit card companies, credit cards are usually even issued to students and housewives with no regular incomes, thus removing potential debit card demand. In 2001, payments by debit cards totaled less than 2 million by volume, representing only 0.04% of all non-cash retail payments.

Prepaid cards

Single-purpose prepaid cards with embedded magnetic stripes were first introduced in 1994. The maximum stored value on a prepaid card is KRW 500,000. Telephone and public transportation (bus & subway) cards of this type are becoming very popular.

E-money called K-CASH, a general-purpose prepaid card, was first developed in 2000, and other types of e-money, Mondex cards and Mybi cards, were introduced afterward. An e-money card stores the maximum value of KRW 500,000 in an embedded IC (integrated circuit) chip. E-money is still in its trial stage and is not widespread yet in Korea.

3. Interbank settlement systems

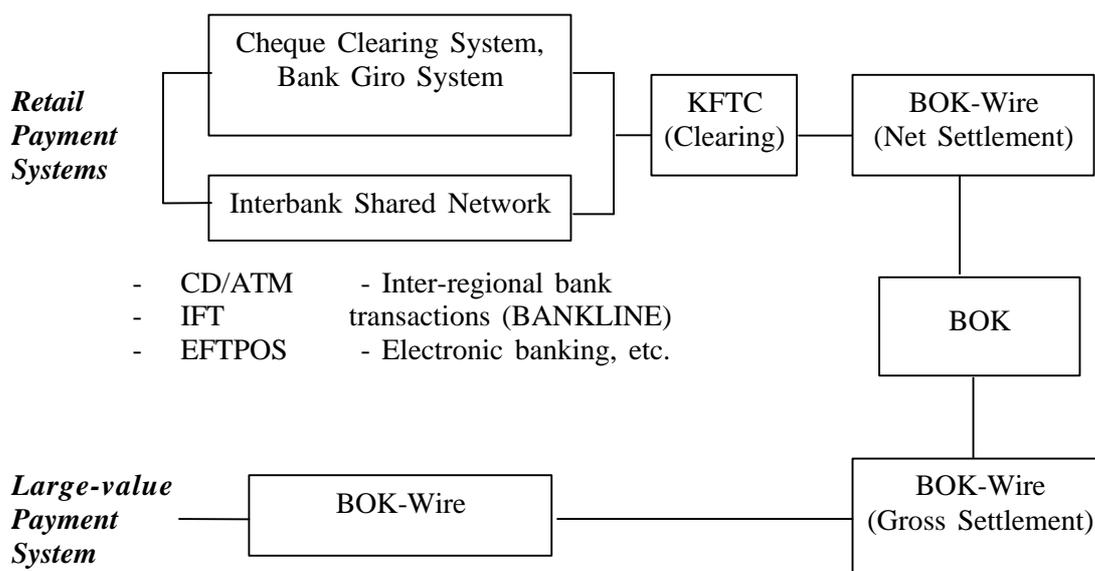
Overview

The Korean interbank settlement system consists of one large-value funds transfer system, BOK-Wire, and ten retail payment systems.

All of the ten retail payment systems that deal with cheques, bank giro, and other electronic small-value payments are under the management of KFTC. They adopt multilateral net settlement, and final settlement is made across the participants' accounts at the BOK on the following business day.

BOK-Wire is owned and operated by the Bank of Korea. It is an online network that connects the BOK with the financial institutions to allow transfer of funds on a real-time gross basis. It provides settlement finality for almost all transactions, from large-value foreign exchange transactions of banks to interbank settlement of individuals' small-value ATM transactions. Settlement value through BOK-Wire accounts for around three quarters of all non-cash payments in Korea. Chart 1 shows the basic structure of interbank settlement systems in Korea.

Chart 1: Structure of Interbank Settlement Systems in Korea



3.1 BOK-Wire

3.1.1 Ownership

The Bank of Korea Financial Wire Network (BOK-Wire), the only real-time gross settlement system in Korea, is owned and operated by the Bank of Korea. The Bank of Korea introduced BOK-Wire in December 1994 to handle large-value funds transfers between banks more efficiently.

3.1.2 Participation

In principle, participation in BOK-Wire is open only to institutions that are eligible to hold current accounts with the Bank of Korea. However, since nearly all financial institutions, such as banks, securities companies, insurance companies and other related institutions, are currently allowed to hold current accounts with the BOK, most financial institutions and some special purpose companies are eligible to participate in BOK-Wire subject to the Bank of Korea's approval. There is no special membership class. Regardless of whether participants are banks or non-banks, the same access criteria are applied and the same level of service except intraday overdraft which is extended only to banks is provided. A remote access to BOK-Wire is not available. As of the end of December 2001, there were 65 banks and 67 non-bank institutions participating in BOK-Wire.

3.1.3 *Type of transactions*

BOK-Wire enables participants to transfer domestic currency funds irrespective of the reasons for payments. It also settles net positions of retail payments such as cheque, bank giro and CD/ATM transactions, and the cash leg of OTC bond transactions on a DVP basis (see section 4.2.3). In addition to domestic currency transfers, US dollar and Japanese yen transfers are available between participants' foreign currency accounts held with the BOK. The *Bank of Korea Act* requires that all banks in Korea maintain reserve balances on their customers' foreign currency deposits with the BOK.² The required reserves are deposited in US dollar or Japanese yen at the BOK foreign currency accounts. A BOK-Wire member bank can transfer US dollars and Japanese yen from its account to other member bank's account through BOK-Wire, without sending a payment instruction to its oversea correspondent bank. In this way reserve account balances are conveniently adjusted between banks with excess reserves and banks with insufficient reserves.

Through BOK-Wire, the BOK deals with settlements related to the BOK's loans, as well as the disbursement and receipt of government treasury funds. In addition, BOK-Wire provides participants with settlement services related to issue, transfer, repurchase, and redemption of government bonds and BOK Monetary Stabilization Bonds (MSBs).

BOK-Wire also provides a third-party funds transfer service for non-participants. Companies and individuals are able to transfer large-value funds (minimum KRW 1 billion per transaction, about USD 0.8 million) to their customers' accounts through BOK-Wire participants.

Although there is no maximum or minimum limit on transaction amounts, except for that on third-party funds transfers, each transaction amount is extremely large, with the average being KRW 14 billion (about USD 11 million); far greater than the average of KRW 2 million (about USD 1,500) for retail payment system transactions.

3.1.4 *Operation of the system*

The online operating hours of BOK-Wire are 9:30 - 17:00 from Monday to Friday and 9:30 - 13:30 on Saturday. The Bank of Korea can extend the operating hours of BOK-Wire if necessary.

3.1.5 *Settlement*

All funds transfers are carried out on a real-time basis and on a gross, trade-by-trade basis. Net obligations of retail payments are settled at two designated times, 11:30 and 14:30, depending on the type of payment. Settlement for cheque payments is designated at 14:30 and settlement for the other retail payments such as CD/ATM, IFT and bank giro at 11:30. Designation of pre-fixed net settlement times for retail payments gives participants more flexibility in managing their funds during the day, thus ensuring smooth settlement operations through BOK-Wire. Once funds transfers and settlements have been made through BOK-Wire, they are irrevocable and unconditional. If a payment is made in error,

² The ratio of required reserves to foreign currency deposits ranges from 1% to 5% depending on the type of customer account. Besides reserve requirements on foreign currency deposits, domestic currency deposits are also subject to the BOK's reserve requirements. The ratio of required reserves to domestic currency deposits is 1-2% for time and savings deposits and 5% for demand deposits. In principle, interest is not paid on foreign and domestic currency accounts at the BOK.

the payer has to ask the recipient to carry out an offsetting transaction.

If the sending banks have insufficient funds in their accounts to cover settlement, their payment instructions are held in a queue in the BOK-Wire system. When sufficient balances are in place, the queued transfers are executed and settled on a by-pass FIFO (First-In, First-Out) basis. Under the by-pass FIFO principle, BOK-Wire attempts to process the first payment instruction in the queue, but if this is not possible owing to lack of funds the next payment instruction is then settled instead.

3.1.6 Risk management

To induce smooth settlements among participants, the BOK extends intraday overdrafts with no interest to a participating bank, which temporarily falls short of settlement funds. The basic ceiling for intraday overdrafts available for a bank is twice its average deposit balance held with the BOK. If a bank needs more than its basic ceiling, it may request the BOK's approval to increase its ceiling. If an intraday overdraft is not redeemed by the end of the same business day, it is automatically converted into a BOK's Temporary Loan with a penalty interest rate (average call transaction rate + 2% points). Banks are required to provide government bonds or Monetary Stabilization Bonds (MSBs) as collateral against intraday overdrafts. Non-bank institutions are not entitled to intraday overdrafts.

Half-day call transactions between participants are available to cover intraday funds' shortages at the designated settlement time for retail payments. A participant anticipating a net debit position in cheque clearing can also arrange the transfer of the necessary funds in advance, with other participants anticipating net credit positions at the designated settlement time.

3.1.7 Pricing policies

The BOK-Wire pricing scheme is based on transaction fees determined by the Bank of Korea. The funds transfer fees are KRW 150 (about USD 0.12) per transaction until 16:00, and KRW 300 (USD 0.23) after 16:00. A fee of KRW 500 (USD 0.4) is levied for cancellation of a pending transaction. There are no admission fees and no annual fees.

3.1.8 Governance

The Monetary Policy Committee (MPC) of the BOK sets up the principal policies of the BOK-Wire system, such as those on access, operation, pricing, risk management and security. The Bank of Korea formulates detailed operational rules in accordance with the MPC's policies, and makes agreements on admission and net settlement with participants in order to specify the rights and obligations of the BOK and participants.

3.2 Cheque Clearing System

3.2.1 Ownership

Like other retail payment systems in Korea, the Cheque Clearing System is owned and operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), owned by member banks.

3.2.2 Participation

There are currently two classes of members in the Cheque Clearing System – direct and indirect. Direct participants clear directly with one another and settle net obligations across their accounts at the BOK. General and associate members of KFTC are entitled to direct participation in the System. Since general and associate memberships are open to banks only, non-banks and banks other than general and associate members are required to obtain the prior permission of the KFTC's general meeting in order to participate directly in the Cheque Clearing System. Indirect participants appoint direct participants as their agents, to clear and settle their cheques on their behalf.

As of the end of December 2001, the Seoul Clearing House had 24 direct participants such as domestic banks and the Post Office, and 1,504 indirect participants such as foreign bank branches and mutual credit facilities.

3.2.3 Type of transactions

Cheques, promissory notes, bills of exchange and other payment documents such as postal money orders and dividend receipts are cleared through 51 clearing houses in Korea.

3.2.4 Operation of the system

The cheque clearing process in the Seoul area is as follows:

Cheques deposited by customers are automatically sorted by reader-sorter machines at the institutions' data centers. Most cheques have an MICR (magnetic ink character recognition) line encoding the detailed information such as the cheque amount and the payee's bank. Cheques are delivered to the Seoul Clearing House for overnight clearing by 1:00 on day T+1. Cheques of institutions without their own reader-sorters are sent to the clearing house by 19:00 on day T to be sorted by the clearing house on institutions' behalves. After exchange of cheques and final verification among participants, the clearing house calculates the net obligation of each institution on a multilateral basis and sends it to the Bank of Korea by 13:30 on day T+1 for final settlement. Meanwhile, by 14:30 on day T+1, the payer's bank should notify the payee's bank of any cheques which are expected to remain unsettled because of insufficient funds on payer's account. From 14:50 on day T+1, the payee's bank allows the payee to withdraw funds on cheques except those expected to remain unsettled. Unsettled cheques are put again in the regular clearing cycle and returned to the payee's bank.

In the Seoul Clearing House, cashier's cheques and some paper-based giro bills are cleared by online transmission of digital information only, without physical delivery, as cheque truncation has been implemented since May 2000 to reduce operating costs. The other clearing houses, where the clearing volumes are relatively small, use manual clearing.

For the sake of more rapid settlement of cheques issued in neighboring regions, mutual clearing between clearing houses is carried out. The 51 clearing houses in Korea are divided into eight area groups, and banks directly exchange cheques drawn on banks of other clearing houses in the same area group by 22:00 on day T. These cheques are cleared together with other cheques presented by banks of the same clearing house.

3.2.5 Settlement

Following the KFTC's notification to the Bank of Korea of participants' multilateral net settlement obligations, the Bank of Korea simultaneously credits and debits participants accounts at the designated time, 14:30 (13:00 on Saturdays) on day T+1.

3.2.6 Risk management

Multilateral netting applied to retail payments in Korea can reduce the size of participants' credit and liquidity risk by lowering the value of payments between participants. However, it could also increase systemic risk by increasing the possibility of one participant's failure causing the failures of other participants.

In order to contain systemic risk, the Cheque Clearing System has collateral arrangements under the control of the BOK. Every participant in this system is required to provide government bonds or BOK MSBs as collateral against its failure. The collateral requirement for each participant is equivalent to 30% of its daily average obligations. In the event of a participant's default, the BOK can sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. If the defaulting participant's collateral is insufficient to cover its settlement shortfall, or a participant is ordered to suspend its banking business by the Financial Supervisory Commission, unwinding can also be applied. Under unwinding, all of the cheques presented by and payable to the defaulting participant are removed from the calculation of participants' multilateral net settlement obligations.

3.2.7 Pricing policies

Participants in the Cheque Clearing System are required to pay annual basic fees and transaction fees based on the volume and value of their transactions.

Banks charge their customers collection fees of about KRW 1,000~10,000 for cheques drawn on banks located in other regions. There is generally no collection charge for cheques drawn on banks in the same mutual clearing region.

3.2.8 Governance

The General Meeting of KFTC, composed of all general members, acts as the supreme decision-making body for all retail payment systems including the Cheque Clearing System. It establishes basic policies on access, pricing, budget, and appointment of KFTC executives. Every member has one vote, and in the case of a tie the chairman, the Governor of the BOK, casts the decisive vote.

3.3 Bank Giro System

3.3.1 Ownership

The Bank Giro System, which was introduced in 1977, is also owned and operated by KFTC.

3.3.2 Participation

Like all other retail payment systems operated by KFTC, the Bank Giro System places restrictions on non-banks' access. Only general and associate members of KFTC are entitled to participate in the Bank Giro System, which means that non-bank institutions and banks

other than general and associate members must obtain the prior permission of KFTC's General Meeting to participate directly in the Bank Giro System. As of December 2001, there were 25 participants in the system, including the Post Office.

3.3.3 Type of transactions

Through its credit and debit transfer services, the Bank Giro System allows any individuals or companies to make use of all bank branches as their paying or receiving windows. In Korea, bank giro, accounting for about 20% of all non-cash retail payments, is the most efficient solution for companies' paying and collecting large volumes of recurring bills.

Credit transfers are carried out in paper-based or electronic form, depending on the type of transaction. Paper-based credit transfers are mainly used for paying specific-purpose bills such as insurance premiums, public utilities charges, regional government taxes, etc. Direct (electronic) credit transfers are used for making payments to large numbers of recipients, such as payroll deposits.

Direct debits allow payees, such as public utilities, insurance and credit card companies, to collect pre-authorized payments automatically from payers' bank accounts at regular intervals.

Meanwhile, KFTC also provides an Internet giro service, or electronic bill presentation and payment service, which is an electronic method of credit transfer for payments of public utilities and tax bills. This service is usually used by large organizations such as insurance and utilities companies, which send out substantial volumes of regularly recurring paper bills. Under the Internet giro scheme, a payee sends KFTC the details of the bills on a magnetic tape or online, and KFTC then posts the bills on its Internet giro web site without mailing paper giro bills to individual payers. Payers confirm the bills on the web site and the amounts involved are then automatically debited from their accounts. KFTC verifies the payments and requests the Bank of Korea to settle interbank net obligations.

3.3.4 Operation of the system

In the case of paper-based credit transfers, giro bills paid by customers are delivered to KFTC on day T. After processing the bills with reader sorters, KFTC sends payment details on a magnetic tape to each payee's bank. Settlement obligations are calculated on a multilateral basis and notified to the Bank of Korea on day T+2.

For direct credits, direct credit notices are first sent by the payer to KFTC on a magnetic tape or a floppy disk at least two days before the due date (T-2). After classifying and grouping all such notices by payees' banks, KFTC sends credit details to the payee's bank on day T-1. Settlement obligations are calculated on a multilateral basis and notified to the BOK for final settlement on day T.

In the case of direct debits, pre-authorized debit details, recorded on a magnetic tape or a floppy disk, are delivered to KFTC by the payee three days before the due date (T-3). On the due date, the debit is posted to the payer's account in accordance with the advice of KFTC. Final net settlement between banks and credit to the payee's account are completed on day T+3.

3.3.5 Settlement

The Bank of Korea posts the multilateral net settlement amount to each bank's account at 11:30 on the settlement date: day T for direct credits; day T+2 for paper-based credits; and day T+3 for direct debits.

3.3.6 Risk management

In order to contain systemic risk caused by a participant's possible settlement failure, each participant is required to pledge government bonds or BOK MSBs equal to 30% of its daily average obligation as collateral. The collateral is under the control of the Bank of Korea. In the event of a participant's default, the BOK can first sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. If the value of the bonds is not sufficient to cover the amount involved, loss sharing among all participants takes place.

3.3.7 Pricing policies

Participants in the Bank Giro System are required to pay annual basic fees and transaction fees based on their usage.

Banks levy fees for bank giro services on corporate customers who pay and collect large volumes of bills. Fees are not levied on individual customers. Giro service fees, set by KFTC, range from KRW 120 to 400 per transaction for paper-based credits, and from KRW 30 to 50 for direct debits. Fees for direct credits have been deregulated and differ among banks.

3.3.8 Governance

Governance arrangements for the Bank Giro System are the same as those for the Cheque Clearing System.

3.4 Interbank Funds Transfer (IFT) System

3.4.1 Ownership

The Interbank Funds Transfer (IFT) System, which was introduced in 1989, is owned and operated by KFTC.

3.4.2 Participation

Regulations on participation in the IFT System are the same as those for the Bank Giro System. As of the end of December 2001, there were 30 participants including the Post Office.

3.4.3 Type of transactions

The IFT System enables a customer visiting a bank branch to transfer funds to a payee holding an account at any bank across the nation on a real-time basis. A customer can use any bank, whether or not he holds an account with it, for funds transfers. IFTs are made on a 'single-payer-to-single-payee' basis for general-purpose payments with irregular frequency, while bank giro is used on a 'from-one-to-many' or 'from-many-to-one' basis for specific-purpose payments with regular frequency. IFT services have a ceiling of KRW 100 million (approximately USD 80,000) per transaction.

3.4.4 Operation of the system

A funds transfer instruction requested by a payer at the bank counter is put in the system by a bank clerk and sent to KFTC, which in turn transmits the instruction to the payee's bank. Upon receiving the instruction, the payee's bank credits the payee's account. The entire process is completed in a few seconds. IFT services are available between 9:30 and 16:30 (13:30 on Saturdays), which corresponds to bank business hours.

3.4.5 Settlement

A payee can withdraw funds immediately once they have been credited to his/her bank account, but interbank settlement is finalized at 11:30 on the next business day. KFTC calculates the multilateral net positions of participants and transmits the details online to the Bank of Korea and participants.

3.4.6 Risk management

Since the IFT System is based on net multilateral settlement like other retail payment systems, a set of risk management arrangements have been set up to reduce systemic risk. The IFT System limits a participant's aggregate net debit, because interbank payment orders are transmitted in real time and payments to customers are made prior to final interbank settlement.

Each participant in the system is required to set its own net debit cap through self-assessment based on its past settlement records, and then collateralize this with Monetary Stabilization Bonds or government bonds. The collateral requirement for each participant is 20% of its net debit cap. The collateral is under the control of the Bank of Korea, and in the event of a participant's default the BOK can first sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. Loss sharing among all participants is carried out if the value of the bonds is not sufficient to cover the default.

3.4.7 Pricing policies

Participants in the IFT System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their customers for use of the IFT network at their discretion. Fees range from about KRW 500 to 7,500, depending on the remittance amount and the location of the payee. IFT services handled by bank clerks at bank counters have a higher fee scheme than those for other automated funds transfers such as CD/ATM and Internet banking transactions.

3.4.8 Governance

Governance arrangements for the IFT System are the same as those for the Cheque Clearing System.

3.5 Interbank CD/ATM System

3.5.1 Ownership

The Interbank CD/ATM System, launched in 1988, is owned and operated by KFTC.

3.5.2 Participation

The CD/ATM System has the same regulations on participation as the Bank Giro System does. As of December 2001, there were 25 participants, including the Post Office.

3.5.3 Type of transactions

Since cash dispensers (CDs) were first introduced into Korea in 1975 and automated teller machines (ATMs) added in 1984, they have grown to become one of the most popular payment schemes. Especially, the recent increase of unstaffed bank branches has greatly influenced the installations of off-premise CDs and ATMs. At the end of 2000, the number of CDs and ATMs in Korea was 1.02 machines per 1,000 inhabitants, a larger number than in many other countries.³

The nationwide CD/ATM network in Korea supports cash withdrawals, funds transfers and deposit balance inquiries by the cardholders of any member bank. It allows cardholders electronic access to their accounts without the need to visit a bank branch. The network provides this convenience on a real-time basis by linking CDs and ATMs in a shared system and by allowing cardholders from many banks to access accounts from any CDs and ATMs in the network. Funds transfers through the CD/ATM network have a ceiling of KRW 10 million (approximately USD 8,000) per transaction.

3.5.4 Operation of the system

When a cardholder puts a card into an ATM for cash withdrawal, the relevant information is transmitted electronically to the ATM owner. The ATM owner sends the information to the card issuer through KFTC's switching computer. After verifying the information, the card issuer sends an authorization message to the ATM owner via KFTC, enabling the customer to withdraw cash.

The process of an ATM funds transfer is much the same as that of a funds transfer made at a bank counter through the IFT network. A payee is able to withdraw cash from his bank instantly after a payer makes a funds transfer through an ATM. CD/ATM services are available between 8:00 and 23:30 seven days a week.

3.5.5 Settlement

Interbank funds settlement in this system is completed on a net basis at 11:30 on the next business day through the banks' accounts at the Bank of Korea. KFTC calculates the multilateral net positions of participants and transmits the details online to the Bank of Korea

³ According to the Statistics on Payment Systems in the Group of Ten published by the CPSS, the number of CDs and ATMs per 1,000 inhabitants in most of the G-10 countries was less than one machine at the end of 1999. The United States had 0.83 machine per 1,000 inhabitants, the United Kingdom 0.48 machine, Canada 0.87 machine, and Germany 0.55 machine. Japan had the highest number of CDs and ATMs, 1.14 machines per 1,000 inhabitants.

and the individual banks.

3.5.6 Risk management

The risk management arrangements for the CD/ATM System are exactly the same as those applied to the IFT System, i.e. net debit caps, collateralization and loss sharing.

3.5.7 Pricing policies

Participants in the CD/ATM System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their cardholders CD/ATM service fees at their discretion. There is generally no charge when cardholders use CDs or ATMs owned by their banks. However, cardholders pay transaction fees to their banks when they withdraw cash through CDs or ATMs owned by other network members. Fees vary from KRW 500 to 900, depending on the bank. Cardholders' banks pay interchange fees to the ATM owners for provision of ATM access services to their customers. The interchange fee, determined by KFTC, is currently KRW 300 per transaction.

When cardholders transfer funds through CDs or ATMs to accounts held with other banks, they pay fees ranging between about KRW 500~7,000 to their banks, depending on the amount of the funds transferred and the location of the payee.

3.5.8 Governance

Governance arrangements for the CD/ATM System are the same as those for the Cheque Clearing System.

3.6 Electronic Funds Transfer at the Point of Sale System

3.6.1 Ownership

The Electronic Funds Transfer at the Point of Sale (EFTPOS) System was organized as an interbank network in 1996. It is owned and operated by KFTC.

3.6.2 Participation

The EFTPOS System has the same membership arrangements as the Bank Giro System does. As of December 2001, 19 banks participated in this system and six network companies including KFTC provided network services between retailers and banks.

3.6.3 Type of transactions

The EFTPOS System enables debit-card holders to purchase goods and services from any affiliated retailers by providing them with electronic access at the point-of-sale to their bank accounts. The limits on the amount that a cardholder can spend are KRW 500,000 (approximately USD 400) per transaction and KRW 1 million (approximately USD 800) per day.

3.6.4 Operation of the system

The cardholder presents the card to the retailer and enters a personal identification number (PIN), and the relevant information is then transmitted to the cardholder's bank through the network. The cardholder's bank debits the purchaser's account and returns an authorization to the retailer through the network. In the meantime, the network sends the trade information to KFTC by magnetic tape or online, one day after the trade date.

Debit card services through the EFTPOS System are available between 8:00 and 22:00 everyday including holidays.

3.6.5 Settlement

Although the customer's account is instantly debited at the point of sale through the EFTPOS network, the interbank settlement occurs on a deferred net basis. The interbank net positions are calculated by KFTC, and are then settled across the banks' accounts held with the Bank of Korea at 11:30 on the day after the trade date. After interbank settlement has been completed, the bank transfers the relevant funds to the retailer's account on the same day.

3.6.6 Risk management

The risk management arrangements for the EFTPOS System are exactly the same as those applied to the Bank Giro System, i.e. collateralization and loss sharing.

3.6.7 Pricing policies

Participants in the EFTPOS System are required to pay annual basic fees and transaction fees based on their usage.

Retailers in the debit card network are required to pay 1-2% of the value of each transaction as a merchant service fee to the card issuers. The card issuers, meanwhile, pay 15% of the merchant service fees to the network operators. There is no fee for cardholders.

3.6.8 Governance

Governance arrangements for the EFTPOS System are the same as those for the Cheque Clearing System.

3.7 Electronic Banking System

3.7.1 Ownership

The Electronic Banking System was organized as an interbank shared network in 2001. It is owned and operated by KFTC.

3.7.2 Participation

The Electronic Banking System has the same regulations on membership as the Bank Giro System does. As of the end of 2001, 28 institutions consisting of 25 domestic banks, two foreign banks and the Post Office were participating in this network.

3.7.3 Type of transactions

The Electronic Banking System in Korea supports funds transfers, account information inquiries and loan services, using the telephone and the Internet to communicate customers' instructions to their banks. Customers using IFT or CD/ATM services must visit bank branches, CDs or ATMs during limited operating hours. In the Electronic Banking System, however, customers are able to use services around the clock all year around in their offices, at home and even on the streets, through telephone, mobile phones or personal computers. Funds transfers have a ceiling of KRW 1 billion (approximately USD 800,000) per transaction

In 2001, the number of interbank transfers through the Electronic Banking System averaged around 0.7 million a day, with a value of around KRW 3.3 trillion (about USD 2.5 billion) a day. They represented 3.5% by volume of all non-cash retail payments, and 8.3% by value.

With the tremendous growth of Internet access in Korea in recent years, all banks are encouraging the use of Internet banking through assessing cheaper service fees to it than to other payment products. In December 2001, around 24 million people, or 56% of the South Korean population, were estimated to have access to the Internet at least once a month. About 9 million Koreans, or more than one-third of these Internet users, used Internet banking services. Daily usage of Internet banking services such as funds transfers and account information inquiries averaged around 3 million.

3.7.4 Operation of the system

In order to use Internet banking and phone banking services, a customer is first required to establish an electronic banking agreement with that bank. An Internet banking user must obtain a digital certificate from a certification authority through the Internet. A digital certificate is an electronic file which identifies the real user in all Internet transactions, such as Internet banking and e-commerce. Internet transactions made with digital certificates have legal validity in Korea under the *Digital Signature Act*. Phone banking services do not require digital certificates.

Like with other electronic retail payments, funds transfers in the Electronic Banking System are made on a real-time basis. The entire process of funds transfer is the same as those in IFT and CD/ATM transactions. The system operates around the clock. Some banks, in fact, provide 24-hour electronic banking services.

3.7.5 Settlement

Although the customer's account is instantly debited and credited upon delivery of the payment instruction, interbank settlement takes place on a deferred net basis. The Bank of Korea settles the interbank net positions for funds transfers done by 23:30 at 11:30 on the day after the trade date.

3.7.6 Risk management

The risk management arrangements for the Electronic Banking System are exactly the same as those applied to the IFT System, i.e. net debit caps, collateralization and loss sharing.

3.7.7 Pricing policies

Participants in the Electronic Banking System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their customers transaction fees for electronic banking services. Most banks currently levy a fixed fee of KRW 300 - 1,000 per transaction on funds transfers. To encourage less costly transactions, some banks do not charge any fees on their Internet banking services.

3.7.8 Governance

Governance arrangements for the Electronic Banking System are the same as those for the Cheque Clearing System.

3.8 Other retail payment systems

The Cash Management Service (CMS) System, established in 1996, supports companies' large-volume and small-value funds transfers. The CMS System enables a company with several accounts in more than one bank to make and receive a number of payments electronically through its accounts, and to produce multi-banking reports. Interbank settlement is carried out through the BOK account on a multilateral net basis at 11:30 on the settlement date.

The BANKLINE System, an inter-regional bank network established in 1997, allows customers access to all regional banks across the country. Customers of regional banks are able to withdraw cash from and deposit cash to their accounts at any regional bank, and remit funds to any other regional bank. For inter-regional bank settlements, the Bank of Korea posts the multilateral net settlement amount to each bank's account at 11:30 on day T+1.

The Electronic Money System, established in 2000, supports clearance of interbank settlement obligations arising from K-CASH payments for goods and services. Under the System, payments to retailers and multilateral net settlements between banks are made on the following business day.

The E-Commerce Payment Gateway, established in 2000, is a shared network for settlement of interbank obligations arising from Business-to-Consumer transactions over the Internet. Arrangements for payments to retailers and interbank settlements are the same as those for the Electronic Money System.

3.9 Major projects and policies being implemented

3.9.1 Development of e-money

A few kinds of e-money have been developed in Korea, in the form of stored-value cards. K-CASH, the first e-money with an embedded IC chip containing encrypted card information, was initiated by KFTC, banks and credit card companies, and experiments with its use were launched in some regions in Korea in 2000. Another e-money, the Mybi card, was introduced by a regional Korean bank. Its pilot project was begun in 2000 in Pusan, a regional city in Korea, and is being expanded into the field of transportation. Mondex Korea, a subsidiary of MasterCard Corp, launched the Mondex card scheme in 2000, in which chip-to-chip funds

transfers are available. Other private sector companies are also planning to develop e-money on a joint business basis. All types of e-money in Korea are issued by commercial banks.

E-money is currently in the pilot stage in Korea, and customer penetration is very weak due to certain reasons, for example, the lack of noticeable advantages of e-money use compared with use of other substitutes such as credit cards and prepaid transportation cards; and high investment costs in the formative stage of the network.

3.9.2 *Discouragement of promissory note usage*

Since promissory notes, as a means of payment, give buyers a financial advantage in that payments can be easily deferred into the future date, they have been used extensively in Korea by large companies which purchase materials and semi-processed goods from small companies. Small and medium companies in Korea are usually at a considerable disadvantage compared to large companies in negotiating the terms of business transactions. Small companies are forced to accept promissory notes with maturity of two or three months for ongoing business transactions with their purchasers.

With all their widespread use, it is true that promissory notes have certain drawbacks as a means of payment. Promissory notes enable buyers, or large companies, to easily pass their financial burden on to sellers, mostly small companies, with no interest. Sellers have to wait until maturity of promissory notes to obtain cash settlement, or cash promissory notes through banks' discounts before the day of maturity. This indicates that sellers bear additional costs after finishing the delivery of goods, such as handling cost and interest cost. Also, since a promissory note can be signed over to others with endorsement, default by an original issuer of a note can result in successive defaults of all users involved in the note's circulation. Moreover, promissory notes cause financial institutions considerable handling costs for issuance, collection and storage. In this context, a couple of arrangements have been developed to discourage the use of promissory notes for non-financial transactions between firms.

The Bank of Korea introduced the corporate procurement loan scheme in 2000. After delivering goods, the seller draws a bill of exchange on the buyer for the full amount of sale, instead of receiving a promissory note, and presents it to the buyer's bank through the cheque clearing process. The buyer's bank then extends the corporate procurement loan to the buyer, who uses this loan to settle the bill of exchange. The seller receives cash shortly after interbank settlement. The buyer's bank charges interest for the loan to the buyer. In order to secure the widespread adoption of the corporate procurement loan scheme, the BOK provides banks with the BOK loan up to half of their total corporate procurement loans.

Another arrangement, the corporate purchasing card scheme, was introduced in 1999 by some commercial banks. A corporate purchasing card is a kind of special credit card used by purchasing firms as a substitute for promissory notes. Its use is limited to purchase of specific goods and services from member firms of the card system. Suppliers can be instantly paid for their goods by the banks.

3.9.3 *Structuring legal framework of electronic financial transactions*

Electronic financial transactions and e-money in Korea are regulated partly by existing laws such as the *Commercial Act* and the *Framework Act on Electronic Commerce*. With recent technological advances, however, especially based on the Internet, these laws are not able to appropriately embrace all aspects of electronic money, e-commerce and participants. The

government is planning to introduce a basic law governing electronic financial transactions, in cooperation with the Bank of Korea, the Financial Supervisory Service, KFTC and other experts. The law is expected to mainly deal with aspects which are not addressed by other laws at present, such as the rights and obligations of users, customer protection, risk control and supervision related to electronic financial transactions, as well as the establishment of Internet banks. The law will also be designed to play the role of a minimum requirement, rather than a strict regulatory tool, in order to accommodate the rapid advance of technology and avoid the drawbacks of over-regulation.

3.9.4 Development of B-to-B e-commerce payment system

In spite of the fact that business-to-business e-commerce in Korea is conducted online over the Internet, because of lack of a shared online payment network available to all banks, most of the settlements take place off-line outside computer networks. In order to provide an interbank payment scheme for B-to-B e-commerce transactions, KFTC is developing an e-commerce payment network, which is scheduled to be put into operation in early 2002. Electronic bills will be available as a means of payment at the outset of operation, and billing and settlement for them will be made online over the network. An electronic bill is issued to a seller by a buyer through its bank and then is registered in an electronic form at KFTC to guarantee the existence of the bill. The seller can hold the bill until it matures, or borrow money on the security of the bill from its bank. Electronic bills are expected to reduce the use of promissory notes (see section 3.9.2). Corporate purchasing cards and corporate procurement loans will be also adopted as available payment methods for B-to-B e-commerce in the near future.

4. Securities settlement systems

Introduction

In Korea, securities clearing and settlement are carried out separately for different types of securities traded in three markets: the Korea Stock Exchange (KSE), the Korea Securities Dealers Association Automated Quotation (KOSDAQ) and the over-the-counter (OTC) markets.

Stocks are traded mainly on two highly organized markets: the KSE and the KOSDAQ.⁴ The cash legs of stock transactions on the two markets are settled in commercial bank money, and the securities legs on a Korea Securities Depository (KSD) book-entry basis. Multilateral netting is used and final settlement is conducted two days after the trade date (T+2).

⁴ Besides the two stock exchanges, a third stock market named the OTC Bulletin Board market was officially opened in 2000 to ensure fairness in the trading of OTC stocks that are not listed on the KSE or the KOSDAQ. Securities companies direct bid-offer prices to the OTC Bulletin Board trading system, which matches the orders between potential counterparties. Settlement is done on a bilateral net basis on day T+2 through book-entry transfer by KSD. The market is still in an early stage, and its trade turnover, about KRW 350 million (about USD 0.3 million) a day, is small compared with those in the other markets.

In addition, an Electronic Communication Network (ECN) was introduced in December 2001 as an alternative trading system to the regular markets. Its trading hours are from 16:30 to 21:00. Stocks listed on the KSE and KOSDAQ markets are traded at the closing prices made in the two markets.

Although bond trading in Korea is available in both the KSE and OTC markets, more than 95% of bond trades are carried out in the latter. The OTC market is an unorganized market where various types of bonds, such as government bonds, corporate bonds and financial bonds, are traded between institutional investors. Bonds traded in the OTC market are settled on a DVP basis in central bank money or on a free-of-payment delivery basis in commercial bank money, on a trade-by-trade basis on the trade date (T+0).

KSD acts as operator of the settlement systems for stocks and bonds traded in the KSE, the KOSDAQ and the OTC markets, providing book-entry transfer and centralized depository services.

Table 3 summarizes the structure of securities settlement in Korea.

Table 3: Structure of Securities Settlement in Korea

	Stocks	Bonds	
Market	KSE, KOSDAQ	KSE (IDM ¹ , GBM ²)	OTC
Clearing entity	KSE market: KSE KOSDAQ: KSD	KSE	-
Settlement/ depository entity	KSD	KSD	KSD
DVP model	Model 3	Model 3	Model 1 or free-of-payment delivery
Settlement funds	Commercial bank money	IDM: central bank money GBM: commercial bank money	Central bank money, or commercial bank money
Settlement date	T+2	T+0	T+0
Method of Settlement	Multilateral netting	multilateral netting	gross settlement

1) Inter-dealer Market where government bonds only are traded between authorized dealers.

2) General Bond Market where all types of bonds are traded.

4.1 Stocks

4.1.1 Trading

4.1.1.1 Market overview

The Korean stock market is divided into two separate exchanges – the KSE and the KOSDAQ markets. The KSE market commenced trading with only 12 listed stocks in 1956, and has currently grown into the largest securities market in Korea, dealing with various types of securities and market index derivatives. In 2001, 690 companies were listed on the KSE stock market, and more than 400 million shares, with a value of around KRW 1.8 trillion (around USD 1.4 billion), were traded each day.

Korea

As a second stock exchange in Korea, the KOSDAQ market was established under management of the Korea Securities Dealers Association in 1996, through reorganization of the existing OTC stock market into a more systematic market. The KOSDAQ market has grown rapidly to support high-tech companies and small and medium-sized enterprises in raising long-term funds effectively. In 2001, the average daily turnover in the KOSDAQ market was KRW 1.8 trillion, showing the same value as in the KSE market. As of the end of December 2001, 721 companies were listed on the KOSDAQ market.

4.1.1.2 Trading system

KSE Market

The Korea Stock Exchange (KSE) market is open from 9:00 to 15:00, with no lunch break, Monday through Friday. Besides the regular trading session, the KSE operates an after-hour session from 15:10 to 15:40, during which customers trade securities at the closing prices of the day. Customers in the market place orders through member companies by phone, in writing or by way of the Internet. A computerized order-routing system enables securities companies to transmit orders directly to the KSE trading system.

Access to KSE membership is confined to securities companies only, both domestic and foreign. The KSE has two classes of memberships, regular and special. Regular members have both voting rights and claims on the KSE properties, while special members have only the right to use the trading facility. A regular member is required to pay an admission fee based on the net assets of the KSE and a membership premium, while a special member pays a membership premium and an annual membership fee equivalent to one-year interest on deposit of an admission fee. Both types of members also pay transaction fees geared to their daily average transaction values.

The general meeting, which is made up of all regular members, approves admission to KSE membership and sets basic policies on KSE management. The board of directors of the KSE is empowered to establish trading arrangements for the KSE market, concerning such matters as products traded, order placements and matching, along with clearing, settlement and market surveillance. In order to represent the public interest, public directors, appointed from among persons not engaged in the securities business, are also included on the KSE board of directors.

KOSDAQ Market

The KOSDAQ Stock Market, Inc., founded and financed jointly by the Korea Securities Dealers Association (KSDA), the Korea Securities Depository (KSD) and securities companies, operates a virtual trading floor, i.e. a central computer trading system in which transactions are made. The KOSDAQ market is open from 9:00 to 15:00, with no lunch break, Monday through Friday. The entire process of order placement and price matching is the same as that in the KSE market.

The KSDA has responsibility for market management, market surveillance, listing examination and corporate disclosure. Participation in the KOSDAQ market is granted to regular and special members of the KSDA only, i.e. domestic and foreign securities companies. Regular members have voting rights and claims on assets of the KSDA, while special members do not. Regular members pay admission fees and membership fees based on their trade values. Special members pay admission fees which are one-third of the amount paid by regular members, and also pay membership fees.

The general meeting of the KSDA, the principal governing body, is represented by all members. The board of directors includes public directors to represent the public interest, along with member directors. The KOSDAQ Committee established in the KSDA is empowered to regulate the KOSDAQ market, i.e. approve listing and delisting on KOSDAQ, and conduct surveillance of stock prices, disclosure, settlement, and risk control. The Committee is composed of experts from academic circles and related institutions.

4.1.2 Pre-settlement

Trading confirmation

Since trade orders in both the KSE and the KOSDAQ markets are locked in after being placed to the floor, and trade confirmation and execution occur at the same time, they cannot be canceled. Direct participants, securities companies, confirm their trades within a few seconds after trade execution through terminals linked to the KSE electronic trading system. Trades by indirect participants such as institutional investors are confirmed a few seconds after trade execution through the dedicated terminal, or after the termination of trading on day T+0 by fax or phone.

Clearing

Stocks traded on the two markets are cleared and settled separately through the respective systems. The KSE serves as a clearing house as well as a provider of a market place for stock transactions in the KSE market. After trade confirmation, the KSE nets out securities and funds to be delivered on a multilateral basis, and then sends net settlement data to KSD by day T+1. Multilateral netting of KSE transactions facilitates smooth settlement by reducing each participant's settlement value to about 10% of the trade value.

KSD is in charge of the clearing process for KOSDAQ stocks. The KOSDAQ Stock Market, Inc. transmits trade data to KSD on day T+1, and KSD then nets out securities and funds to be delivered on a multilateral basis and compiles the net settlement data on the same day. In the KOSDAQ market, net settlement reduces the settlement value by more than 95% of the trading value.

4.1.3 Settlement

Settlement cycle

Rolling settlement is used for all stock transactions in the KSE and the KOSDAQ markets. Final settlement occurs at 16:00 two business days after the trade (T+2).

Settlement procedure

Securities and funds are settled simultaneously on a deferred multilateral net basis (i.e. DVP Model 3). Securities are transferred across participants' accounts opened at KSD using an automated book-entry system, and the funds are settled across participants' accounts opened at commercial banks which the KSE or KSD has designated.

Central securities depository

The Korea Securities Depository, as the sole CSD in Korea, provides a depository service for all types of securities including stocks. KSD is a not-for-profit organization having 96

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shareholders as of the end of 2001. The general meeting of shareholders is its supreme decision-making body. Shareholders of KSD consist of users such as the KSE, securities companies, banks, and insurance companies. The board of directors includes public directors to represent the public interest.

There is no special restriction on eligibility for participation in the KSD deposit and settlement system. Foreign financial institutions and depositories as well as domestic securities companies, banks, insurance companies, and pension funds are allowed to participate. All participants pay fees on a usage basis for the KSD's post-trade processing services such as securities deposit and settlement.

While an intraday credit facility against settlement funds shortage is not provided, securities lending and borrowing are available, through brokerage of KSD, to facilitate timely settlement of securities. A securities borrower is required to provide eligible securities or cash as collateral.

Central counterparty

The KSE, which acts as central counterparty in the KSE market, provides trades-guarantee and risk management services for KSE stock transactions. Participants in the KSE market make payment to or collect payment from the KSE accounts in settlement banks. The KSE is required to compensate losses incurred from settlement failures by its members, resulting in centralizing of risk exposure at the KSE.

The KSE employs the Joint Compensation Fund as a risk management safeguard against a member's failure in the KSE market. Every KSE member had been depositing 1/100,000 of its trading value into the Fund from 1974 to 1999, when, with the total amount of the Fund having reached the maximum limit (KRW 100 billion, about USD 77 million), deposits were temporarily suspended. When a settlement default occurs, the amount deposited in the Fund by the defaulting member is to be used first, with the deposits of other members used to cover the remaining losses.

KSD provides central counterparty service for KOSDAQ market participants. Since KSD acts as the counterparty to sellers and buyers, participants make payment to or collect payment from the KSD accounts in settlement banks. When a participant fails to fulfill a settlement obligation, KSD completes the settlement, using the Settlement Stabilization Fund employed by the Korea Securities Dealers Association.

The Settlement Stabilization Fund is similar to the Joint Compensation Fund of the KSE. Every participant deposits 1/100,000 of its trading value into the Fund, until the maximum limit for deposits (set at KRW 100 billion, about USD 77 million) is reached. The current amount of deposits in the Fund was KRW 23 billion (about USD 18 million) as of the end of 2001. When a settlement default occurs, amount in the Fund is to be used first, with all non-defaulting participants then sharing coverage of any remaining losses.

4.2 Bonds

4.2.1 Trading

Market overview

Although the Korea Stock Exchange (KSE) has an inter-dealer and a retail market for bond trades, nearly all bond trades in Korea take place in bulk over the counter between financial institutions.

The OTC market is a wholesale market in which one-to-one trading of bonds between various types of institutional investors is conducted. The value of each trade is considerably large, with the minimum trade amount being KRW 10 billion (about USD 7.7 million) per transaction. Since corporate bonds are issued with different kinds of conditions, they are not suitable for trading in systematic markets such as the KSE. Owing to these, more than 95% of total bond trades in Korea, or about KRW 5 trillion (about USD 3.8 billion) a day, are conducted in the OTC market.

The Inter-dealer Market (IDM) is an organized wholesale market where authorized dealers trade government bonds only with each other. The IDM was established in the KSE in 1999, to upgrade the Korean bond market by providing benchmark yields and underlying products for government bond futures trading. The General Bond Market (GBM), one of the KSE sub-markets, is a retail market in which individual investors can participate to trade all kinds of fixed income securities and convertible bonds through the brokerage of securities companies. In 2001, average daily turnover in the IDM and GBM of the KSE was KRW 64 billion (USD 50 million), representing less than 2% of total bond trading value in Korea.

Trading system

All types of bonds are eligible for trading in the OTC market, regardless of whether they are listed on the KSE. Most trading conditions such as quotation and trading unit are generally agreed by negotiation between seller and buyer, and trading is available at any time of the day. Most institutional investors, such as banks, securities companies, investment trust companies, insurance companies and pension funds, are eligible to participate in the OTC market without any membership requirements.

The IDM and GBM in the KSE have almost the same trading arrangements as the KSE stock market. As systematic markets, they offer competitive trading of listed bonds. Although in principle securities companies only are entitled to participation in the KSE market, access to the Inter-dealer Market (IDM) is in fact open to both banks and securities companies, irrespective of KSE membership, as long as they are licensed as government bond dealers by the FSC.

4.2.2 Pre-settlement

Bonds traded on the three markets are cleared and settled separately through the respective systems. Both the seller and buyer in an OTC bond transaction transmit trade data to KSD and then verify the result of the trade through the KSD electronic system on the trade date. After trade confirmation, KSD sends out a settlement statement to the participants. Participants' settlement obligations are calculated on a gross, trade-by-trade basis without netting, for both securities and cash.

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Bond trades in the IDM and the GBM, which are settled on a multilateral basis, are cleared by the KSE. After trade confirmation, the KSE nets out securities and funds to be delivered on a multilateral basis, and then sends net settlement data to KSD on the trade date.

4.2.3 Settlement

Settlement cycle

Bond transactions are settled on a rolling basis. Final settlement is completed at 16:00 on the trade date (T+0).

Settlement procedure

For settlement of OTC bond transactions, both full DVP settlement in central bank money and free-of-payment delivery are currently available.

The DVP system for OTC bonds was introduced in 1999, to eliminate potential credit risks caused by time lags between funds and securities transfers and by the failures of commercial settlement banks. Under the DVP scheme, settlements of securities and funds are made in real time and simultaneously on a gross, trade-by-trade basis (i.e. on the basis of BIS DVP Model 1). The DVP system is based on a direct link between the securities settlement system of KSD and BOK-Wire of the Bank of Korea. Securities in the seller's KSD account are first restricted from disposal for other purposes, and funds are then transferred to the seller's account via the KSD's account at the BOK. At the same time, the securities held in the seller's account at KSD are transferred to the buyer's account. In the free-of-payment delivery scheme, the securities leg is settled through KSD book-entry, and the cash leg through the BOK or commercial banks separately from the securities transfer. Currently, about 40% of total OTC transactions are settled in the DVP system, and the portion is increasing. The remaining turnover, or about 60% of total OTC bond trades is settled on a free-of-payment delivery basis.

Securities and funds in the IDM and the GBM of the KSE are settled simultaneously on a deferred multilateral net basis (i.e. BIS DVP Model 3). Securities are transferred across participant accounts opened at KSD. In the case of cash settlement, the cash legs of government bond trades on the IDM are settled across participant accounts opened at the Bank of Korea, and the cash legs of other bond trades on the GBM are settled across participant accounts opened at the commercial banks which the KSE has designated.

Central securities depository

KSD serves as a CSD for bonds, just as it does for all other securities. Details on KSD are described in Section 4.1.3 above.

Central counterparty

Like it does in the KSE stock market, the KSE provides central counterparty service in the IDM and GBM of the KSE as well, and also uses the Joint Compensation Fund in the event of a participant's settlement failure. The Joint Compensation Fund is used to ensure timely settlement of all securities traded on the KSE market. Details on the central counterparty service are described in Section 4.1.3 above.

Since OTC bonds are traded one-to-one between buyers and sellers, without a central counterparty, and are settled bilaterally on a gross, trade-by-trade basis, there is no collateral pool against participants' settlement failures. Participants in the OTC bond market manage their credit risk bilaterally, through their choice of counterparty.

4.3 Major projects and policies being implemented

4.3.1 Reconstruction of securities settlement infrastructure

The recent mergers of clearing and settlement agencies in European markets have led to heated discussion about Korea's current settlement arrangements, under which settlements are made separately for different types of securities and different markets. The government is considering reconstruction of the securities settlement infrastructure to improve its efficiency and reduce costs, in the face of the changing European and U.S. markets.

Two highly controversial issues are currently being discussed in Korea: first, consolidation of settlement within a single system encompassing the full range of securities in the KSE and KOSDAQ markets; and second, consolidation of the post-trade processing functions such as clearance, settlement and deposits within a single institution. In the course of discussions, however, severe conflicts among securities-related institutions have come up, and how to design the best consolidated settlement system is still in dispute. There is currently some skepticism as to the possibility of successful reconstruction of the securities settlement infrastructure.

4.3.2 Introduction of DVP in central bank money

Payment in central bank money is increasingly seen internationally as the best settlement practice. Although a form of DVP is provided in the KSE and KOSDAQ markets in Korea, the cash leg of securities transactions is settled in commercial bank money. Because of frequent payment delays by some participants, moreover, it is also true that some settlements are not completed at the designated settlement time (16:00).

In order to conform to the global standards for securities settlement systems, the Bank of Korea has taken the initiative in planning DVP settlement in central bank money for KSE and KOSDAQ market transactions. The BOK is currently discussing preliminary preparations for implementation of DVP through BOK-Wire with the KSE and KSD, and is requesting that the government and the Financial Supervisory Service actively encourage the KSE and KSD to prepare for DVP.

4.3.3 Shortening of settlement cycle

As the U.S. market is moving from T+3 to T+1 settlement, T+1 settlement is expected to become a new best practice in the near future. In spite of the fact that the current settlement cycles in the Korean market meet international standards such as CPSS/IOSCO Recommendations, the Korean market is planning to shorten its stock settlement cycle from T+2 to T+1, in order to reduce settlement risk exposure and maintain its competitiveness.

In 2000, the FSS, KSD, and other industry organizations established a "T+1 Task Force" to address institutional and regulatory requirements for successful transition to T+1 settlement. The introduction of the straight-through-processing system and the global communication procedures and standards are now under consideration to meet earlier processing deadlines.

T+1 settlement for stocks in Korea is scheduled to be achieved by the end of 2005.

5. Role of the central bank

5.1 Provision of settlement facilities

The Bank of Korea provides banks and non-bank institutions with current accounts for funds transfers and final settlement for net obligations cleared between banks. The *Bank of Korea Act* entitles banks and the central government to hold current accounts with the BOK. In addition, the Act states that non-bank institutions are also able to hold accounts with the BOK if they obtain approvals from the Monetary Policy Committee (MPC) of the BOK. Currently, a range of non-bank institutions, such as securities companies, insurance companies, money broker companies, the CSD and the stock exchange, are allowed to have direct access to BOK accounts. Recently, as non-bank financial institutions become involved actively in funds, securities and foreign exchange transactions in the financial market, their needs for direct access to large-value settlement services are increasing. In particular, introduction of DVP in central bank money in the OTC securities market in 1999 led many securities companies to have direct access to BOK settlement facilities.

Access to a BOK account is restricted to corporate bodies only. Individual customers and private non-financial business companies are not permitted to access the BOK settlement facilities. Except for requirement of a corporate body, there are no other explicit requirements for direct access to a BOK account, i.e. minimum asset or payment volume restrictions.

Since only one type of account, a current account, is provided, all of the financial institutions' other transactions, such as deposits and withdrawals of required reserves, are also made through this account.⁵ In principle, interest is not paid on the current account balances. The BOK extends collateralized intraday overdrafts to bank participants to cover temporary shortages of settlement funds. In accordance with the *Bank of Korea Act*, non-bank institutions are not entitled to all types of BOK loans including intraday overdrafts.⁶

The Bank of Korea also issues banknotes and coins as legal tender. The size, design or denomination of banknotes and coins are determined by the MPC, subject to the approval of the government. Banknotes and coins are manufactured by the Korea Minting and Security Printing Corporation, a special purpose company funded by the government.

The Bank of Korea provides a DVP settlement service for OTC bond transactions. The cash leg is settled through participants' and the KSD's accounts at the BOK. The cash and securities legs are settled simultaneously, providing participants with same-day funds without either credit or liquidity risk. Details on DVP of OTC bond transactions are described in Section 4.2.3.2 above.

⁵ All banks in Korea are required to maintain reserve balances equal to 1-2% of time and savings deposits and 5% of demand deposits in their BOK current accounts.

⁶ The BOK can carry out RP transactions with non-bank financial institutions for open market operations, although it cannot provide loans to them.

5.2 Operation of payment systems

The Bank of Korea operates the large-value payment system known as BOK-Wire, while KFTC, a banking industry body, operates the retail payment systems. BOK-Wire ensures real time, final, irrevocable payments between participants. It also provides a third-party funds transfer service for non-participants such as companies and individuals. Details on BOK-Wire are described in Section 3.1 above.

5.3 Operation of securities registration systems

The Bank of Korea does not operate any settlement systems for securities traded in the secondary markets. Instead, the BOK, as an official manager of government bonds on behalf of the Korean government, operates the registration system for government bonds as well as for Monetary Stabilization Bonds (MSBs). Through the registration system, the BOK provides BOK-Wire participants with services such as issuance, transfer, redemption and repurchase of government bonds and MSBs.

According to the New Issue Blanket Deposit (NIBD) provision in the *Securities and Exchange Act*, the real owners of government bonds can request their registration on the BOK's registration book in the name of KSD on their behalf. This is intended to enhance trading convenience and to encourage immediate dematerialization of securities. Under the NIBD scheme, information on transfers of real ownership handled in the KSD settlement system is not sent to the BOK's government bond registration system. Therefore, in order to conduct efficient open market operations in the government bond market, and especially to promptly provide the financial market with liquidity through one-to-one RP transactions with financial institutions in case of financial emergency, the BOK has recently established the linked computer system for detailed information on financial institutions' holdings of securities.

5.4 Oversight

The Bank of Korea operates and manages payment systems insofar as this is related to monetary and credit policies, in accordance with the *Bank of Korea Act*. Since the BOK operates the large-value payment system, its oversight is focused on retail payment systems operated under the management of KFTC.

To maintain the safety of the retail payment systems, which are based on net settlement, the BOK introduced a set of risk management measures under its control in 1997. The BOK sets up and manages the operational arrangements for net debit caps, collateralization and loss sharing, which all participants in the retail payment systems are required to comply with. KFTC, the system operator, regulates all of the other policies of the retail payment systems, such as access, pricing, and system operation. However, the Bank of Korea participates in the decision-making process of KFTC as one of the general members. The Governor of the BOK chairs the general meeting of KFTC and is able to call a general meeting or board of directors meeting of KFTC if necessary. An Assistant Governor of the BOK participates in decision-making related to the operational policies of the retail payment systems, as a member of the KFTC board of directors. In addition, KFTC is required to regularly submit statistics on the clearing and settlement flows of the retail payment systems to the BOK. The BOK evaluates the safety and efficiency of a newly established retail payment system before the BOK allows the system to access BOK-Wire for net settlements of members' obligations.

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The *Bank of Korea Act* stipulates that the BOK can participate on a joint basis in the Financial Supervisory Service's on-site inspections of banking institutions and require the Financial Supervisory Service to examine banking institutions. Through its participation in supervisory services in these ways, the BOK is able to check participants' compliance with payment systems regulations.

STATISTICAL TABLES

Korea

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (thousands) ¹⁾	45,525	45,954	46,287	46,617	47,008
GDP (KRW billions)	418,479	453,276	444,367	482,744	521,959
GDP per capita (KRW thousands)	9,192	9,864	9,600	10,356	11,004
Exchange rate vis-à-vis USD:					
<i>year-end</i>	844.2	1,415.2	1,207.8	1,145.4	1,259.7
<i>average</i>	804.8	951.1	1,398.9	1,189.5	1,130.6

¹⁾ As of July 1.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	2000
					KRW billions
Banknotes and coins	15,453	15,448	13,670	19,475	17,636
Transferable deposits	24,089	19,588	21,913	24,900	29,361
Narrow money supply (M1)	39,542	35,036	35,583	44,375	46,997
<i>Memorandum items:</i>					
Broad money supply (M2)	178,312	203,531	258,538	329,317	413,049
Transferable deposits in foreign currencies :	19,063	58,677	37,046	26,069	23,072
Outstanding value on e-money schemes ¹⁾	nap.	nap.	nap.	nap.	nav.
of which:					
<i>on card-based products</i> ¹⁾	nap.	nap.	nap.	nap.	nav.
<i>on network-based products</i>	nap.	nap.	nap.	nap.	nav.

¹⁾ Introduced in 2000.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	2000
					KRW billions
Transferable balances held at central bank ¹⁾	8,830	4,976	4,734	6,254	8,124
Cash reserve held by banks ¹⁾	2,298	1,616	1,770	2,252	2,879
Total	11,128	6,592	6,504	8,506	11,003
of which:					
<i>required reserves</i> ¹⁾	11,112	6,575	6,477	8,477	10,977
<i>free reserves</i> ¹⁾	16	17	27	29	26
Transferable deposits held at other banks	412	391	845	1,192	1,942
<i>Memorandum item:</i>					
Institutions' borrowing from central bank	6,759	10,971	13,884	8,714	7,656

¹⁾ Averages of daily figures.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (KRW billions)
Central bank	1	16	715	6,902
Commercial banks	17	4,709	nav.	32,608
Specialized banks ¹⁾	5	1,406	nav.	10,993
Postal institution	1	2,788	nav.	849
Total	24	8,919	nav.	51,352
of which:				
<i>virtual institutions</i>	<i>nap.</i>	<i>nap.</i>	<i>nap.</i>	<i>nap.</i>
<i>branches of foreign banks</i>	43	63	nav.	692

¹⁾ Comprising the Industrial Bank of Korea, the Korea Development Bank, the Export-Import Bank of Korea, the credit and banking sectors of National Agricultural Cooperative Federation and National Federation of Fisheries Cooperatives.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
					thousands
Retail systems	2,173,904	2,450,754	2,315,097	2,484,282	2,896,421
Cheques & bills	1,146,626	1,222,191	1,012,463	1,027,172	1,091,782
Bank Giro	648,340	700,121	664,818	636,248	723,941
IFT	197,288	241,991	270,263	320,603	392,112
CD/ATM	177,974	239,517	260,885	324,312	395,645
EFTPOS	660	1,119	1,440	1,892	1,786
CMS	2,826	44,924	103,534	172,717	289,881
BANKLINE ¹⁾	nap.	641	1,464	1,196	1,218
Others	190	250	230	142	56
Large-value system					
BOK-Wire	1,273	1,491	1,425	1,399	1,407

¹⁾ An inter-regional bank network introduced in 1997.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
					KRW billions
Retail systems	8,149,364	8,517,920	8,808,186	11,449,725	8,986,878
Cheques & bills	7,435,701	7,391,659	7,505,823	9,677,298	6,790,075
Bank Giro	56,692	60,402	55,797	55,194	73,610
IFT	600,525	979,401	1,154,294	1,589,201	1,922,115
CD/ATM	55,672	79,854	80,037	109,972	164,484
EFTPOS	34	57	64	98	106
CMS	668	4,889	8,526	14,582	32,466
BANKLINE ¹⁾	nap.	1,636	3,625	3,368	4,015
Others	72	22	20	12	7
Large-value system					
BOK-Wire	7,277,950	9,496,390	14,290,165	19,975,616	18,840,784

¹⁾ An inter-regional bank network introduced in 1997.

Table 7

Indicators of use of various cashless payment instructions: volume of transactions

	1996	1997	1998	1999	2000
	millions				
Cheques & bills	1,147	1,222	1,012	1,027	1,092
Payments by debit card ¹⁾	0.7	1.1	1.4	1.9	1.8
Payments by credit card ²⁾	153	177	194	275	469
Credit transfers	791	893	893	1,004	1,225
of which:					
Wholesale payments ³⁾	1	1	1	1	1
Retail payments ¹⁾	790	892	892	1,003	1,224
Direct debits ¹⁾	237	336	410	453	579
Total	2,329	2,629	2,510	2,761	3,367

¹⁾ Interbank data only.

²⁾ Bank credit cards only.

³⁾ Credit transfers through BOK-Wire.

Table 8

Indicators of use of various cashless payment instructions: value of transactions

	1996	1997	1998	1999	2000
	KRW billions				
Cheques	7,435,701	7,391,659	7,505,823	9,677,298	6,790,075
Payments by debit card ¹⁾	34	57	64	98	106
Payments by credit card ²⁾	24,262	26,781	22,773	28,469	48,967
Credit transfers	7,979,329	10,604,600	15,571,005	21,721,812	20,995,375
of which:					
Wholesale payments ³⁾	7,277,950	9,496,390	14,290,165	19,975,616	18,840,784
Retail payments ¹⁾	701,379	1,108,210	1,280,840	1,746,196	2,154,591
Direct debits ¹⁾	12,251	17,994	21,458	26,132	42,106
Total	15,451,577	18,041,091	23,121,123	31,453,809	27,876,629

¹⁾ Interbank data only.

²⁾ Bank credit cards only.

³⁾ Credit transfers through BOK-Wire.

Table 9**Transfer instructions handled by securities settlement systems: volume of transactions ¹⁾**

	1996	1997	1998	1999	2000
Stocks ²⁾	7,820	12,172	28,739	78,034	124,835
Korea Stock Exchange	7,785	12,125	28,533	69,359	73,785
KOSDAQ	35	47	206	8,675	51,050
Bonds ³⁾					
IDM ⁴⁾	nap.	nap.	nap.	278,189	20,593
GBM ⁵⁾	1,318	3,876	15,039	10,836	6,285
OTC	nav.	nav.	nav.	nav.	nav.

¹⁾ Indicates total volume of securities traded in the market, not the number of transactions.

²⁾ In millions of share.

³⁾ In KRW billions.

⁴⁾ Inter-dealer Market for government bonds, established in 1999.

⁵⁾ General Bond Market for all types of bonds.

Table 10**Transfer instructions handled by securities settlement systems: value of transactions**

	1996	1997	1998	1999	2000
					KRW billions
Stocks	143,177	163,448	194,452	973,731	1,205,623
Korea Stock Exchange	142,642	162,282	192,845	866,923	627,133
KOSDAQ	535	1,166	1,607	106,808	578,490
Bonds	115,862	143,497	429,530	1,200,290	1,084,943
IDM ¹⁾	nap.	nap.	nap.	280,830	20,447
GBM ²⁾	1,378	4,045	15,489	12,777	6,723
OTC	114,484	139,452	414,041	906,683	1,057,773

¹⁾ Inter-dealer Market for government bonds, established in 1999.

²⁾ General Bond Market for all types of bonds.

Table 11**Number of participants in securities settlement systems**

	1996	1997	1998	1999	2000
Stocks					
Korea Stock Exchange ¹⁾	37	38	40	40	51
KOSDAQ ¹⁾	54	58	51	58	64
Bonds					
IDM ²⁾	nap.	nap.	nap.	62	82
of which:					
Banks	nap.	nap.	nap.	20	29
Securities companies	nap.	nap.	nap.	41	52
Other institutions	nap.	nap.	nap.	1	1
GBM ³⁾	37	38	40	40	51

¹⁾ All participants are securities companies.

²⁾ Inter-dealer Market for government bonds, established in 1999.

³⁾ Participants in General Bond Market are the same as those in stock market of the KSE.

PAYMENT SYSTEMS IN MALAYSIA

Malaysia

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List of abbreviations

AD	Authorized Depository
ADI	Authorized Depository Institutions
ATM	Automated Teller Machine
B2B	Business to Business
BAFIA	Banking and Financial Institutions Act 1989
BEA	Bills of Exchange Act 1949
BNM	Bank Negara Malaysia
BSN	National Savings Bank (Bank Simpanan Nasional)
CBA	Central Bank of Malaysia Act 1958
CD	Compact Disk
CDS	Central Depository System
CHS	Central Host System
COINS	Corporate Information Superhighway Systems
DVP	Delivery versus payment
EFTPOS	Electronic funds transfer at point of sales
FES	Front-End System
FDSS	Fixed Delivery and Settlement System
FSMP	Financial Sector Master Plan
GMPC	Government Multipurpose Card (officially known as MyKad)
IBA	Islamic Banking Act 1983
IFTS	Interbank Funds Transfer System
KLSE	Kuala Lumpur Stock Exchange
LOFSA	Labuan Offshore Financial Services Authority
MDCH	Malaysian Derivatives Clearing House Berhad
MEPS	Malaysian Electronic Payment System (1997) Sdn Bhd.
MICR	Magnetic Ink Character Recognition
MPC	The Multipurpose Card
MSC	The Multimedia Super Corridor
NPAC	National Payment Advisory Council
PMB	Pos Malaysia Berhad
PMPC	Payment Multipurpose Card
RENTAS	Real-Time Transfer of Funds and Securities
RTGS	Real-Time Gross Settlement System
SCANS	Securities Clearing and Settlement Systems
SCORE	System on Computerised Order Routing and Execution
SET	Secured Electronic Transaction
SIA	Securities Industry Act 1983
SPEEDS	Sistem Pemindahan Elektronik untuk Dana dan Sekuriti
SPI	Skim Perbankan Islam
SPICK	Sistem Penjelasan Imej Cek Kebangsaan

Malaysia

SSL

Secured Socket Layer

SSTS

Scriptless Securities Trading System

Overview

The Malaysian payment systems have evolved from currency notes and coins first issued in 1897 to an increasingly cashless and paperless payment systems of the digital era. The use of available banking technology has helped to significantly improve efficiency in the payment systems.

Bank Negara Malaysia (BNM), the Central Bank of Malaysia, owns and operates the image based cheque clearing system, known as Sistem Penjelasan Imej Cek Kebangsaan (SPICK), and the Real Time Gross Settlement (RTGS) system, Real Time Transfer of Funds and Securities (RENTAS). SPICK was implemented in November 1997 to provide efficient clearing of cheques, cashier orders, demand drafts and other retail paper-based instruments. RENTAS, which was implemented in July 1999, replaced the previous end-of-day net settlement system, Sistem Penjelasan Elektronik Dana dan Sekuriti (SPEEDS). It consists of two sub-systems, the Interbank Funds Transfer System (IFTS) and the Scripless Securities Trading System (SSTS).

A host of other proprietary systems owned and operated by financial institutions and other entities complements the systems in BNM. The proprietary systems are retail payment systems consisting of mainly credit and debit card systems, ATM networks, the giro system, stored value cards, and the securities and derivatives clearing and settlement systems namely the Securities Clearing Automated Network Services (SCANS) and the Malaysian Derivatives Clearing House (MDCH).

Currently, efforts are being made to reduce the use of cash and cheques in daily consumer spending due to the increasing convenience that can be accorded by non-cash or cheques handling and clearing. Efficient and convenient substitutes are card-based instruments such as credit cards, charge cards, debit cards and pre-paid cards as well as other electronic based payment method. The use of these instruments especially credit cards have increased significantly with the growing affluence and sophistication of consumers.

The Payment Multipurpose Card (PMPC), a Malaysian Multimedia Super Corridor flagship application officially launched in August 1996 is being introduced in the third quarter of 2002. Payment applications such as the ATM card, e-cash and e-pos will be combined onto a single chip-based card. The PMPC is an exciting progress that fulfils the requirements for convenience, efficiency and security – the hallmark of an efficient payment systems mode.

A sound regulatory framework exists to govern the payment systems in Malaysia. In the promotion of financial stability, the Central Bank Act 1958 (CBA) and the Banking and Financial Institutions Act 1989 (BAFIA) establishes the legal foundation for payment systems and funds transfer systems to be operated and approved by BNM. Similarly, in the equities market, a comprehensive and sound regulatory framework exist governing the Kuala Lumpur Stock Exchange (KLSE), and the Malaysian securities industry to maintain investors' confidence in a market which promotes fair and open price formations, provides for investor protection and ensures prompt and reliable information disclosure and dissemination. An order-driven market, trading on the KLSE was fully computerised in 1992 with the full implementation of the System on Computerised Order Routing and Execution (SCORE) automated trading system. The Central Depository System (CDS) implemented in 1993, is the central depository system of the KLSE.

1. Institutional aspects

1.1 The legal and regulatory framework

In Malaysia, there are several sets of legislation that constitute the legal and regulatory framework for the country's payment and settlement systems. The principal legislations are listed and described briefly below:

- The CBA, which established BNM, provides for BNM to assume the responsibility of issuing Malaysian currency and outlines the statutory requirements governing the issue. In addition, the CBA also authorizes BNM to operate clearing house facilities for the banking system. The development and the operation of the national cheque image clearing system, SPICK, by BNM was undertaken pursuant to this provision.
- The BAFIA, which essentially provides for the licensing and regulating of institutions carrying out banking, finance company, merchant banking, discount houses and money-broking businesses, also contains legal provision pertaining to payment systems. The BAFIA requires any person who intends to operate an electronic funds transfer system to obtain approval of BNM. Recognizing the growing importance of credit cards business in Malaysia, the BAFIA also stipulates that any person who intends to operate a credit token business, which is defined to include credit cards, to obtain the approval of BNM.
- The Bills of Exchange Act 1949 (BEA) deals with the usage of paper based cheques and other bills of exchange. The BEA, together with the Contract Act 1950 provides a comprehensive legal provision on the usage of bills of exchange. The BEA was amended in 1998 in line with the technological innovations and developments to allow for presentment of cheques through a document image processing system introduced by the SPICK system.
- To further promote the efficiency and security of payment systems in the country, BNM had also issued several Guidelines relating to payment systems. The Guideline on "Know Your Customer Policy" issued in December 1993 highlighted the need for the banking institutions to have a comprehensive knowledge of the transaction profile of their customers to prevent banking institutions from being used as vehicles for money laundering. In March 2000, BNM issued the Guideline on Minimum Security Standards for ATM Machines to enhance the security features of the ATM cards and systems to be complied with by the banking institutions. BNM had also in June 2000 issued a set of minimum guidelines on the Provision of Internet Banking Services by licensed banking institutions.
- BNM administers the Exchange Control Act 1953 which, amongst others, addresses cross border payments and payments between residents and non-residents.

The importance of payment systems is also reflected in BNM's Financial Sector Masterplan (FSMP) published in March 2001. The purpose of the FSMP is to set out the plan to chart future direction of the financial system over the next ten years that will ensure its continued effectiveness, competitiveness and resilience. The FSMP incorporates three recommendations that emphasize the need for an efficient and reliable payment systems to enhance the integrity of the financial system. Recognising the increasing importance of payment systems and the rapid developments in the financial systems, BNM had also

established a National Payments Advisory Council to provide input on issues relating to payment systems.

1.2 Institutions providing payment services

Traditionally, the banking institutions are the main provider of payment systems services in Malaysia. While this function is still important to the banking institutions, the advancement of information technology has facilitated the emergence of non-banking sectors, particularly the telecommunication companies, in providing payment services.

1.2.1 Commercial banks

Commercial banks form the largest group of financial institutions in the country. As at end of September 2001, there were twelve domestic commercial banking institutions and 14 foreign owned banks with a total of 1,719 bank branches. With the completion of the bank merger exercise, the number of domestic commercial banks has been consolidated into 10 banking groups. The banking institutions provide payment services via their own proprietary network, and through their clearing accounts with BNM to effect interbank funds transfer or third party payments.

Together with the Islamic banking institutions, the commercial banks offer ATM services through 3,355 machines located on and off branches. A number of them are credit and/or debit card issuers that offer electronic funds transfers at point of sale (EFTPOS) terminals. The introduction of Internet banking in Malaysia in 2000 saw a total of six commercial banks providing Internet banking services that facilitate online banking for account enquiries, transfer of funds between accounts, loan repayments, and online bill payments to various utility companies and municipalities. In addition, commercial banks also provide the Interbank Giro system to facilitate large volume interbank funds transfer.

In Malaysia, only commercial banks and Islamic banking institutions are allowed to offer demand deposit accounts that provide checking facility. Consequently, both commercial banks and Islamic banking institutions are the participants of the SPICK cheque clearing system.

1.2.2 Finance companies

Finance companies are the second largest group of deposit-taking institutions. There were 19 finance companies and a total of 599 branch offices as at end September 2001. The finance companies provide payment services through the ATM network and the Interbank Giro. As a group, finance companies have a total of 606 ATM machines as at end September 2001.

1.2.3 National Savings Bank

The National Savings Bank or Bank Simpanan Nasional (BSN) was established in 1974 to promote and mobilise private savings, especially of small savers in the lower income groups and those in the rural areas. As at end of 2000, the BSN has 427 branches nationwide with a network of 610 ATMs. Besides providing financial services such as extending loans and accepting deposits, BSN also provides payment services through its own proprietary ATM network, credit cards, and pre-arranged crediting of salaries and debiting of public utility charges.

1.2.4 Credit and charge card companies

In Malaysia, credit card companies do not issue their cards directly to the cardholders. Instead, their cards are issued by commercial banks, finance companies and the BSN through licensing arrangements. There are 19 credit card issuers in the country. Unlike the credit card companies, charge card companies like American Express and Diners Club International issue their card directly to the cardholders. In addition to these international charge cards schemes, there are several domestic companies issuing charge cards in Malaysia.

1.2.5 Other institutions

Malaysian Electronic Payment System (1997) Sdn. Bhd. (MEPS)

MEPS is a payment consortium owned by domestic banking institutions to provide the retail electronic clearing and settlement system for participating institutions. The objective for the formation of this consortium was to avoid duplication of investment or resources by individual banks in undertaking payment systems related projects. By pooling their resources, the banking institutions are able to provide a common platform for product innovation reaching out to a larger customer base. Since its inception, MEPS has implemented several payment systems related projects including the integrated ATM network for the domestic banking institutions, the PMPC, a payment gateway to support Internet transactions, Interbank Giro and the MEPS Cash e-money scheme.

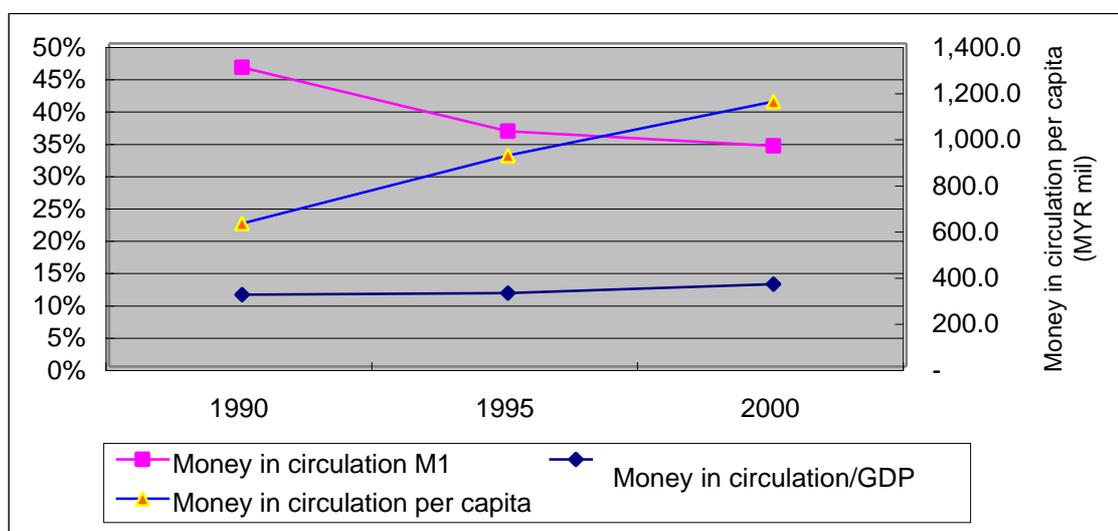
Postal Services

Pos Malaysia Berhad (PMB) is Malaysia's main agency providing postal services. In addition, PMB offers remittance services to fulfil customers' needs for a cheap, convenient, efficient, safe and reliable remittance service. The services offered by PMB are not under the purview of BNM.

2. Payment methods

2.1 Cash payments

In Malaysia, BNM has the sole right to issue notes and coins as provided under the CBA. Currently, BNM issues notes in five denominations, as follows; MYR1, MYR5, MYR10 MYR50 and MYR100. Coins are also issued in five denominations, as follows: 1 sen, 5 sen, 10 sen, 20 sen, and 50 sen. The value of notes and coins in circulation as at end of year 2000 totalled MYR26.7 billion (USD7.0 billion) with notes accounting for 94.3% of the total value. Notes and coins in circulation represent 34.1% of M1 monetary aggregate. Chart 2.1 shows that the ratio of money in circulation to M1 has declined over the past 10 years. However, the ratios of money in circulation over the GDP and GDP per capita have increased over the same period reflecting the increase in the money in circulation in excess of the increase in the GDP and population growth in Malaysia. In the first nine months of 2001, cash withdrawals via ATMs totalled 141.5 million transactions with an average withdrawal amount of MYR450 (USD118.4) per transaction.

Chart 1: Money in Circulation over M1, GDP and Per Capita

Similar to other developing countries, cash is the most commonly used payment instrument for retail payments in Malaysia. Its usage covers all types of payments made between consumers, businesses and the Government. Typical cash payments include utility bills, transportation fares, purchases of groceries, shopping and others. Despite the emergence of other non-paper based payments mechanism, such as electronic payment methods, it is envisaged that cash will continue to be a major retail payment instrument in Malaysia in the near future.

Nevertheless, with the increasing usage of electronic fund transfers through the Internet banking, interbank GIRO, and the national roll-out of the Government's MyKad¹, it is anticipated that there would be a gradual shift from cash to electronic money for retail payments.

2.2 Non-cash payments

2.2.1 Cheques

Apart from cash, cheques are also commonly used payment instruments for retail payments, particularly amongst the business community. All Ringgit denominated cheques are cleared through the SPICK cheque clearing houses that are located at three regions in Malaysia. For the year 2000, a total of 164.8 million cheques, valued at MYR1,076 billion (USD283.2 billion), were cleared through the three automatic clearing houses, compared to 153.9 million cheques, valued at MYR1,007 billion (USD265.0 billion) in 1999.

In view of the importance of cheques as a payment method, BNM, with the co-operation of the banking industry, has undertaken a two-pronged strategy to improve the efficiency of the use of cheques as a payment instrument:

¹ Government Multipurpose Card (GMPC) or officially known as MyKad, is a smart card based multi-application ID card for the Malaysian citizen. Currently, it serves as an ID card, a driving license and as an immigration card to facilitate speedy entry/exit from the immigration points. It also includes ATM and MEPS Cash. GMPC is one of the Multimedia Super Corridor's flagship applications.

Malaysia

- i. Improved the cheque clearing process by reducing the day-hold for cheque clearing. The implementation of a cheque clearing and imaging system at the Central, Southern and Northern regions have largely reduced the number of day-holds to two days for the SPICK areas; and
- ii. Clamping down the incidence of returned cheques due to insufficient funds.

In 1988, BNM established a Cheque Information Bureau to address the problem of bad cheques being issued by account-holders. The Bureau's objective is to instil discipline among the banking public in the use of cheques as a mode of payment.

The salient features of the Bureau's guidelines on bad cheques are:

- i. Issuance of a bad cheque refers to a cheque issued by an account-holder which is dishonored by the drawee bank due to:
 - *Insufficient funds in the account; or*
 - *"Effects not cleared"; or*
 - *Account closed for reasons other than blacklisted.*
- ii. Each occurrence of a bad cheque drawn from the same account will be treated as a bad cheque incident.
- iii. Issuance of three bad cheques from the same account within 12 months from the date of the first incident constitutes a bad cheque offence.
- iv. Bad cheque offenders will be subjected to a global closure of accounts, i.e. the account-holder's current account with all commercial banks will be closed. As such, the account-holder cannot operate any checking facility during the prohibition period.

A current account-holder who has been blacklisted will be given a clean record if no further bad cheque offenses are committed during the probation period. Any offence after the probation period will be considered as the first offence. However, further bad cheque offences committed during the probation period will be considered as committing subsequent level of bad cheque offences.

Table 1 provides the details of blacklisting, prohibition period and the probation period for bad cheque offences.

Table 1: Treatment of Bad Cheque Offenders

Blacklisting	Prohibition Period	Global Closure	Probation Period
First level	6 months	Yes	2 years
Second level	12 months	Yes	2 years
Third level	12 months	Yes	3 years
Fourth and subsequent level	24 months	Yes	3 years

2.2.2 Direct debit and credit transfers

Direct debit transfers are mainly used to effect recurring payments such as utility bills, insurance premiums and loan repayments. As such, individual transaction amounts are normally of small value.

The usage of the credit transfer facility is popular amongst corporations and Government agencies for purposes of making scheduled payments to various parties. Typical transaction using the credit transfer system is the payment of salaries.

2.2.3 Automated Teller Machines (ATM)

Most of the banking institutions in Malaysia own proprietary ATM networks. To further improve their customer services, domestic banking institutions have established three ATM switches, which were linked to each other in 1997 with MEPS as the merged entity. MEPS consolidates and operates the switching, clearing and settlement operations of the networks. With the merger of these ATM networks, Malaysia had moved to a more cost efficient use of resources by operating a single, integrated ATM network for the banking institutions. With the MEPS shared ATM network, the public is able to access their bank accounts and conduct transactions, such as cash withdrawals and balance enquiries, at any ATM machines nationwide within the MEPS network. Currently, foreign banks are not members of MEPS ATM network. All domestic commercial banks, finance companies and Islamic banks in Malaysia are linked to the MEPS shared ATM network, with a total card in circulation of more than 9.3 million as of the year-end 2000. As part of the recommendations for the banking sector in the FSMP, incumbent foreign banks will be allowed to operate their own ATM network in the near future.

Besides cash withdrawals, ATMs also provide an expanded range of services, such as bill payments, funds transfer between accounts and payment for shares subscription at initial public offerings. In recent years, the number of ATMs in operations has increased from 2,632 units in 1995 to 3,961 units in September 2001.

2.3 Payment cards

2.3.1 Credit cards

Credit card or “use now pay later” payment mechanism is the most popular card based payment instrument used in Malaysia and its usage has been increasing in recent years. Only institutions with prior approval from the BNM are allowed to issue credit cards in Malaysia. Currently, there are 19 institutions issuing mostly Visa and MasterCard credit cards. Recently, the American Express has issued its credit card brand through banking institutions.

In Malaysia, credit card issuers are subject to the guidelines on credit card operations issued by BNM, which among others, include the following requirements:

- (i) The minimum age for the principal card holder shall be 21 years old;
- (ii) Minimum income requirement of MYR1,500 (USD395) per month or MYR18,000 (USD4,736.8) per annum;
- (iii) Minimum monthly repayment of 5% of the outstanding balance; and
- (iv) The maximum finance charge shall be 1.5% per month or 18% per annum.

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The credit card industry is expanding rapidly in Malaysia. While credit cards provide cash advance facility, most Malaysian credit card holders use credit cards for payment purposes, which represent 85% of the total credit card transactions. By the year-end 2000, there were approximately 2.8 million credit cards in circulation and the transactions valued at MYR16.4 billion (USD4.3 billion).

2.3.2 Charge cards

Charge card is another form of payment mechanism frequently used in Malaysia. Typically, charge cards are issued by non-banking institutions that do not provide a line of credit. It enables the cardholders to make purchases, but does not offer revolving credit and as such, cardholders need to settle in full the amount due at the end of a specific period. The main charge card companies in Malaysia are American Express and Diners Club. In addition, there are few domestic card operators issuing charge cards for payment of specific services offered by the operating company.

While the BNM does not regulate charge card operations, operators of charge cards are required to obtain prior acknowledgement to operate such schemes. As of year-end 2000, there were approximately 236,000 charge cards in circulation with transactions valued at MYR1.9 billion (USD0.5 billion).

2.3.3 Debit cards

The usage of debit cards is gaining popularity in Malaysia with banking institutions issuing both domestic debit cards and international brand debit cards, such as Visa Electron and MasterCard Maestro. As a step forward to improve the operational efficiency of the domestic debit card system and promote the usage of debit cards in Malaysia, MEPS has set up a domestic debit card switching network that enables universal usage of domestic debit cards at all debit card merchants. As of year-end 2000, about 630,000 debit cards transactions, valued at more than MYR90 million (USD23.7 million) were conducted.

2.3.4 Stored value cards/E-money

In Malaysia, the development of electronic money products started in the 1980s with the introduction of the single purpose telephone card. The development in information technology has promoted the emergence of several types of single purpose electronic money schemes. In 1997, MEPS and the banking institutions jointly undertook to develop a multipurpose stored value card using smart card technology, i.e. MEPS Cash.

The banking institutions and the system operators are now planning to roll out the MEPS Cash application beyond the city of Kuala Lumpur. Aside from being introduced as a stand-alone card, the MEPS Cash will also be issued as an application in the normal bank card known as the PMPC and MyKad. In addition to MEPS Cash, the transportation and telecommunication sector has also introduced their respective stored value cards for convenience of payments at toll plazas and telephone booths. Rangkaian Segar Sdn. Bhd. introduced the Touch N Go card for transportation purposes while Telekom Malaysia Berhad and other telephony companies have introduced telephone cards. Other utility providers are also intending to issue their respective stored value cards.

2.4 Other payment delivery channel

Bank branches are still the major delivery channels used by the banking institutions in Malaysia to deliver banking services to their customers. Rapid development in information technology has enabled the banking institutions to expand their delivery channels through remote channels. Some of these delivery channels include the following:

2.4.1 Payment Gateway for Internet transactions

MEPS had developed an Internet payment gateway in 1999 with the main objective of establishing a monitoring mechanism for e-commerce activities in Malaysia.

The implementation of the Payment Gateway is an integral component of the electronic commerce infrastructure not only in Malaysia but also worldwide. The global interoperability of this system allows any consumer, who complies with the Secured Electronic Transaction (SET) and other accepted Internet secured channels, to buy from Malaysian merchants from around the world. With the introduction of the Payment Gateway, e-commerce transactions over the Internet and other open computer networks are now more secure in Malaysia.

MEPS and the banks provide SET and MOSET (which enable both SET and SSL² transactions) facilities to be accepted by merchants. The payment gateway also accepts purely SSL transactions from merchants and the public. Therefore, all participating Malaysian banks and locally incorporated foreign banks can accept SET and SSL transactions using the credit card for payment over the Internet.

2.4.2 Electronic banking

Banking institutions in Malaysia provide electronic banking in one form or another. This includes telephone banking, desktop banking, mobile banking and home banking. Desktop banking and telephone banking are commonly used in electronic distribution channels. However, the level of utilisation and concentration of these technologies depends on the respective business strategies of the banking institutions.

2.4.3 Internet banking

Effective June 1, 2000, domestic banking institutions were allowed to provide a full range of Internet banking facilities, subject to compliance with the guidelines on Internet banking issued by BNM. Typically, the services offered by the banking institutions through their Internet banking facilities are account balance summary, request for account statements, funds transfer between own accounts or third party accounts, payments facilities and cheque book request services.

There are three main types of Internet banking services in Malaysia, namely, informative, communicative and transactive. To foster orderly development of Internet banking services, BNM issued the Guidelines on Internet Banking in June 2000 outlining the several requirements, such as security requirements, bank's senior management involvements in Internet banking and clear terms and conditions of service.

² SSL – Secure Socket Layer and SET are two security protocols for payment over the Internet.

2.4.4 Electronic bill presentment and payment

An electronic bill presentment and payment system is a system that facilitates customers to view and pay their bills (e.g. utilities, rates) electronically via the Internet. Depending on the system architecture, credit card and direct debit are the most preferred payment method. Regardless of the nature of the Internet sites, most of the systems are linked to the banking system.

2.4.5 Postal remittance services

Pos Malaysia Berhad (PMB) is the nation's main agency providing postal services. In line with the economic growth in Malaysia, PMB has further upgraded the remittance services to fulfil customer's needs for a cheap, convenient, efficient, safe and reliable remittance service. The types of remittance services that are being offered by PMB include the following:

- *Domestic money order*
- *Express money order*
- *International money order*
- *Trade charge money order*
- *Postal order*

3. Interbank settlement systems

Introduction

There are two major interbank settlement systems in Malaysia, namely the RENTAS and the SPICK systems. The RENTAS system was developed to handle large- value interbank funds transfer and scripless securities transactions, while the SPICK system caters for the clearing and settlement of cheques among the participating commercial banks.

In addition to the these settlement systems operated by BNM, the banking institutions has implemented an Interbank Giro system to cater for smaller value interbank and third party funds transfer. In 2000, a total of 1.5 million interbank funds transfers valued at MYR11.4 trillion (USD3.0 trillion) were transacted through the RENTAS system. At the same time, a total of more than 52,000 transfers of scripless securities valued at MYR421.0 billion (USD110.8 billion) were also conducted via the system.

3.1 RENTAS system

The RENTAS system was implemented in July 1999 by BNM to reduce interbank settlement risk in an environment of increasing economic activity. Prior to the implementation of RENTAS, settlements for interbank funds transfer were conducted in an end-of-day net settlement system known as SPEEDS. Under the previous system, the total settlement exposure would only be made known at the end-of-day.

3.1.1 Ownership

BNM developed, owns and operates the RENTAS system. This is similar to the approach chosen by many other countries, as it is a systemically important payment system . The

system is managed by the Payment Systems Department of BNM, which is also responsible for the oversight of payment systems in the country.

3.1.2 Participation

All financial institutions licensed under the BAFIA, Islamic Banking Act 1983 (IBA) or any other institutions approved by BNM may become members of the RENTAS system. Accordingly, there are two types of memberships, banking institutions, which offer conventional banking and those that operate the Islamic banking scheme. The former has 53 members, including BNM, whilst the latter has 36 members. All members are direct members.

Table 2: Breakdown of the RENTAS's Participants as at Year- End 2000

Types of institution	Conventional banking	Islamic banking
Commercial banks	25	15
Finance companies	9	7
Merchant banks	10	3
Discount houses	7	7
Islamic banks	-	2
Others	2	2
Total	53	36

3.1.3 Types of transactions

There are essentially two types of transactions handled by the RENTAS system. They are the IFTS and the SSTS. The IFTS effects, processes and settles the transfer of high value Ringgit interbank funds with BNM and among the participating member institutions. The SSTS, on the other hand, effects, processes and settles scripless securities (such as Government securities, BNM papers, Cagamas bonds and unlisted private debt securities) on a Delivery Versus Payment (DVP) basis.

Being a high-value payment systems, the RENTAS system is used for interbank funds transfer, cash withdrawals by financial institutions from BNM, adjustment of statutory deposits, settlement of vostro accounts, money market and foreign exchange settlements and transactions on behalf of the Government and its agencies.

There are no lower and upper limits for the transfer of funds between members. However, for third party payments (originating from a non-RENTAS member or beneficiary), the value of such transactions shall not be less than MYR50,000 (USD13,158). This limit does not apply for payments to and from BNM involving the accounts of the Government.

3.1.4 Operation of system

The RENTAS IFTS is an on-line electronic interbank funds transfer communications network, which permits on-line processing of same day credit and debit transfers of funds in Ringgit, via the Central Host System (CHS) at the BNM, between participating member institutions and BNM, provided there is sufficient funds in the sending banks' accounts.

The RENTAS daily operation hours are as follows:

	<u>Monday-Friday (hrs)</u>	<u>Saturday (hrs)</u>
RENTAS Start time	8:00	8:00
Intraday Credit Cutoff Warning	16:00	11:00
Intraday Credit Cutoff	16:30	11:30
RENTAS Cutoff	18:00	13:00

BNM, under its discretion, may vary, amend or extend any of the above cut-off times. In exceptional cases, BNM may also consider the extension of the cut-off times at the request of a member.

3.1.5 Settlement

Under the RENTAS system, all transactions are processed and settled on a real-time basis through a book-entry mechanism. As each interbank credit and debit transfer is sent and received by member institutions, their account records in the CHS for interbank funds transfer will be credited or debited accordingly, depending on the availability of funds in the remitter's account. The net clearing balances from cheque clearings are also incorporated into the CHS transaction file. However, the updating or settlement is only affected on the next working day.

Several types of settlement accounts are maintained in the RENTAS system, including, the conventional or Islamic banking scheme current account, the statutory reserve account, and the vostro account. These accounts can be updated and inquired on a real-time basis and are managed by the individual banking institutions.

The RENTAS system which has straight-through processing capability process, transfer and settle interbank funds and scripless securities transactions simultaneously in real-time. The transfers are effected on a gross basis (i.e. without netting debits against credits) and provide finality (i.e. payee banks are able to receive funds with certainty for individual transfers). The settlement for SSTS transactions will be effected on the settlement date as follow:

- (i) Same day value trades:
 - Mon-Fri: Deals transacted before 15:00 must be settled by 17:30 on the same day.
 - Saturday: Deals transacted before 11:00 must be settled by 12:00 on the same day.
- (ii) Standard/Tom/Forward value dates:
 - Mon-Fri: All settlement by 11:00 on the value date.
 - Saturday: Saturdays are not a value date for such transaction.

3.1.6 Risks and risk management

The RENTAS system has become the most common means of addressing and controlling the risks associated with large-value payments in developed financial markets. The RENTAS system substantially reduces interbank settlement and systemic risks and eliminates counterparty settlement risk as it provides DVP for electronic book-entry securities transaction. In this system, the time lag that allows settlement failures to occur due to credit and settlement risks is eliminated. RENTAS also improves market transparency. As settlements are done bilaterally, it is possible to identify markets players and monitor unusual developments.

To ensure that settlement is effected by member participants, BNM provides a collateralized intraday credit facility to members who are short of funds. The credit facility is extended during the day without interest and is to be settled by the borrowing institution before a specific time at the end of the day. Participation in the system is subject to the approval of BNM. Since RENTAS is a real-time gross settlement system, BNM as well as RENTAS members are not directly exposed to monetary risks in the electronic payments system, as the system has incorporated several checks and balances to reduce such risks.

As RENTAS is a critical system, BNM has set-up contingency arrangements and a Disaster Recovery Centre (DRC) to enable processing to resume in the event of a breakdown at BNM's head office. Testing is conducted regularly at the DRC. All participants have also been advised to have a back-up site.

3.1.7 Technical aspects

BNM uses the Corporate Information Superhighway Systems (COINS), a wide area network provided by a local communication network provider, to connect its RENTAS CHS with the Front-End Systems (FES) of the members.

Various security measures have been put in place to ensure the security of the RENTAS system, including point-to-point secure connection, the use of personal ID and password and digital signature authentication. BNM's contingency site is always in a "hot standby" mode, with continuous transfer of data from the prime site to enable processing to continue in the event of break-down. Business continuity arrangements that include a "minimum level of service" are also enforced to ensure that the critical payments in the country are not disrupted.

3.1.8 Pricing policies

Participants of the RENTAS system are subjected to an annual fee of MYR5,000 (USD1,315.8) per member. In terms of transaction charges, BNM, as the operator of the system, charges MYR2.50 (USD0.65) per single IFTS transaction, MYR2.00 (USD0.53) for a central host enquiry, MYR2.00 for an administrative message, a MYR100.00 (USD26.4) cancellation fee for an aborted new stock issue and MYR150.00 (USD39.5) for the issuance or replacement of a smartcard. In addition, the participants also bear all connection cost, and cost for communication and security arrangement used by them.

3.1.9 Governance

The RENTAS system is governed by the RENTAS Participation Rules and RENTAS Members Rules, which were formulated by BNM and the commercial banks respectively.

The rules were formulated after a comprehensive consultation process undertaken with all stakeholders. However, BNM reserves the right to vary, amend, add or revoke any of the provisions in these Rules.

In the event of a dispute between members of the RENTAS system, BNM does not have any duty to determine the legality, validity or enforceability of any transaction under the RENTAS system. BNM will be entitled to regard all transactions executed under the RENTAS system as legal, valid and enforceable to ensure that the settlement is not disrupted. However, any dispute can be heard and resolved at an arbitration committee formed by the Association of Banks in Malaysia.

3.2 Sistem Penjelasan Imej Cek Kebangsaan (SPICK)

Introduction

The cheque clearing system in Malaysia has evolved over time, in line with the economic and technological development of the country. At present, there are two cheque-clearing methods in Malaysia, the SPICK and manual cheque clearing. The SPICK system which was implemented in phase, beginning from November 1997, handles about 90% of the total cheques cleared in Malaysia while the remaining are processed manually. The introduction of SPICK was part of BNM's continuous effort to reduce the day-holds for cheques clearing. With the introduction of the SPICK system, the day-holds for cheque clearing has been reduced to two days for local cheques (i.e. issued and deposited within the same SPICK area) and three days for inter SPICK areas.

Currently, the SPICK system has been implemented in three regions in West Malaysia. The clearing house covering the Central region is located at Kuala Lumpur, which covers the city itself, the states of Selangor, Negeri Sembilan, Malacca, Perak and Pahang; the Northern region located at Pulau Pinang for the states of Kedah, Penang and Perlis; and the Southern region at Johor Bahru is for the state of Johore. In non-SPICK areas of Kelantan, Terengganu, Sabah and Sarawak cheque clearing is conducted on a manual basis. Map of Malaysia is shown in Chart 2.

Chart 2: Map of Malaysia



The SPICK system is a combination of the automated cheque clearing system with the image of inward cheques for purposes of verification of signatures by the paying banks. Data on the inward cheques (the MICR line) are transmitted to the paying banks, followed by images of the cheques in compact disc (CD). The system provides benefit to the commercial banks as they are able to process and verify cheques based on the data and CDs received, without having to use the physical cheques.

3.2.1 Ownership

Similar to RENTAS system, BNM developed, owns and operates the SPICK system. The manual cheques clearing centers in the non-SPICK areas are set up and operated by the commercial banks themselves.

3.2.2 Participation

All the commercial banks and Islamic banks in Malaysia that provide a checking facility to their customers are participants of the SPICK system. There are currently, twelve domestic commercial banking institutions, including two Islamic banks and 14 locally incorporated foreign banks that provide checking services in Malaysia.

3.2.3 Types of transactions

Besides the normal cheques, SPICK also processes other clearing items such as bankers' acceptances, cashier's orders, demand drafts, interest warrants, pension warrants and drawing vouchers.

3.2.4 Operation of the system

The cheque clearing process is conducted at the clearing house located at BNM. Generally, there is only a slight difference in the clearing time between the three SPICK centres. All the centres adopt the same operational flows as implemented in the SPICK central region. The operational flows of the SPICK central region are as follows:

Reception/Set-up

Cheques from various banks in the SPICK area are delivered to the SPICK reception before 18:00 in a sealed envelope with an attached PIS (Pay in Slip). A copy of the PIS is returned to the bank(s). The sealed envelope is then delivered to another section of SPICK called 'Set-up'.

Set-up

The sealed envelope will be opened and the cheques, which are bundled, are processed. Each bundle will have a batch ticket. The batch ticket is used to credit the collecting bank(s) with the total amount of the bundle, whereas the cheques facilitate the debit entries for each paying bank. Each bundle will be inspected for its MICR code, cheque arrangement and batch ticket before the bundle is placed into a tray to be sent for processing. Cheques sent for processing would be in a group of four trays. The cheques are sent to another section of SPICK called 'UT Machine' for processing.

i. *UT Machine (On-Line)*

Cheques received are placed into the input tray of the processing machine. MICR data will be captured as well as the image of the cheques. Items or cheques that are not readable by the machine will be rejected. These rejected items will be sent to another section called 'Reject/Balancing' section for manual processing and data input.

ii. *Reject/Balancing*

Non-readable items/cheques are sent to the manual input section. The section is responsible for ensuring that each credit amount of batch ticket tallies with the debit amount of each cheque sent. At the end of the day, the section is responsible for ensuring that the total credit amount of batch tickets tallies with the total debit amounts of cheques sent for clearing before the next process is executed.

Computer Room

Data processing is done and the data is sent to commercial banks via the FINET (Financial Institution Network) line. The CDs and physical cheques are sent at a later stage.

iii. *UT Machine (Off-Line)*

After the on-line processing is completed, the UT Machine section will sort the cheques electronically according to the banks. The sorted cheques will be sent to the Reception/Set-up section for out delivery to commercial banks for verifications.

3.2.5 Settlement

The clearing of cheques among the participating banking institutions is conducted at the end of the day, which enables the clearinghouse to determine the net position, for settlement purposes, of the individual member banks. The actual settlement of the cheque clearing amount is effected via the RENTAS system by 9:00 on the following business day by crediting or debiting the current accounts, of the banking institutions, maintained with BNM. The unpaid items, i.e. cheques returned due to insufficient funds or any other reasons would be settled by 15:30 on the second business day.

3.2.6 Risks and risk management

Cheques are an important payment mode for consumers and play a major role in payment systems and the economy as a whole. To address any operational risk that would cause a failure in the SPICK system, BNM has set up a contingency site on a "hot standby" mode, with continuous transfer of data from the prime site, so that in the event of a breakdown, processing can resume within a few hours. Business continuity arrangements that include a 'minimum level of service' are enforced. In addition, there are legally enforceable system rules and regulations that all participants are subject to.

3.2.7 Pricing policies

In the SPICK system, BNM charges the banking institutions MYR0.06 (USD0.016) per inward clearing item, MYR1.00 (USD0.26) per unpaid item, and MYR0.05 (USD0.013) per

image for each physical cheque that is processed and stored in the CD ROM, subject to a minimum charge of MYR50 (USD13.2). A MYR2.00 (USD0.53) charge is imposed on each rejected item.

3.2.8 Governance

The BEA is the main legislation governing cheques. The BEA was amended in 1997 to incorporate a provision on cheque imaging to recognise the presentation of a cheque for payment through a document image processing system to facilitate the implementation of the SPICK system. The operation of SPICK is also governed by the SPICK User Manual.

3.3 Interbank Giro (IBG)

The IBG system was implemented in October 2000 to enable payment transactions to be carried out between different bank accounts electronically. IBG is an interbank fund transfer system designed to handle a high volume of low value interbank payments. The main objective of the IBG system is to efficiently debit one bank account and credit another. The system will generate the transaction onto an electronic media for payment and collection through the IBG system. This will reduce the time needed to credit the amount to a consumer's account, especially to an outstation account.

The IBG system facilitates third party payment between the participating banking institutions for any amount. It includes standing instructions for loan repayment, payment of insurance premiums, salaries, income tax payment, Employees Provident Fund contributions and other 'over the counter' transactions. Currently, only the domestic banking institutions are allowed to participate in the IBG system, which has a total of 12 participants. As part of BNM's plans to increase efficiency and competition in the payment systems, locally incorporated foreign banking institutions would be allowed to participate in the IBG system from mid-2002. As at end October 2001, more than 100,000 transactions with a total value of MYR880 million (USD231.6 million) had been carried out through the IBG system.

The parties involved in the IBG system are the originating financial institutions, the system operator (i.e. MEPS) and the receiving financial institutions. The originating financial institution receives payment instructions from the originators or customers and forwards those instructions to MEPS. MEPS would then distribute those entries to the appropriate receiving financial institutions, and perform the settlement function for the respective financial institutions. Upon receiving the entries from MEPS, the receiving financial institutions would make the necessary posting to the accounts of the ultimate receivers/beneficiaries.

4. Securities settlement systems

Introduction

The capital market in Malaysia comprises of the Government securities market, the equity market, private debt securities market and the financial futures and derivatives markets. The settlement systems for transactions traded in the various markets vary from one to another.

4.1 Scripless Securities Trading System (SSTS)

The SSTS, which is part of the RENTAS system, is an on-line book entry system to effect and to record the trading of Government securities, Treasury bills, Cagamas Berhad (National Mortgage Corporation) papers, unlisted private debt securities and Bank Negara Certificates and Bills. The system, apart from facilitating the electronic settlement of deals on a DVP basis, also eliminates completely the dangers of loss, theft and destruction of scrips and enhances the ability of the system to handle a larger volume of transactions.

4.1.1 Rules

The RENTAS Participation Rules formulated by the BNM governs the operations of the SSTS. Participants must also comply with “The Code of Conduct and Market Practices for Malaysian Scripless Securities Market under the Real-Time Electronic Transfer of Funds and Securities (RENTAS) System” guidelines issued by BNM.

4.1.2 Issue, lodgement, custody, recording and transfer system for SSTS securities

With the SSTS, a new system for the issue, lodgement, custody, recording and transfer of securities was introduced so that the holders could, in effect, hold and trade securities in a scripless form. The securities issued are in the form of Master Certificates and lodged by the issuer (i.e. the Government and Corporate companies) directly with BNM as the Authorized Depository (AD) for safe custody.

BNM will hold the Master Certificate on behalf of all the holders and their scripless securities account for the purpose of trading and transfers. BNM as the AD has designated Principal Dealers (dealers who underwrite the auctions of the securities which are sold on auction basis) and Approved Dealers (these dealers can only bid for the securities through the Principal Dealers) to act as Authorized Depository Institutions (ADIs).

BNM will not record the holdings and transactions of scripless securities by non-members of SSTS. Instead, the function of recording the holdings and transactions of non-SSTS members will be undertaken by the ADIs, which will maintain a separate account for each of the holder who is their customer. In accordance with the law and the code issued by BNM, securities held in custody on behalf of customers must be segregated from those securities held in the ADIs own securities account.

ADIs act only as agents in respect of the securities held in their aggregate customers' accounts maintained with the SSTS, and have no beneficial interest in the securities held in these accounts.

4.1.3 Participants in SSTS securities

Under the Securities Industry Act 1983 (SIA), dealers in securities are divided into two broad categories, namely, dealers who are licensed under the SIA and dealers who are exempted from the provisions of the SIA by being authorized by BNM to participate in the inter-bank money market. The exempt dealers include the commercial banks, merchant banks, finance companies, discount houses and Cagamas Berhad. Participants in the Malaysian Securities market, who do not participate in the interbank money market, are not eligible to become RENTAS members and to directly undertake trade in the SSTS transactions.

The non-exempt dealers are those finance companies, which have not been allowed by BNM to participate in the inter-bank money market. These non-exempt dealers cannot undertake trades for third parties, since they have not been licensed under the SIA, nor exempted from its provisions. Under the SIA, they cannot trade for their own account in the SSTS, unless they deal through a Principal Dealer or an Approved Dealer who is a RENTAS member.

4.1.4 Operation of the system

The SSTS system connects the securities dealers by linking up computer systems located in their offices to BNM's CHS. The CHS will accept, validate and acknowledge securities transactions sent from a participating member institution (the sending party) and then transmit the transaction to another member institution (the receiving party) connected to the securities system.

The seller of the securities is always the party to initiate a transaction by sending an "Unconfirmed Sales/Transfer Advice" to the buyer via the SSTS. The buyer will verify the details on the advice and has the option to confirm the transaction or to reject it if the details do not correspond with what has been agreed upon. Only upon confirmation from the buyer will the transaction be posted to the sellers and buyers respective securities and cash accounts maintained with the system.

4.1.5 Settlement procedures

A sale/purchase of securities from one securities account to another involves a book entry and intra-day settlement of funds in the cash settlement account maintained with BNM. The RENTAS system is thus, a DVP system, i.e. securities and funds settle gross throughout the day.

4.1.6 Risk and risk management policies

When an error or omission is discovered after the transaction has been entered into the system and accepted by the buyer, it can only be cancelled with the mutual agreement of the buyer and the seller. The advice to cancel a transaction should contain a reference to the earlier transaction, which is to be cancelled. In the event that a dispute cannot be resolved between the two parties concerned, the matter shall be referred to the Joint Standing Committee of the Forex Association of Malaysia for a final decision. The costs, if any, shall be borne equally by the two parties involved.

4.2 Equities

The secondary market trading of stocks and shares and listed private debt securities are carried out almost entirely in the KLSE, and to a lesser extent in the Bumiputra Stock Exchange.

4.2.1 Participants

The business of dealing in securities in Malaysia is carried out by stock broking companies, which are referred to as Member Companies of the KLSE and these totalled 64 at the end of 2000. Several laws and regulations govern the companies, primarily the:

- Securities Commission Act 1993

- Securities Industry Act 1983
- Securities Industry (Central Depositories) Act 1991
- Companies Act 1965
- Rules and Regulations of the KLSE

4.2.2 Operation of the system

Trading on the KLSE prior to 1989 was based on an open outcry system to match and execute orders. In 1989, a semi-automated trading system known as SCORE (System on Computerized Order Routing and Execution) was introduced and this was fully automated by November 1992 to allow for speedier matching of orders. Investors place orders through stock-broking firms, which in turn routed the orders to the SCORE system.

4.2.3 Settlement procedures

Previously, settlement was mainly paper-based with the physical delivery of the scrips by both investors and stockbrokers. However, several measures have been introduced over the years to enhance the settlement and delivery processes. In March 1984, the KLSE established a clearing house, the Securities Clearing Automated Network Services Sdn. Bhd. (SCANS), to ensure a more efficient settlement system. To reduce the physical delivery of shares between the broking firms and the clearing house, a “daily netting” system was introduced in January 1990 to effectively net, on the date of contract, all outstanding sales and purchases of stock transacted on the same day.

A Fixed Delivery and Settlement System (FDSS) was also implemented in February 1990 to develop a more organized system of scrip movements and enhance the management of cash flow among the stock broking firms. In 1992, the KLSE undertook the development of a CDS. The CDS is a scripless trading system in which scrips are immobilized and transactions are effected through a computerized book-entry clearing system.

Corporate and individual investors are required to open securities accounts with the 64 appointed Authorized Depository Agents (stock broking firms) or the Authorized Direct Members, made up of the banking institutions, Government institutional investors, insurance companies, unit trusts and other institutional investors which participate in the CDS. All main board and second board counters were prescribed into the CDS by the end of 1996.

Brokers settle net amounts of stock and money through SCANS, which will perform multilateral netting of contracts and notify market participants of the net amounts they owe one another. Payment of net amounts is effected through commercial banks, where all members of SCANS maintain accounts, with physical or book-entry delivery of the securities. Settlement of interbank payments is at the end-of-day on a net settlement basis through the RENTAS system.

4.2.4 Fixed Delivery and Settlement System (FDSS)

To facilitate trade settlement, the FDSS rules will apply whether or not a company’s shares have been prescribed into the CDS. Delivery of securities and settlement of payment for contracts are done on a ‘ready basis’.

If the selling client fails to deliver to the broker by the due date, and consequently, the broker is unable to deliver to SCANS by the due date, the KLSE will institute automatic buying-in against the broker concerned on the market day following the due date to SCANS.

4.2.5 Central Depository System (CDS)

Under the CDS, the FDSS as described in the preceding section will continue to apply except that delivery is replaced by book-entry. Trade settlement in the CDS does not refer to cash settlement. The CDS account will show the quantities of shares and not the values. Quantities of shares in the CDS accounts will be credited and debited as a result of buy or sell trades. Settlement on the KLSE is conducted on T+3 basis effective from December 2000.

4.2.6 Risk management

The KLSE, being a self-regulatory body, stipulates the entry criteria for membership of the exchange as well as listing. It also established a compensation fund to provide recourse to investors and stockbrokers in the event of insolvency of a member company. The KLSE had also introduced a computerized surveillance system in 1994 to enhance its market surveillance system.

4.3 Financial derivatives market

In recent years, rapid developments have occurred in the regulatory framework of the Malaysian capital markets. One of the major developments was the merger of the Kuala Lumpur Options and Futures Exchange and the Commodity and Monetary Exchange of Malaysia to form the Malaysian Derivatives Exchange Berhad (MDEX) on June 11, 2001.

Similar to the equity market, the clearing and settlement for derivatives transactions are not conducted by the RENTAS system operated by BNM. This function is performed by the Malaysian Derivatives Clearing House Berhad (MDCH). Its primary function is to ensure that financial obligations under the future contracts entered into on the derivatives exchange are performed in a timely manner. It acts as the counterparty to these contracts, and assumes and manages the credit risk of its clearing members. Currently, MDCH clears stock index futures and options, interest rate futures and palm oil futures.

There are four classes of MDEX membership namely, the trading, local, associates and trading permit holders members. However, the membership for MDCH is limited to trading members only. Other MDEX participants clear their trades through any of the clearing members. In principle, MDCH will clear all trades conducted by its trading members while the eventual settlement will be conducted through the appointed clearing banks.

5. Role of the central bank

BNM, as the Central Bank of Malaysia, is responsible for the regulation and supervision of the banking system, with the exception of the offshore banks operating in the Labuan International Offshore Financial Centre that come under the purview of the Labuan Offshore Financial Services Authority (LOFSA). The banking system performs an important role in the economy, as well as playing a vital role in the payment systems. BNM plays a critical role in developing and providing quality clearing, settlement and payment services as well as

undertaking system design and development of systemically important payment systems. Initiatives are taken to promote and support a sound and progressive financial sector.

The roles of BNM with respect to payment systems are provided in the CBA and the BAFIA. The CBA lays out the function of BNM, including its responsibility in payment related matters, such as to act as a banker to the Government, to issue currency and to provide a clearing house for the banking institutions. The BAFIA provides specific powers to BNM with respect to regulating certain types of payment systems and payment mechanisms in Malaysia.

5.1 Provision of settlement accounts and provision of payment systems

As stated in Section 3.1 and 3.2, BNM develops, owns and operates both the RENTAS and SPICK systems. Participants in these systems must maintain a settlement account at BNM to facilitate the clearing and settlement process. Transactions from other payment methods such as credit, debit and charge card systems, ATM networks, the Interbank Giro system, stored value cards and the clearing of securities and derivatives are settled through multilateral netting between participants, where the final settlement is conducted through an appointed settlement bank.

5.2 Operation of securities settlement systems

Through RENTAS, BNM provides the system for the transfer and settlement of unlisted securities. Details of the system are given in Section 4.1. However, BNM is neither involved in nor regulates the clearing and settlement for the equity, derivative and commodity markets, which are undertaken by SCANS and MDCH respectively. Capital market activities in Malaysia are regulated by the Securities Commission. An explanation of the clearing and settlement of securities is provided in Sections 4.2 and 4.3 respectively.

5.3 Oversight

BNM performs its oversight functions as part of its overall responsibility for regulating and supervising the banking system. This function is conducted through various means including on and off-site supervision and issuance of guidelines and regulations. Payment systems oversight is essential as a reliable and efficient payment system contributes to the stability of the financial system and the economy. It is also needed to safeguard the transmission channel for the implementation of monetary policy objectives. The oversight of payment systems covers not only the licensed banking institutions under the BAFIA and IBA, but also the payment systems facilities provided by non-banking institutions. Specifically, BAFIA states that the operation of credit token business (e.g. credit card) and electronic fund transfer systems would require the prior approval of BNM. This is to ensure that such systems are operated in a manner that is not detrimental to the participants and provide a minimum level of customer protection.

5.4 Other roles

To meet its objectives of price stability in an environment of growth and development, BNM has at its disposal a broad array of instruments that are directed at affecting the availability and cost of money and credit through the impact on banking institutions' reserves and credit.

These instruments consist primarily of open market operations, variations in the statutory reserve requirement and variations of minimum liquidity requirements. The payment system

is the conduit for the implementation of the above measures and policies. The Central Bank also has an important role in maintaining financial stability and that banking institutions perform their intermediation function.

In addition, BNM also plays an important role in promoting innovation, efficiency and stability in the country's payment systems. The availability of a secure, efficient and reliable payment system is important in ensuring the efficient implementation and transmission of monetary policy objectives and in maintaining public confidence in the domestic financial system.

In promoting innovation in the payment systems, BNM was involved in the coordination of the implementation of the national multipurpose smart card project. The Malaysian Government is the first government in the world to implement a national strategy for a multi-application smart card. The Multipurpose Card (MPC) Flagship Application is one of the MSC Flagship Applications³ that seeks to develop a single common platform for a MPC enabling the Government and private application providers to implement smart card solutions.

Two types of cards are being issued under this project. MyKad, issued by the Government, contains critical Government applications such as the national identity, immigration particulars, driving license, and medical information, as well as payment applications, namely the MEPS Cash and ATM applications. The second smart card, the PMPC, incorporates the ATM, debit and MEPS Cash applications and is to be individually issued and branded by banking institutions.

To promote the development of e-commerce among the business enterprises, BNM has formulated a model for an Internet based financial exchange for the business-to-business (B2B) community. The exchange, once implemented, will allow the participants to trade and execute payments via the Internet and facilitate end-to-end solutions for their businesses.

To assist BNM in performing its function relating to payment systems more effectively, BNM has established the National Payments Advisory Council (NPAC). It is supported by the Payment Systems Policy Working Group, which is an internal consultative body that discusses policy issues concerning payment systems. The members of the Payment Systems Policy Working Group are the Heads of various Departments in BNM, which are in one way or another related to payment systems. The NPAC acts as a formal external consultative body to BNM in matters relating to payment systems. Its members are senior representatives of relevant Government agencies, the Securities Commission, Association of Banks in Malaysia, Association of Finance Companies of Malaysia, Association of Merchant Banks in Malaysia, Association of General Insurance of Malaysia, MEPS, and a representative from the Bank of Japan, as well as a representative from the Hong Kong Monetary Authority.

³ The other MSC Flagship applications are the Electronic Government, Telehealth, Smart Schools, R & D Clusters, Borderless Marketing Centres and World-Wide Manufacturing Webs. The Multimedia Super Corridor (MSC) is an innovation by the Malaysian Government incorporating both advanced physical infrastructure and policies to lead Malaysia's foray into the Information Age.

Malaysia

STATISTICAL TABLES

Malaysia

Table 1

Basic statistical data

	1996	1997	1998	1999	2000 ¹⁾
Population (millions) ²⁾	21.17	21.67	22.18	22.71	23.26
GDP at current prices (MYR millions)	253,733	281,795	284,243	330,340	340,705
GDP per capita	11,986	13,006	12,815	14,545	14,645
Exchange rate vis-à-vis USD: ³⁾					
<i>year-end</i>	2.53	3.89	3.80	3.80	3.80
<i>average</i>	2.52	2.81	3.92	3.80	3.80

¹⁾ Preliminary.

²⁾ Mid-year population.

³⁾ The ringgit was pegged at MYR3.80=USD1 on the September 2, 1998.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	MYR billions 2000
Banknotes and coins on issue	19.03	21.43	18.25	24.78	22.26
Transferable deposits ¹⁾	41.55	41.93	35.89	48.67	55.96
Other	0	0	0	0	0
Narrow money supply (M1)	60.59	63.37	54.13	73.45	78.22
<i>Memorandum items:</i>					
Broad money supply ²⁾	329.71	390.81	401.46	434.59	456.50
Transferable deposits in foreign currencies	1.82	4.13	5.34	6.91	9.79
Outstanding value on e-money schemes					
of which:					
<i>on card-based products</i> ³⁾	0	0	0	neg.	neg.
<i>on network-based products</i>	0	0	0	0	0

¹⁾ Demand deposits maintained by non-banking institutions.

²⁾ Broad money (M3) = Transaction balances + broad quasi-money.

Transaction balances = currency in circulation + demand deposits.

Quasi-money = Demand deposit + fixed deposits + Negotiable instruments of deposits + Repos + Foreign deposits.

³⁾ MEPS Cash introduced on September 1, 1999.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	MYR billions 2000
Transferable balances held at central bank	45.64	61.74	18.20	21.67	19.32
of which:					
<i>required reserves</i> ¹⁾	43.18	57.18	15.15	14.48	14.05
<i>free reserves</i>	2.46	4.55	3.04	7.19	5.27
Transferable deposits held at other banks	3.94	27.80	2.51	2.13	1.62
<i>Memorandum item:</i>					
Institutions' borrowing from central bank ²⁾	0	0	0	0	0

¹⁾ The statutory required reserve was reduced to 10% in February 1998, 8% in July 1998 and 4 % in September 1998.

Beginning January 1999, some banking institutions migrated to the New Liquidity Framework. Since January 1, 2001, all banking institutions have moved to the New Liquidity Framework.

²⁾ Intra-day credit facility used for RENTAS settlement. The credit facility has to be settled before end of the business day.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (MYR millions)
Central bank	1	5	186	58,153
Banking institutions				
<i>commercial banks</i> ¹⁾	33	1,880	nav.	362,994
<i>finance companies</i>	19	933	nav.	82,649
<i>merchant banks</i>	12	22	nav.	24,764
Postal institution	0	0	nav.	nav.
National Savings Bank	1	436	8,905,000	10,386
Total	66	3,276	nav.	538,946
of which:				
<i>virtual institutions</i>	0	0	0	0
Branches of foreign banks ²⁾	0	0	nav.	nav.

¹⁾ Comprising of domestic banks, locally incorporated foreign banks and Islamic banking institutions.²⁾ Branches of foreign banks are required to be locally incorporated.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	thousands 2000
Retail system ¹⁾	96,800	104,920	105,480	153,914	164,779
Large-value system ²⁾	2,029.31	2,390.37	1,947.32	1,400.09	1,440.59
Other systems					
ATM network ³⁾	nav.	nav.	nav.	nav.	146,066.3
Interbank Giro ⁴⁾	nav.	nav.	nav.	nav.	9.94

¹⁾ Retail system - SPICK.²⁾ Large-value systems - RENTAS.³⁾ Withdrawals only.⁴⁾ Interbank Giro was implemented in October 2000.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	MYR billions 2000
Retail system ¹⁾	859.90	907.70	953.90	1,007.35	1,076.04
Large-value system ²⁾	15,138.89	23,069.25	17,663.81	12,100.65	11,383.00
Other systems					
ATM network ³⁾	nav.	nav.	nav.	nav.	61.96
Interbank Giro ⁴⁾	nav.	nav.	nav.	nav.	0.06

¹⁾ Retail system - SPICK.²⁾ Large-value systems - RENTAS.³⁾ Withdrawals only.⁴⁾ Interbank Giro was implemented in October 2000.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions

Instruments	millions				
	1996	1997	1998	1999	2000
Cheques	96.10	104.80	133.20	154.10	164.80
Payments by debit card	nav.	nav.	nav.	nav.	0.63
Payments by credit card ¹⁾	nav.	nav.	nav.	nav.	67.23
Credit transfers	nav.	nav.	nav.	nav.	nav.
Direct debits	nav.	nav.	nav.	nav.	nav.
Other types of instruments ²⁾	nav.	nav.	nav.	nav.	neg.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Also includes charge cards.

²⁾ Interbank Giro services implemented in October 2001.

Table 8

Indicators of use of various cashless payment instruments: value of transactions

Instruments	MYR billions				
	1996	1997	1998	1999	2000
Cheques	1,109.9	1,304.7	954.1	1,041.9	1,076.0
Payments by debit card	nav.	nav.	nav.	nav.	0.09
Payments by credit card ¹⁾	11.52	14.40	12.68	13.61	18.32
Credit transfers	nav.	nav.	nav.	nav.	nav.
Direct debits	nav.	nav.	nav.	nav.	nav.
Other types of instruments ²⁾	nav.	nav.	nav.	nav.	0.08
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Also includes charge cards.

²⁾ Interbank Giro services implemented in October 2000.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	millions				
	1996	1997	1998	1999	2000
Government bond settlement system	nav.	nav.	nav.	nav.	nav.
Corporate bond settlement system	nav.	nav.	nav.	nav.	nav.
Total ¹⁾	0.04	0.04	0.04	0.06	0.05
Equity settlement system ²⁾	nav.	nav.	nav.	nav.	2,353.76
Other settlement systems ³⁾	0.62	0.94	1.15	0.85	0.72

¹⁾ Figures covers both public and private sectors.

²⁾ Securities Clearing Automated Network Services (SCANS).

³⁾ Malaysian Derivatives Clearing House which handles the clearing for derivatives transactions.

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	MYR billions				
	1996	1997	1998	1999	2000
Government bond settlement system	nav.	nav.	nav.	nav.	nav.
Corporate bond settlement system	nav.	nav.	nav.	nav.	nav.
Total ¹⁾	257.82	352.13	414.67	236.60	421.00
Equity settlement system ²⁾	463.26	408.56	117.24	196.63	244.06
Other settlement systems	nav.	nav.	nav.	nav.	nav.

¹⁾ Figures covers both public and private sectors.

²⁾ Securities Clearing Automated Network Services (SCANS). Based on transaction value.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
Number of participants in securities settlement systems of which:					
SSTS ¹⁾	97	77	70	65	66
<i>Financial institutions</i>	88	77	70	65	65
<i>Others</i>	9	0	0	0	1
SCANS ²⁾	60	60	64	75	74
<i>Trading Clearing Members</i>	60	60	64	63	61
<i>Non-Trading Clearing Members</i>	nap.	nap.	nap.	12	13
MDCH ³⁾	nav.	nav.	nav.	nav.	29

¹⁾ Scripless Securities Trading System.

²⁾ Securities Clearing Automated Network Services Sdn Bhd.

³⁾ Malaysian Derivatives Clearing House Bhd.

PAYMENT SYSTEMS IN NEW ZEALAND

New Zealand

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List of abbreviations

ATM	Automatic Teller Machine. Refer to section 2.2.3
AustraclearNZ	Austraclear New Zealand System. Refer to sections 3.3 and 5.3
CD	Certificate of Deposit. Refer to section 4.2.1
CHESS	Clearing House Electronic Sub-register System. Refer section 1.1.2
CLS	Continuous Linked Settlement. Refer to section 3.6
CPI	Consumers' Price Index. Refer to section 5.5
EDI	Electronic Data Interchange. Refer to section 2.2.5
EFTPOS	Electronic Funds Transfer at the Point Of Sale. Refer to section 2.2.3 and 3.5
ESAS	Exchange Settlement Account System. Refer to sections 3.1 and 5.2
FASTER	Fully Automated Screen Trading and Electronic Registration system. Refer to sections 4.3.2 and 4.3.3
GDP	Gross Domestic Product
ISL	Interchange and Settlement Limited. Refer to section 3.4
NZBA	New Zealand Bankers' Association. Refer to section 1.2.3
NZCSD	New Zealand Central Securities Depository Limited. Refer to section 4.1.3
NZDMO	New Zealand Debt Management Office. Refer to section 4.1.1
NZFOE	New Zealand Futures and Options Exchange Limited. Refer to sections 1.2.3 and 4.4
NZSE	New Zealand Stock Exchange. Refer to sections 1.2.3 and 4.3
OCR	Official Cash Rate. Refer to section 5.5
PIN	Personal Identification Number. Refer to section 2.2.3
RBNZ Reserve Bank	} Reserve Bank of New Zealand. Refer to sections 1.2.3 and 5
RTGS	Real Time Gross Settlement. Refer to section 3
SCP	Same Day Cleared Payment. Refer to section 3.2
SFE	Sydney Futures Exchange. Refer to section 4.4.1
SOE	State Owned Enterprise. Refer to section 4.2.1.
UNCITRAL	United Nations Commission on International Trade Law. Refer to section 1.1

Overview

New Zealand has a well-established legal and financial infrastructure serving a population of 3.8 million people and annual gross domestic product of NZD100 billion (USD45 billion)¹. There are active primary and secondary money and securities markets, and two national exchanges, the New Zealand Stock Exchange and the New Zealand Futures and Options Exchange. The main payment instruments and services are provided by the registered banks. Banks and other financial institutions service the securities market.

The payment and securities settlement systems that underpin these markets have evolved to meet the needs of the market and the participants. The major payment and settlement systems are fully electronic and the high value systems settle on a real time gross basis.

1. Institutional aspects

1.1 Legal and regulatory framework

New Zealand is an independent state, with a parliamentary government. The law of the country consists of statute law enacted by the New Zealand Parliament, common law, constitutional conventions, regulations, by-laws and other forms of subordinate legislation.

Commercial and consumer protection laws apply to all business activities, regardless of the instrument or channel used. Umbrella financial market and general legislation includes the following:

- Companies Act 1993. This Act is generally permissive, but includes a high degree of personal responsibility on company directors for the solvency and proper administration of the company. There are also a number of investor protections, including public registration; equal treatment and protection of shareholders rights; and provision of information.
- Financial Reporting Act 1993. The provisions of this Act define the nature and content of the financial information companies must provide to shareholders.
- Financial Transactions Reporting Act 1996. The Financial Transactions Reporting Act facilitates the prevention, detection, investigation and prosecution of money laundering. It requires reporting of suspicious cash transactions to the Commissioner of Police, and places an obligation on banks and financial institutions to identify and “know their customer”.
- Commerce Act 1986. This Act is the New Zealand equivalent of the anti-trust law found in other countries. The law’s objective is to promote competition in markets for the long term benefit of consumers. It does this by preventing any business acquisition which results in a person acquiring or strengthening a dominant position in a market, unless that business acquisition can be justified in terms of public benefit.

¹ All values are in domestic (New Zealand dollar) terms unless otherwise stated.

The Act specifies and prohibits (unless authorized by the Commerce Commission) a range of anti-competitive activities.

- Fair Trading Act 1986. The Fair Trading Act, also administered by the Commerce Commission, aims to ensure customers receive accurate information about goods and services. It deals with misleading advertising; prohibits deceptive or misleading conduct and false representations about the provision of goods and services; prohibits certain unfair trading practices; promotes product safety; and provides for consumer information.

In addition, the Electronic Transactions Bill, which is expected to be enacted in 2002, will facilitate the use of electronic technology. The Bill aims to achieve functional equivalence with regard to electronic and paper transactions, and technology neutrality in terms of the technology used. The provisions of the Bill closely follow the Model Law on Electronic Commerce prepared by UNCITRAL in 1996. Once enacted, it will reduce the uncertainty regarding the legal effect of electronic information and allow certain paper-based legal requirements (such as a requirement for writing, a signature, or the retention of documents) to be met by using electronic technology.

1.1.1 Payment instruments and systems

There are no specific legislative or regulatory requirements governing payment systems in New Zealand. Payment systems must be operated within the general law including compliance by payments providers with anti-competitive requirements. General commercial and consumer law and the contractual conditions agreed between the participants in the separate systems govern the day to day operations of payment instruments and systems. The New Zealand Bankers' Association establishes industry standards and policies in some instances, but the payment services entities have their own governance arrangements, business strategies and rules.

Legislation has been drafted, but not yet enacted, to formalize the oversight arrangements and responsibilities in the payment system in New Zealand by the Reserve Bank of New Zealand.

Instrument-specific legislation includes the Cheques Act 1960, which codifies aspects related to the cheque payment instrument, notably the procedures for the endorsement, presentment and payment of cheques. A 1995 amendment provided for the electronic presentment of cheques and removed the previous requirement to deliver cheques physically to the paying bank, opening the way for cheque truncation and imaging.

The Cheques Act is part of the Bills of Exchange Act 1908, the latter being the principal Act dealing with negotiable instruments. The Act sets out the rules governing bills of exchange, including some provisions relating specifically to cheques, and promissory notes.

The Credit Contracts Act 1981 covers the provision of credit under contracts of various kinds, including credit contracts between a bank credit card issuer and the cardholder. This Act requires the disclosure of the cost of credit on a uniform basis and provides for the ability to re-open any credit contract that is deemed to be oppressive. The Government has announced plans to introduce a Consumer Credit Bill in the first half of 2002 that will replace both the Credit Contracts Act and the Hire Purchase Act 1971.

Legislation, which sets out the enforceability of netting agreements and payments finality on insolvency in New Zealand, came into effect in April 1999². This legislation provides that payments that have been completed on the same day, but prior to the time at which a liquidation, bankruptcy, or statutory management commences will not have to be unwound. The netting provisions provide for both bilateral and multilateral netting agreements. The netting agreements must be in writing and, in the case of multilateral netting, recognition is restricted to an agreement that is subject to the rules of a 'recognized clearing house', determined by the Reserve Bank. The rules of one payment system, the Austraclear New Zealand system, have been recognized to date.

1.1.2 Securities settlement

The Securities Act 1978 is the main statute governing the securities market in New Zealand. This Act and associated regulations provide for the issue of securities to the public (whether by debt, equity or other instruments), the conduct and record keeping requirements of issuers, and disclosure requirements.

The Securities Act provides that no security may be offered to the public for subscription unless the offer is made in, or accompanied by, a registered prospectus or the offer is made in an authorized advertisement. Unless exempted from these provisions, it is necessary for a public offer prospectus to comply with the Act and be registered by the Registrar of Companies.

Issuers and market participants that are companies are also required to meet the general requirements of the Companies Act 1993 and, in the case of listed securities, to meet the listing requirements of the New Zealand Stock Exchange. The listing requirements are quite extensive and are imposed by the Exchange as part of its self-regulatory role. They are aimed at ensuring there is a fully informed market at all times.

The transfer of securities is regulated under the Securities Transfer Act 1991. The provisions of this Act provide for the transfer of securities by electronic means where the transfer system has been approved. The Securities Commission has the responsibility for making the recommendations concerning approvals to the Minister. Two systems, FASTER and CHESS, have been approved to date.

Depositories acting as custodian trustees must also comply with the Trustee Act 1956. This Act covers the general power of trustees, their appointment and discharge, and provisions relating to the investment of trust funds.

There are no sales restrictions preventing certain types of investors being offered particular instruments. Nor, other than in respect of sharebrokers and futures dealers, are there regulatory requirements determining who can be market participants, intermediaries or dealers. Sharebrokers require a sharebroker's licence issued by the District Court. Futures exchanges and dealers are required to be authorized by the Securities Commission or be a member of a class that is authorized.

² The legislation is contained in the Companies Amendment Act 1999, the Corporations (Investigation and Management) Amendment Act 1999, the Insolvency Amendment Act 1999 and the Reserve Bank of New Zealand Amendment Act 1999.

There are comprehensive disclosure obligations on investment advisers. Any person or organization offering investment advice must comply with the Investment Advisers (Disclosure) Act 1996. This requires that investment advisers disclose their procedures for invested monies, together with details of personnel, including qualifications, experience and whether the adviser has any financial interest in the matter upon which advice is being offered.

The Securities Amendment Act 1988 provides the statutory framework prohibiting insider-trading and prescribes financial penalties for persons who act or who incite others to act upon inside information.

New Zealand does not constrain general investment in its stock market. There are no restrictions on the movement of currency by residents or non-residents; no regulatory constraints on New Zealand investors wishing to invest abroad; no controls on the repatriation of capital or income by non-residents; and no restrictions imposed on the physical movement of securities.

Portfolio investment does not require consent unless it will breach the thresholds at which Overseas Investment Commission or Commerce Commission consent is required. The consent of the Overseas Investment Commission is required in the case of non-residents seeking to acquire control of 25% or more of any class of shares or voting power in a company where the consideration for the transfer of the value of the assets exceeds NZD50 million (USD22 million). The Commission's approval is also required for non-resident investment in commercial fishing and, in specified circumstances, investments in land.

1.2 Institutions

1.2.1 Providers of payment services

The Reserve Bank of New Zealand provides the central Exchange Settlement Account System (ESAS) and a high value payment and securities settlement system, the Austraclear New Zealand system (AustraclearNZ).

The registered banks provide the current retail payment services and a wholesale payment facility. Banks are registered and supervised by the Reserve Bank. There are currently 17 registered banks, of which all but two are overseas owned.

There is a high level of ownership and governance commonality among the bank payment entities. The bank-owned payment services are typically owned and operated collectively by a consortium of banks through a separately incorporated entity established for the purpose. A single bank owns and operates one of the retail card systems.

The bank-owned and operated payment services companies provide messaging and processing services, but do not carry any value for the transactions processed. They do not operate as central counterparties, nor do they offer liquidity facilities. The participant banks intermediate the positions and carry the financial risk of the transactions.

Some non-bank financial institutions, such as building societies and credit unions, have agency arrangements with the banks to allow the former to provide retail payment services, typically cheque and card facilities, to their customers. Because of the open policy to bank

registration and low formal thresholds, non-bank deposit-taking financial institutions are not significant in New Zealand.

1.2.2 Providers of securities services

Securities services are provided by banks and non-bank financial institutions, including funds managers, investment houses, financial advisers, and brokers.

New Zealand has a national stock exchange (the New Zealand Stock Exchange), a derivative exchange (the New Zealand Futures and Options Exchange Limited), a dominant registrar of listed securities (Computershare New Zealand Limited) and a single depository (New Zealand Central Securities Depository Limited). Government securities are registered with the Reserve Bank, acting as agent for the New Zealand Debt Management Office.

There are two main securities settlement systems in New Zealand, AustraclearNZ, which is operated by the Reserve Bank, and the Fully Automated Screen Trading and Electronic Registration (FASTER) system, operated by the Stock Exchange. The futures and options exchange products are cleared and settled as part of the Sydney Futures Exchange arrangements.

1.2.3 Role of other private and public sector bodies

The *Reserve Bank of New Zealand* is New Zealand's central bank. It is responsible for three main functions: operating monetary policy to maintain price stability; promoting the maintenance of a sound and efficient financial system; and meeting the currency needs of the public. It also has a policy and operational role in the payment and securities settlement system, described in section 5.

The primary oversight agency for securities market activity in New Zealand is the *Securities Commission*. The Securities Commission is an independent statutory corporate body. It aims to facilitate capital investment in New Zealand by: promoting the efficiency of New Zealand's securities markets; enhancing the integrity of these markets; promoting the regulation of these markets; and strengthening public and institutional confidence in these markets, both in New Zealand and overseas. The Commission also reviews practices relating to electronic offerings, trading and transfer of securities in terms of the Securities Transfer Act 1991. The Commission has some enforcement powers. It may, for example, suspend or cancel false or misleading prospectuses.

The *Commerce Commission* is responsible for promoting and bringing about compliance with the Commerce and Fair Trading Acts, which are aimed at ensuring consumers and producers benefit from healthy competition. It also administers the Sharebrokers Amendment Act establishing the NZSE framework.

The *Overseas Investment Commission* administers the government's foreign investment policies in terms of the framework established by the Overseas Investment Act 1973, the Fisheries Act 1996, and related regulations. Its primary function is to assess applications for consent from non-residents who intend making substantial investments in New Zealand.

The *New Zealand Stock Exchange* (NZSE) is a national corporate body representing its shareholder members. The Exchange operates as a broker-owned mutual entity in terms of

the Sharebrokers Amendment Act 1981. The primary purpose of the NZSE is to provide and operate an efficient market for the raising of capital for listed companies and the trading of securities, including fixed interest securities. It is also responsible for maintaining professional standards among its members and listed companies.

New Zealand Futures and Options Exchange Limited (NZFOE) operates as an authorized futures exchange in New Zealand. It offers and trades a range of standard derivative products based on New Zealand securities and commodities. NZFOE is a wholly owned subsidiary of the Sydney Futures Exchange (SFE).

The *New Zealand Bankers' Association* (NZBA) is a professional industry organization, representing banking industry interests in the public arena. Membership is voluntary and open to any registered bank. Currently ten banks are members. The Association carries out a number of coordination and advisory activities for and on behalf of its members, including development of rules and standards for payment instruments, and representing the collective view of members on public policies that affect the banking industry. It is also responsible for the Code of Banking Practice, a plain English document outlining the standards member banks agree to observe when dealing with personal customers. A statement of principles applies to business customers. Both documents are due to be combined in the 2002 edition of the code. The code is monitored by the Banking Ombudsman and covers, inter alia, customer privacy issues, bank disclosure, and cheque and other payment methods.

The role of the *Banking Ombudsman* is to provide an independent and impartial arbitrator of unresolved disputes about the provision of banking services. Anyone dissatisfied with a banking service in New Zealand from a participating bank can submit a complaint for review. The service is free. The Banking Ombudsman's jurisdiction covers complaints about all types of banking business normally transacted through bank branches, (including complaints about payment services), up to a maximum value of NZD100,000, but does not cover complaints about general bank policy or about commercial judgement decisions on lending.

2. Payment methods

While cash remains dominant for low value transactions, recent years have seen a marked increase in the range and number of payment instruments and services, particularly retail payments. In addition to the traditional paper-based instruments (notably cheques), direct debit and credit transfers, debit and credit cards, and telephone banking facilities are readily available. More recently, all the major banks have introduced Internet banking facilities.

Electronic systems have rapidly increased in importance, both for retail and wholesale (high value) transactions to the point where they now account for the majority of payments, by number as well as by value.

2.1 Cash

Cash (New Zealand dollar banknotes and coin) is used widely for small value, face-to-face transactions between individuals and between individuals and merchants. Being legal tender, banknotes and coins have the advantage of convenience and immediate final transfer of value. Estimates suggest cash accounts for around 30-35% of retail transactions.

The Reserve Bank has the sole right to issue banknotes and coins in New Zealand. Coins are issued in 5c, 10c, 20c, 50c, NZD1 and NZD2 denominations and banknotes in denominations of NZD5, NZD10, NZD20, NZD50 and NZD100.

Notwithstanding the increasing use of electronic funds transfer at the point of sale (EFTPOS) and other forms of non-cash payment, the total value of currency in circulation has grown around 10% per annum in recent years. Demand for cash by the community has tracked ahead of the nominal growth in the economy but, by international standards, remains low relative to GDP. The total value of notes and coins on issue as at June 2001 was NZD2.54 billion (USD1.1 billion), approximately 2.25% of nominal GDP. As a percentage of the public's total money balances, notes and coins comprise about 12% of the narrowly defined money supply (M1) and 2% of the broad money supply (M3).

2.2 Non cash

2.2.1 Cheques

Traditionally, cheques have been the major non-cash payment instrument in New Zealand, heavily used by both business and consumers. They are used for face-to-face and remote transactions and for any size of payment. In the case of face-to-face transactions by individuals, some form of identification of the payer is frequently required.

Once banked, cheques are processed electronically together with other retail payment instruments, such as direct debits and credits and telephone banking transactions. The physical paper is exchanged in the day(s) following and it can take up to five business days for a cheque to be cleared. The introduction of cheque truncation and imaging is starting to remove the need for the physical movement of cheques and should reduce the total cheque clearance time.

The payee is typically credited for the funds on the day of the deposit, and thus receives same day value, but may not be able to draw on the funds until the cheque has cleared.

Payment statistics indicate a strong move away from cheques in favour of electronic payment methods. From being the most popular form of non-cash payment until the mid-1990s, cheques now lag behind EFTPOS payment transactions and electronic credits. Payments by cheque accounted for over 50% of transactions through the banking system in 1993 and averaged 130 cheques per capita. By the year 2000, the per capita annual figure had halved to 65 cheques, and accounted for 17% of non-cash payments.

2.2.2 Direct entry transactions

Direct debits, or pre-authorized debits on the payer's bank account, account for around 4% of payments through the banking system. Direct debit transfers are initiated by the payee and are subject to the payer completing a direct debit authority for the payer's bank. They are typically used for processing payments from large number of payers to one payee and for regular bills, including those where the amount due may vary, for example, payments for property tax to local authorities and recurring payments to utility and other firms.

They must be processed in electronic form and, although the number of direct debits has grown in recent years, the use of the instrument has remained unchanged in terms of its share of total non-cash payments.

Electronic credits are widely used. They are initiated by the payer to their bank to make payments direct to the account of named payees. Electronic credits may be in the form of a schedule of payments submitted directly by the payer to their bank or set up as automatic payments involving a regular payment of fixed amounts from one account to another. They are used for private and public payroll payments, government benefit payments and recurring payments to utility firms, insurance and rental providers, and other regular suppliers of services.

As for direct debits, electronic credit transactions are generally processed as part of the overnight settlement arrangements and account for around 20% of non-cash transactions by number.

2.2.3 Payment cards

Debit and credit cards are well established in New Zealand. Their use has increased in recent years, with credit card transactions being boosted by loyalty programs, and debit card use reflecting the overall convenience and acceptability of the cards, coupled with fee structures designed to encourage the use of electronic rather than more costly paper-based transactions.

Both debit and credit cards include contractual risk allocation conditions. Cardholders typically assume some risk for unauthorised transactions (generally limited to NZD50) subject to the cardholder safeguarding the PIN and promptly advising the loss or theft of the card.

Credit cards are used for a variety of payments, domestic and foreign, and for large and small value. Moreover, with the introduction of loyalty programs, they are being used increasingly for payments previously settled by other payment methods (e.g. for supermarket purchases previously paid by cash or cheque).

The major credit cards held are Visa and MasterCard, issued by the banks, and the older style travel and entertainment cards issued by American Express and Diners Club. Additionally, some retail stores offer store charge cards to their customers.

The bank-issued cards generally have revolving credit facilities associated with them, with an interest free period of up to 55 days, depending on the billing cycle. Many credit cards are also multi-functional, functioning as a cash or debit card.

The majority of transactions are processed electronically with direct links to the banks for authorization. The small number of paper-based credit card transactions are processed in a similar manner to cheques.

Transactions involving overseas-issued cards are switched to the applicable international card entity network for authorization and processing.

Credit card transactions have doubled in number over the last five years and now account for around 13% of non-cash payments. At the end of 2000, credit card advances outstanding totalled NZD2.9 billion (USD1.3 billion), while credit card billings for the year on New

Zealand cards were NZD12.7 billion (USD5.8 billion). A total of 2.3 million bank credit cards were on issue.

Debit/EFTPOS cards are widely used for retail payments and automatic teller machine (ATM) cash withdrawals. They are used for retail transactions of all sizes and are estimated to account for around 50% of retail sales. To reduce cash handling costs, some retailers, particularly supermarkets, will also provide cash withdrawal services to EFTPOS customers.

There are two types of PIN-based debit cards: ATM cards used for cash withdrawals (against the cardholder's bank account) and other services at automatic teller machines, and EFTPOS cards for electronic funds transfer point of sale transactions (where funds are transferred to the merchant and the cardholder's account is debited).

The original ATM cash cards have largely been superseded by EFTPOS debit cards, which provide both ATM and EFTPOS facilities.

EFTPOS cards are used for face-to-face point of sale transactions and are not suited for remote transactions, requiring the card and a PIN to be entered for the transaction to be authorized by the cardholder's bank. Once authorized, the payment to the merchant is effectively guaranteed by the cardholder's bank.

EFTPOS transaction numbers have grown fivefold since 1994 and have surpassed the use of cheques for payments. EFTPOS transactions now account for around a third of all non-cash payments by number and continue to grow annually. New Zealand also has a comparatively high number of EFTPOS terminals per capita – over 84,000 terminals as at the end of 2000 or 1 for every 45 inhabitants.

EFTPOS transactions in 2000 averaged 126 per capita in number and NZD52 in value while the number of ATM transactions has levelled at round 47 per capita per annum. A total of 4.2 million debit cards were on issue at the end of 2000.

2.2.4 *Stored value cards and e-cash*

Trials to date indicate there is little demand or interest in New Zealand for stored value cards. This is largely attributed to the widespread acceptance and use of debit and credit cards for transactions of all value. EFTPOS card transactions as low as NZD2 are not uncommon.

The major use of stored value cards are single use cards, such as phonecards, which are issued by the telecommunications companies and used for prepaid cellular phone calls or for calls from public telephones.

2.2.5 *Electronic data interchange*

The major New Zealand banks can receive electronic data interchange (EDI) payment requests from their customers, which are then processed through the normal payment channels. Dedicated personal computer-based systems enable customers, typically business customers using proprietary software, to dial a bank's computer system using a secure link to undertake enquiries and initiate transactions. Accounts are either updated in real time or

memorandum items are held which record transaction details until the full update at the end of the day when the main processing occurs.

Use of the Internet for payment and banking services is in its infancy in New Zealand. Internet payment facilities are still limited but generally include account balance information, funds transfers between accounts, bill payments and, in some cases, foreign exchange transactions. Customer penetration is still relatively low, totalling around 350,000 banking customers at the end of 2000. However, the numbers are growing rapidly in percentage terms and, with more than 50% of New Zealanders having access to the Internet, the potential is considered to be high.

2.2.6 Third party bill payments

Third party bill payment services, in addition to those provided by the banks, are available from one major non-bank provider, New Zealand Post, a national postal services company. New Zealand Post has traditionally offered an over-the-counter bill payment service, predominantly for government and local body organizations. Since 1999 it has also offered an Internet-based bill presentation and payment service, eBill. This allows users to receive and pay their bills from participating companies from any computer connected to the Internet and provides an integrated website platform for multiple billing and banking organizations. Users, once registered, access the eBill website by way of a personal identifier and password. Payments are made electronically from pre-authorized bank accounts.

More recently, a national telecommunications company has launched a second online bill presentation and payment system, Bill Online. The system will be used initially for the company's own customers, but is due to be marketed to other parties in 2002.

3. Interbank settlement systems

The real-time gross settlement (RTGS) environment consists of two real time payment switches, AustraclearNZ and Same Day Cleared Payment facility (SCP), which link directly to the Reserve Bank's Exchange Settlement Account System (ESAS). A non real-time switch, Interchange and Settlement Limited (ISL), processes deferred settlement transactions and settles via AustraclearNZ during the morning settlement session for value the previous day, while two further EFTPOS switches process debit card and domestic credit card transactions.

The central bank provides the ESAS/SWIFT interface and ESAS and AustraclearNZ, but is not directly involved in the management of the bank-owned payment systems in New Zealand. Each switch sets its rules as it sees fit without reference to the central bank. The primary interest taken by the central bank is in aspects that may affect systemic stability.

Co-ordination of industry and technical standards is undertaken through a payments system committee of the NZBA. The central bank has observer status on this committee.

3.1 ESAS (Exchange Settlement Account System)

ESAS provides the base to New Zealand's RTGS environment. The system became fully operational in 1998 and provides real time irrevocable settlement across the Exchange

Settlement Accounts held with the Reserve Bank in respect of wholesale financial transactions. The system is owned and operated by the Reserve Bank.

Finality and irrevocability are achieved through a mutual contract binding on all account holders and the central bank. The terms and conditions governing the system are set by the Reserve Bank in consultation with account holders.

The ESAS banking day runs from 9:00 each business day until 8:40 the next business day and the ESAS system is available to account holders to process settlement requests for over 22 hours each day. The system closes for 1 hour in the evening for interim end of day batch processing and for 20 minutes from 8:40 the next day for end of day processing.

ESAS uses a FIFO (first in first out) queuing mechanism for settlement requests. The accounts must be in credit at all times. No overdrafts are permitted.

Intra-day liquidity is provided through an 'autorepo' facility available to settlement account holders who have intra-day repurchase agreements with the Reserve Bank and who have specified acceptable securities to be sold to the Reserve Bank for liquidity purposes. The autorepo mechanism is automated. It accesses the AustraclearNZ securities settlement system throughout the day in accordance with settings in the system controlled by the account holder and the central bank. Securities acceptable to the central bank are determined primarily on issuer credit rating. If intra-day repos are not repurchased within the same ESAS day (thereby providing inter-day liquidity to the counterparty), a penalty interest is charged.

Exchange Settlement Account holders (known as settlement members) are currently all registered banks. However, the ESAS access rules permit non-bank institutions to hold accounts. In essence, account holders must be financial institutions, have a legitimate business case for access to the account, and have systems and arrangements in place that would not jeopardise the soundness or efficiency of the financial system.

Pricing is set by the Reserve Bank based on the marginal cost of developing and operating the system. There is no fee for credit transactions while debit transactions incur a flat per transaction fee. The transaction fee is reviewed and adjusted quarterly based on historic and estimated future transaction volumes.

3.2 SCP (Same Day Cleared Payment)

SCP is an electronic payment service used for high value inter-bank transactions, notably the NZ dollar leg of foreign exchange transactions, and for customer transactions where timeliness is important. Settlement is on a real time, transaction by transaction basis through ESAS.

The business rules for the SCP product are governed by a user group comprising ISL-shareholder banks.

The operational/interface aspects of the system are the responsibility of the Reserve Bank, the *SWIFT central institution*. The system has been operated by the Reserve Bank since October 2001 using the ESAS/SWIFT interface, which in turn uses SWIFT Fin Copy to pass settlement requests, authorizations and confirmations between SCP users.

Participation is governed by the Reserve Bank and the SCP user group. Participants are required to maintain an exchange settlement account at the Reserve Bank, have a SWIFT BIC (Bank Identifier Code) address, be a member of the Reserve Bank's SWIFT Fin Copy service, and accept applicable SCP and NZBA agreements.

The system currently has 9 members, all registered banks. It switches 2,000 transactions per day on average with an average daily turnover value of NZD20 billion (USD9 billion).

3.3 AustraclearNZ (Austraclear New Zealand System)

AustraclearNZ is primarily a securities settlement system and central depository. It is also used for high value cash transfers, providing real time irrevocable settlement of payments on a gross real time basis through ESAS.

All payments, whether for the settlement of securities transactions or straight cash transfers, are irrevocable once they are settled by the system. Transactions are not accepted by the system unless the paying member has sufficient credit provided by their banker to allow the transaction to be completed. The banker can alter this credit limit in real time via a 'debit caps' facility and thus control their exposure to their customer.

The Reserve Bank has operated the system since 1990 under a software licence agreement. The rights and obligations of participants to each other and the rights and obligations of the Reserve Bank as operator of the system are governed by a mutual contract entered into by all participants. Transaction fees are set by the central bank and are set on a cost recovery basis.

The system currently has 269 members in New Zealand and Australia, and settles on average 800 to 1,100 transactions per day with a daily turnover value of NZD6 billion to NZD8 billion (around USD2.7 billion to USD3.5 billion).

The system's functionality is further described in section 4.

3.4 ISL (Interchange and Settlement Limited)

The ISL system is the major retail payment processing switch in New Zealand. The system is used to interchange cheques, direct debits, direct credits, automatic payments, ATM transactions³, telephone banking, and internet banking. It has been in operation since the mid 1960's and is collectively owned by eight settlement banks via a limited liability company.

ISL operates on an overnight batch basis. Settlement positions are advised to the participants who arrange inter-bank settlement through the AustraclearNZ on a bilateral net basis at the end of the banking day.

While the introduction of RTGS in March 1998 reduced the systemic significance of this system, it is still the primary means of making retail payments and the industry is currently

³ Most banks operate their own ATM networks, with agreements providing links between the networks and allowing mutual access by cardholders to other banks' ATMs. Interbank positions are processed through ISL.

reviewing the failure to settlement arrangements with a view to adopting more robust arrangements. ISL currently has “wind back” as its failure to settle mechanism. In essence, this would involve returning and reversing transactions to and from a failed bank for the day it failed. This mechanism has never been used and there are some reservations as to whether it could be done, in a physical sense, in an acceptable time scale.

The owners set the rules governing the operation of the system, including transaction pricing, and the contractual arrangements.

Participation in the system is governed by, but not limited to, the owners. At present, the participants are registered banks who are members of the NZBA and ESAS account holders. In addition, some non-bank financial institutions have agency arrangements in place with participant banks.

The system currently has nine direct participants and processes over two million payment instructions per day.

3.5 EFTPOS systems

Two bank-owned systems capture EFTPOS/debit card transactions and the majority of domestic credit card transactions.

Electronic Transactions Settlement Limited (ETSL), established in 1989, is jointly owned by four major New Zealand banks. The ETSL network is used for the interchange and clearance of point of sale debit, credit, charge and proprietary card transactions. The second system is owned and operated by a fifth major bank, which also uses its network to support its ATM and other electronic banking services.

Interchange agreements in place mean that card transactions are automatically switched to the appropriate system, via links to financial institutions and card processing centres, for authorization and processing. The arrangements establish a many-to-many facility, such that in general all domestic cards can go in all terminals. Transactions are authorized in real time and customer accounts updated. Interbank obligations are settled on a bilateral net basis at the end of the banking day via ISL through AustraclearNZ.

The owners govern management and participation, including pricing. Participation is open to financial institutions, bank and non-bank, that are bona fide charge or debit card issuers or credit card acquirers.

Transactions passing through these systems are estimated to account for around 60% of retail turnover, or around NZD25 billion (USD11 billion) annually.

3.6 Major projects and policies being implemented

Three payment system projects are underway or planned in the near future:

- (i) NZ dollar entry to the Continuous Linked Settlement (CLS) arrangements. With the introduction of real time gross settlement and the netting legislation, the major payment system risk still to be addressed in New Zealand is foreign exchange settlement risk (Herstatt risk). A recent survey of the major participants in the New

Zealand foreign exchange market, conducted as part of an EMEAP-wide survey, indicated that foreign exchange settlement exposures are potentially very large and can last for a considerable period. In some cases, exposures for an individual bank exceeded that bank's total capital for several hours each day. International efforts aimed at reducing this risk focus on the CLS initiative. In parallel with this initiative, the Reserve Bank, together with the industry, is working to facilitate the entry of the New Zealand dollar into the CLS arrangements. It is hoped that the New Zealand dollar will be among the second wave of currencies accepted.

- (ii) Failure to settle arrangements. The industry is currently reviewing the failure to settle arrangements in the net deferred payment switches. The review aims to strengthen the operational, financial and legal arrangements in place and to minimize the risks and impact on the system and other participants of a participant failing.
- (iii) Operating hours. Consideration is being given to the hours of operation of the ESAS/SWIFT interface. The interface is currently available to receive settlement requests from 9:00 to 16:45 each business day. These hours are to be reviewed over the coming year, with a view to extending the availability of the system for users.

4. Securities settlement systems

There are two major securities settlement systems in New Zealand: AustraclearNZ, which clears and settles debt securities and equities among wholesale counterparties; and FASTER, which clears and settles listed securities traded on the NZSE. A third system, SFE Clearing, based in Australia, settles the NZFOE products. All three systems are electronic and operate in real time.

The securities market comprises government securities, corporate debt and equity securities and some related derivative products.

4.1 Government securities

The government issues three types of domestic debt instruments to meet its core financing requirements:

- Treasury bills – short-term zero coupon wholesale debt instruments;
- Government bonds – medium-term instruments paying a fixed coupon interest rate, aimed at the wholesale market (mainly large institutional investors); and
- Kiwi bonds – a fixed-interest instrument designed for retail investors wanting domestic sovereign risk.

All Crown securities are issued under the Public Securities Act 1989, and managed by the NZDMO, a unit of the New Zealand Treasury.

4.1.1 Trading

Treasury bills

Treasury bills are denominated in New Zealand dollars and issued with maturities of three, six and twelve months. They can also be issued for liquidity management purposes. The bills are sold at a discount to par and carry no coupon. The Reserve Bank acts as the Registrar and payment agent for the bills.

Treasury bills are issued by the NZDMO on behalf of the Crown through regular weekly tenders conducted by the Reserve Bank, and as required for liquidity management through open market operations, again conducted by the Reserve Bank. Maturity tranches are created of a size (typically around NZD600 million to NZD750 million) that facilitates the liquidity of the instruments.

Participants in the primary market for Treasury bills consist of institutions registered as bidders with the Reserve Bank. Only bids from registered bidders are accepted by the Reserve Bank. The process of becoming a registered bidder is relatively straightforward and is based on the creditworthiness of the bidder. Bidders are not confined to any particular institution type.

The bills are quoted and priced in the secondary market on a semi-annual yield to maturity basis, and traded in the over-the-counter market. There are a number of price makers in the secondary market, quoting two-way prices in agreed parcel sizes. Turnover in the market is, on average, very low.

In October 2001, there were NZD5.8 billion (USD2.4 billion) Treasury bills on issue, of which non-residents held around 15%.

Government bonds

Government bonds are issued by the NZDMO through tenders conducted by the Reserve Bank. The bonds are denominated in New Zealand dollars with a fixed coupon paid semi-annually in arrears. The Reserve Bank also acts as the Registrar and payment agent for the bonds.

Current maturities of conventional government bonds on issue range through to 2013. (There is also an inflation-indexed bond outstanding, with maturity in 2016.)

As for Treasury bills, participants in the primary market for government bonds consist of institutions registered as bidders with the Reserve Bank.

Government bonds are quoted and priced in the secondary market on a semi-annual yield to maturity basis, and traded in the over-the-counter market. There are a number of price makers in the secondary market, quoting two-way prices in agreed parcel sizes.

The total amount of government bonds held by the market at the end of October 2001 was NZD20.5 billion (USD8.5 billion), of which around 45% was held by non-residents. Average monthly turnover in the government bond market over 2001 was around NZD60 billion (USD25 billion).

Kiwi bonds

Kiwi bonds are issued to provide a default-free retail instrument for small investors. Kiwi bonds are issued on a tap basis with maturities of six months, one, two and four years, and with the option for interest to be paid quarterly, or compounded quarterly and paid on maturity. The interest rates on Kiwi bonds are set at a margin below that of government bonds of similar maturity. The minimum investment is NZD1,000 with multiples of NZD100 thereafter. No single investor is permitted to hold more than NZD250,000 of any one issue.

There are around NZD400 million (USD170 million) Kiwi bonds on issue at present. There is no secondary market. It is, however, possible to transfer the registration of the bond from one party to another. Alternatively, if an investor decides not to hold the bonds to maturity, they can have their principal returned to them on demand, subject to a penalty.

4.1.2 Pre-settlement

Pre-settlement and settlement activities for government securities take place in New Zealand principally through AustraclearNZ.

AustraclearNZ is a real-time trade matching, transfer, clearance and settlement system for money market instruments, government and local authority bonds and notes, corporate bonds and notes, and equities. Other functions of the system include electronic tendering, a cash transfer facility that provides irrevocable commercial bank funds, and a foreign exchange confirmation function.

The system provides a secure paperless settlement environment for the electronic transfer of funds and securities.

Direct participation is available to any organization of good standing that operates in the securities market. Members include banks, brokers, financial institutions and corporates, both resident and foreign. The rights and obligations of participants to each other and the rights and obligations of the Reserve Bank as operator of the system are governed by a mutual contract entered into by all participants.

Pre-settlement steps in AustraclearNZ typically involve both buying and selling parties entering and authorising the agreed details of a transaction into the system. The system will match the details and move into the settlement phase (see 4.1.3).

Government bonds may also be traded on the NZSE Debt Market, although trade volumes to date have been low. Listed bonds are traded and settled in much the same way as the equities listed on the exchange, via the NZSE's FASTER system (See 4.3.2 and 4.3.3).

4.1.3 Settlement

AustraclearNZ provides delivery versus payment settlement on a gross transaction-by-transaction basis in irrevocable bank funds. Interbank transactions resulting from customer and banks' own transactions are settled on a gross real time basis through ESAS. All payments, whether for the settlement of securities transactions or just cash transfers, are irrevocable and final once they are settled by the system.

For settlement to take place via AustraclearNZ, securities must be held by New Zealand Central Securities Depository Limited (NZCSD), the custodian trustee, owned by the Reserve Bank. Each member has a security account(s) on the system which records the securities lodged with NZCSD. NZCSD becomes the legal owner of the securities on the respective register and holds securities on behalf of the member, the beneficial owner. Each member also has a system New Zealand dollar cash account. This account is provided by a registered bank. The bank providing a system cash account has real time access to set daylight limits (debit caps) on that account.

If the seller holds the security outside NZCSD, the security will have to be transferred from the seller's name and lodged into NZCSD's name to allow the trade to complete. Once the security is lodged into NZCSD's name, the seller will become the beneficial owner of the security once their security account is credited. Alternatively, if the buyer wants to be the legal owner of the security (not the beneficial owner), they can uplift the security from NZCSD and transfer the ownership into their own name at the security register once the trade has settled.

On completion of the above steps, AustraclearNZ moves on to settlement. Where A is selling a security to B, this involves the following:

1. AustraclearNZ sends a payment request to ESAS for B's bank to pay the funds to the Exchange Settlement Account of A's bank.
2. B's bank authorizes the transfer of funds to A's bank.
3. ESAS sends a payment confirmation message to AustraclearNZ to effect payment.
4. AustraclearNZ irrevocably settles the transaction. The security and cash records of the system are updated simultaneously.

If all conditions are not met regarding the trade information, the trade will remain pending settlement, and settlement will be continually attempted by the system. If the trade is not settled by the end of day it is removed from the system overnight.

AustraclearNZ currently settles over 90% of all wholesale fixed interest and money market security transactions and an estimated 40% of equity securities transactions. The inventory of securities held in the depository stands at around NZD80 billion (USD35 billion). The system has a bilateral link to the Hong Kong Monetary Authority's securities settlement system.

4.2 Corporate debt

Bank certificates of deposit and corporate bills of exchange are important sources of short term funding in New Zealand. Longer-term corporate debt instruments tend to be similar in structure to bonds issued by the government although some may include additional features.

4.2.1 Trading

Money market instruments

There are three similar money market securities: certificates of deposits, promissory notes and bank bills.

Certificates of deposit (CDs) are securities issued by banks and are one of their main sources of short-term funding. CDs are issued by banks in registered form. The transfer of ownership of CDs is principally effected through NZCSD with electronic transfer through AustraclearNZ (see 4.1.2 and 4.1.3).

Primary issuance of CDs is by private placement. The secondary market for CDs is among the most liquid of the securities markets in New Zealand, with approximately NZD500 million (USD220 million) of CDs traded in the wholesale market daily.

Bills of exchange are discount instruments issued by organizations, other than banks, that wish to undertake short-term borrowing. There are two types of bill: promissory notes (or commercial paper) and bank bills. Both types of bill are typically held in dematerialized form within NZCSD, with the transfer of beneficial ownership settled through AustraclearNZ.

Corporates obtain short-term funds through the issue of promissory notes. Promissory notes are also known as P-notes, bearer notes, commercial paper and one-name paper. The last name is derived from the fact that promissory notes carry only the name of the issuer, unlike bank bills.

Bank bills are bills of exchange that have been issued by an entity and accepted or endorsed by a bank. This gives bank bills the alternative name of 'two name paper'.

The promissory note market is relatively small. Three common methods exist for issuing promissory notes into the market. The first is a tender, where bids are lodged with the programme manager (normally a bank) acting for the borrower. The second method is via a dealer issue. This type of issue is similar to a normal tender except that the bidding is restricted to the dealers appointed to the dealer panel. An alternative method, gaining increased popularity, is private placement, where notes are sold on a tap basis in response to demand from investors.

The secondary market in promissory notes is considerably less liquid than that in CDs, particularly for notes issued by organizations with lower credit ratings. Activity in the bank bill market is extremely limited.

Corporate bonds

The New Zealand corporate bond market consists of bonds issued by State Owned Enterprises (SOEs), Local Authorities (such as the Regional and City Councils) and corporations.

Corporate bonds are usually issued in registered form and most issues are similar in structure to bonds issued by the Crown. Some issues, however, are convertible into the issuer's equity. They are sold by tender or private placement.

The secondary market for corporate bonds is relatively illiquid compared to that for Crown debt. Market makers quote prices mainly only on the larger issues that are of interest to institutional investors.

4.2.2 Pre-settlement and settlement

The majority of corporate debt market transactions are settled through AustraclearNZ, as described in sections 4.1.2 and 4.1.3.

Low volumes of short-term corporate paper and bonds also trade and are settled via the NZSE's FASTER system (see sections 4.3.2 and 4.3.3).

4.3 Equities

The New Zealand stock (or share or equity) market instruments consist of:

- Ordinary shares, representing an equity or part ownership of a company;
- Preference shares. These shares have preferential rights over ordinary shares as to claim on assets, earnings and dividends, and rank below creditors and debenture holders. They usually have a fixed dividend rate;
- Redeemable preference shares. These are preference shares that are redeemable for cash on a fixed date. New Zealand company law requires that redemption may be made only from profits of the company or a further issue of capital;
- Convertible preference shares. Shares with a preferential right over ordinary shares as to claims on assets, earnings and dividends and including a right to convert to ordinary shares on either a fixed or optional basis on a future date or dates;
- Rights (traded) - A transferable right to subscribe for new securities in the offering organization. These rights are traded on the NZSE and are used to offer capital increases to existing shareholders on advantageous terms;
- Rights (non-renounceable) – These have the same purpose as traded rights above except that the rights must be exercised and subscribed for by the existing holder and cannot be traded until fully paid and accepted for trading on the NZSE; and
- Warrants - Long-dated institution issued options over specific securities. The originating institution maintains the obligations attached to the warrant.

4.3.1 Trading

All of the instruments outlined in 4.3 may be registered and traded on the NZSE.

Primary market

The Securities Act 1978 governs the public offering of securities. A combination of private placement and public offer is often used, particularly in the issuance of ordinary shares. Listings may also be arranged by means of an offer of already issued securities.

Depending on the size of the primary issue, the organising broker and other intermediaries managing the issue will choose the type of support structure in conjunction with the issuer. Underwriting/distribution syndicates are typically organized by invitation from the 'lead' underwriting institution.

Secondary market

The majority of secondary market equities trading takes place on the NZSE. The Exchange runs three boards: the Main Board, where all the major companies' shares are listed; the

Unlisted Board, on which smaller companies trade; and the New Capital Market, which is designed as a market place for the equity of 'start-up' companies.

Trading is via a screen-based automated order-matching system. All quotations are captured electronically and broadcast to market participants and the media. The NZSE's trading system operates from 9:00 to 16:00 each business day.

4.3.2 Pre-settlement

There are two main systems for clearing and settling equity market transactions, FASTER and AustraclearNZ. In addition, a small number of (retail) transactions is completed by the physical exchange of transfer documents and cheques.

The NZSE rules require all equity transactions between brokers who are NZSE members to be completed on the NZSE's FASTER system. FASTER is responsible for the management and reporting of all trades up to and including final settlement between brokers. It clears, settles and registers NZSE equity trades and also provides facilities for inquiries to be made on trades. FASTER inter-connects the FASTER Trading system, members' office accounting systems, public subscribers, share registries, and payments systems. Member firms receive on-line advice of matched trades.

Typical pre-settlement steps for a trade made on the NZSE involve buy and sell orders flowing electronically from clients through brokers and into the FASTER Trading system. FASTER Trading automatically matches orders and notifies brokers' systems of the resulting trades. Buyers and sellers are sent contract notes to confirm trades and payment details. At this stage the selling broker is required to transfer securities from the shareholders' accounts to their FASTER Transfer Account. Trades are then passed to the FASTER settlement pool for settlement between member firms (see section 4.3.3 below).

Non-broker to broker wholesale transactions by New Zealand and offshore parties (i.e. trades that are not done on the NZSE) are frequently pre-settled and settled using the AustraclearNZ system (refer sections 4.1.2 and 4.1.3). Over one third of listed equities are held in NZCSD. The beneficial owners of these securities are able to use the AustraclearNZ clearing and settlement facilities.

4.3.3 Settlement

FASTER, together with the NZSE's broker-to-broker accounting system, permits paperless settlement for member firms and buying clients.

The settlement rules of FASTER vary depending on the type of instrument, value and other conditions associated with the trade. A maximum settlement period of three days is mandated for equity trades. Trades over NZD100,000 in value default to settlement on the third business day, although this can be earlier by mutual consent of counterparties. (The current average settlement time of all trades through FASTER is T+1.2 days.)

Settlement occurs on a trade-by-trade delivery versus payment basis within FASTER. Funds are transferred simultaneously and irrevocably with the transfer of ownership of shares. All shares are transferred directly by name on the listed company's own electronic (book entry) register.

All listed company registers are connected permanently to FASTER during business hours to facilitate electronic transfers. The transfer of securities is based on registration into the name of the beneficial owner or the owner's nominee. Selling clients are required to deliver to their broker a signed standard transfer form (accompanied by the relevant share certificate as required).

Payments due between brokers are made using AustraclearNZ. Settlement is for net amounts. Brokers make settlement of many transactions via one daily direct electronic credit or debit using the cash transfer function of AustraclearNZ (see section 3.3).

The NZSE accepts no liability for counterparty risk.

As at June 2001, there were 216 NZSE-listed companies, of which 130 were local equity security listings, 77 were overseas equity securities and 9 were debt securities. The volume of trades settled through FASTER averaged around 2,500 daily with an average daily turnover of NZD40 million to NZD50 million (USD17 million to USD22 million). Market capitalization at the end of June 2001 was NZD44 billion (USD18 billion). Approximately half the market value of NZSE listed stocks is owned by foreign investors.

4.4 Derivatives

A range of derivative products are traded between professionals and are available to investors. Such products are traded on the NZFOE and over-the-counter.

4.4.1 Trading

The NZFOE offers futures contracts, and options on those futures contracts, on 90-day bank bills, three-year and ten-year government bonds. It also offers futures contracts, and options on those futures contracts, on the NZSE-10 Share Index (a share index containing the ten largest and most liquid New Zealand companies). Share options on 11 major New Zealand companies and a New Zealand electricity futures contract are also available.

Interest rate products, particularly the 90-day bank bill futures contract, dominate trading on the NZFOE. Daily Exchange turnover averages around 4,500 contracts per day, of which over 80% by volume is accounted for by the 90-day bank bill futures contract.

Over-the-counter markets, particularly in interest rate and currency related products are reasonably developed. Forward rate agreements (FRAs) are widely used amongst both professional trading institutions and 'end users'.

4.4.2 Pre-settlement and settlement

The registration, clearing, and settlement of all NZFOE trades are performed by SFE Clearing Corporation Pty Limited (SFE Clearing), a wholly owned subsidiary of the SFE. The arrangements provide straight through processing from the SFE's trading system, SYCOM IV, to the clearing and settlement services.

Settlement is made with the Exchange, not the counterparty, and cleared through SFE Clearing. Accordingly, SFE Clearing acts as the central counterparty in each open contract, thus guaranteeing the performance of the contract.

On maturity, contracts are cash settled using AustraclearNZ.

4.5 Major projects and policies being implemented

Current securities market projects include:

- (i) Demutualization of the NZSE. Legislation has been introduced into Parliament to permit the NZSE to demutualize. Once enacted, the provisions of the New Zealand Stock Exchange Restructuring Bill will enable the Exchange, on approval of its members, to demutualize into a for-profit company owned by shareholders. If the demutualization proceeds, the resulting company is expected to list on its own market.
- (ii) AustraclearNZ review. The Reserve Bank is currently reviewing the longer-term strategic options for AustraclearNZ. The system is now over 10 years old. The review will consider whether to continue to operate the system in its current form, in an upgraded form, or finding an alternative clearing and settlement system, also whether to engage a new system operator or partner or seek an agency arrangement. A decision is expected towards the end of 2002.

5. Role of the central bank

5.1 Statutory responsibilities

The Reserve Bank of New Zealand operates under the Reserve Bank of New Zealand Act 1989. At the broadest level, the Reserve Bank's role is to work to ensure that the New Zealand economy is supported by an efficient and effective monetary system that facilitates trade in goods, services and capital. Its main statutory responsibilities are:

- To formulate and implement monetary policy to achieve and maintain stability in the general levels of prices;
- To promote the maintenance of a sound and efficient financial system by, inter alia, registering and monitoring the prudential soundness of banks;
- To manage the note and coin issue; and
- To act as the central bank of New Zealand.

Other important functions include:

- Providing banking services to registered banks and the government;
- Providing depository and settlement facilities for wholesale market securities;
- Acting as a lender of last resort; and
- Implementing exchange rate policy.

5.2 Provision of settlement accounts and payment systems

The Reserve Bank provides Exchange Settlement Accounts, across which settlement members can exchange value to settle inter-bank clearings. Currently there are 11 account holders, all of which are registered banks.

To facilitate the exchange settlement account service, the Reserve Bank owns and operates ESAS. ESAS commenced in March 1998 and provides real time, final, irrevocable payments between account holders at the central bank (described in section 3.1). While all present account holders are banks, the access policy provides for an account to be available to any financial institution, which, in the view of the central bank, has a need for an account. This is consistent with the central bank's concern for financial system soundness and efficiency.

The Reserve Bank also provides the Crown Settlement Account for the government. This account serves as the Crown's central 'disbursement account' although actual cheque processing and other transactional banking services are provided for the government by one of the registered banks. The balances with this bank are 'swept' to the Crown Settlement Account at the Reserve Bank at the end of each day.

There are no reserve ratio requirements in New Zealand.

5.3 Operation of securities settlement systems

The Reserve Bank operates AustraclearNZ, a securities clearing and settlement system, as part of its role in promoting and maintaining a sound and efficient financial system.

AustraclearNZ is a real-time settlement system. It provides electronic securities clearing and settlement services to members on a real-time delivery versus payment basis, as described in sections 4.1.2 and 4.1.3. Members can also use the system to transfer cash (described in section 3.3).

The system operates using a depository structure, whereby members transfer security ownership to the Reserve Bank's trustee company, NZCSD, for safe custody. The trustee company is used to record details of all securities deposited in the AustraclearNZ system by members.

5.4 Oversight of payment systems

The Reserve Bank does not have any formal statutory authority relating to the oversight of payment systems. An indirect mandate is derived from its legislative responsibility to advise on financial sector policy and to promote the maintenance of a sound and efficient financial system.

The Reserve Bank's payment system oversight focuses on prudential and systemic aspects of the payments infrastructure. Matters relating to access and pricing of proprietary systems are subject to the same general competition policy and consumer protection laws as other industries.

Key central bank objectives for the payment system are:

- To ensure that payment system risks are reduced to acceptable levels, and are managed appropriately by system participants;
- To ensure that the payment system can continue to operate without disruption in the event of the sudden withdrawal of a participant from the system, or following other types of financial crisis, or natural disaster;

- To encourage movement towards delivery-versus-payment arrangements in all financial markets, especially with respect to high-value transactions;
- To help ensure that the status of payments is certain at all times, and, in particular, the legal environment supports ‘finality’ and ‘irrevocability’ in payment instructions;
- To encourage banks and others to offer efficient, reliable and relevant payments services to their customers; and
- To maintain an open, flexible and competitive system, and ensure that no unwarranted entry or operational barriers exist.

The approach has been to make progress through a combination of co-operation and consultation with the banking industry and through the Reserve Bank’s ownership and operation of ESAS and AustraclearNZ. In this manner, a working knowledge of the various payment systems is maintained, particularly as regards the failure to settle arrangements.

To clarify and make the Reserve Bank’s role in overseeing the payment system more explicit, legislation has been prepared which will add a new part to the Reserve Bank Act and formally set out the Reserve Bank’s payment system objectives and powers. Once enacted, the provisions will give the Reserve Bank the power to collect and publish payment system information, with the aim of promoting the robustness of the payment system and maintaining a sound and efficient financial system. The planned legislation essentially codifies the existing informal arrangements. No major change in the Bank’s mode or method of oversight is anticipated.

5.5 Monetary policy and payment systems

The Reserve Bank of New Zealand Act makes the goal of monetary policy explicit and non-negotiable. Monetary policy must be directed at ‘achieving and maintaining stability in the general level of prices’. The specifics of the objective are set out in a written agreement (the Policy Targets Agreement) between the Governor of the Reserve Bank and the Treasurer. The Agreement is signed by both parties every five years, on a change of Governor or at any time by mutual agreement, and is made public. The current target range is annual CPI inflation of 0 to 3 per cent, as measured by Statistics New Zealand.

Since 1999, monetary policy has focussed on managing the level of the Official Cash Rate (OCR), the overnight interest rate set by the Reserve Bank. The OCR is the rate around which the Reserve Bank will borrow and ‘lend’, thus influencing the level of other short-term interest rates and monetary conditions more generally. The OCR is reviewed (and adjusted as required) approximately every six weeks.

The OCR is the centre of the ‘band’ of the central bank interest rates. The Reserve Bank pays an interest rate 25 basis points below the OCR for money deposited overnight in settlement accounts, and provides overnight cash on demand against government securities collateral (using repurchase agreements) at 25 basis points above the OCR. The result is a 50 basis point corridor between the interest rates at which the Reserve Bank will inject or absorb overnight funds. This directly anchors interest rates at the very short end of the yield curve and controls the financial price at the beginning of the transmission mechanism.

Unlike the previous monetary policy implementation regime, the quantity of settlement cash left in accounts at the end of each day is not the policy lever. The Reserve Bank conducts

daily open market operations to smooth the impact of the day-to-day forecast fluctuations in government spending and revenue on the level of settlement cash/banking system liquidity.

5.6 Currency issue

The Reserve Bank has the sole right to issue banknotes and coins in New Zealand. This includes the responsibility to determine the denominations, form, design, content, weight and composition of the notes and coins. As at June 30, 2001 the total value of currency in circulation was NZD2.54 billion (USD1.1 billion), approximately 2.25% of nominal GDP.

Until recently, the Reserve Bank provided a daily clearing-house service for the distribution of currency, supplying and accepting repatriations of currency by banks and security companies on demand and in relatively small amounts. Since mid-2000, to improve efficiency, the Reserve Bank has taken a less prominent role in cash distribution, providing wholesale supplies as required, replacing damaged stock and meeting seasonal demands while encouraging the banks and security companies to re-distribute their day-to-day cash needs among themselves.

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New Zealand

STATISTICAL TABLES

New Zealand

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (millions):					
<i>year-end</i>	3.72	3.76	3.79	3.81	3.83
<i>average</i>	3.69	3.75	3.78	3.81	3.83
GDP (NZD billions)	91.3	96.5	99.4	100.0	100.3
GDP per capita (NZD)	24,717	25,764	26,279	26,284	26,211
Exchange rate vis-à-vis USD: ¹⁾					
<i>year-end</i>	0.7060	0.5817	0.5269	0.5233	0.4402
<i>average</i>	0.6872	0.6622	0.5358	0.5294	0.4563

¹⁾ These exchange rates are quoted as the USD value of one NZD.

Sources: Statistics New Zealand, RBNZ.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	NZD billions 2000
Banknotes and coins on issue	1.5	1.6	1.7	2.1	2.1
Transferable deposits: ¹⁾	9.1	9.8	11.2	12.9	13.8
Other ²⁾	-0.1	-0.1	0.0	-0.1	-0.1
Narrow money supply (M1)	10.6	11.3	12.9	14.9	15.8
<i>Memorandum items:</i>					
Broad money supply (M3)	87.7	91.4	92.4	98.7	105.2
Transferable deposits in foreign currencies	nav.	nav.	1.8	1.5	2.1
Outstanding value on e-money schemes	nav.	nav.	nav.	nav.	nav.

¹⁾ Cheque accounts.

²⁾ Inter-institutional transaction balances (cheque) and Government transaction deposits netted for the calculation of M1.

Source: RBNZ.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	NZD billions 2000
Transferable balances held at central bank	neg.	neg.	neg.	0.7	neg.
of which:					
<i>required reserves</i>	0.0	0.0	0.0	0.0	0.0
<i>free reserves</i>	neg.	neg.	neg.	0.7	neg.
Transferable deposits held at other banks	1.3	1.0	1.3	1.2	0.7
<i>Memorandum item:</i>					
Institutions' borrowing from central bank ¹⁾	1.3	1.1	0.5	2.2	1.8

¹⁾ Overnight and term borrowing secured by repurchase agreements and fx swaps.

Source: RBNZ.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (NZD millions)
Central bank	1	1	11	9.3
Registered banks	18	849	nav.	nav.
Finance Companies	46	nav.	nav.	nav.
Building Societies	7	nav.	nav.	nav.
Credit unions	74	nav.	nav.	nav.
Other	20 ¹⁾	nav.	nav.	nav.
Total	166	nav.	nav.	nav.
of which:				
<i>virtual institutions</i>	0	nav.	nav.	nav.
Branches of foreign banks	10	nav.	nav.	nav.

¹⁾ Minimum number.

Sources: RBNZ, NZBA, Statistics New Zealand.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	thousands 2000
Large value systems:					
ESAS	nav.	nav.	665 ¹⁾	771	714
SCP ²⁾	nav.	nav.	450 ¹⁾	525	493
AustraclearNZ	nav.	nav.	215 ¹⁾	246	221
Retail:					
ISL	604,800	666,700	599,700	606,200	629,000
Card systems	464,800	590,800	681,700	772,200	857,700

¹⁾ April-December.²⁾ KITS prior to July 2000.

Sources: RBNZ, NZBA.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998 ¹⁾	1999	NZD billions 2000
Large value systems:					
ESAS	nav.	nav.	8,200	7,800	7,000
SCP ²⁾	nav.	nav.	5,300	5,800	5,100
AustraclearNZ	nav.	nav.	1,900	2,000	1,900
Retail:					
ISL	nav.	nav.	nav.	nav.	nav.
Card systems	nav.	nav.	nav.	nav.	nav.

¹⁾ April-December.²⁾ KITS prior to July 2000.

Source: RBNZ.

Table 7

Indicators of use of various cashless payment instruments: volume of transactions

Instruments	millions				
	1996	1997	1998	1999	2000
Cheques and other MICR	349	342	292	277	250
Payments by EFTPOS debit card	204	306	401	450	484
Payments by credit card	84	96	103	145	194
Electronic credits	220	280	259	271	305
Direct debits	36	45	49	58	73
Total	893	1,069	1,104	1,201	1,307

Source: NZBA.

Table 8

Indicators of use of various cashless payment instruments: value of transactions

Instruments	NZD billions				
	1996	1997	1998	1999	2000
Cheques and other MICR					
Payments by EFTPOS debit card					
Payments by credit card					
Electronic credits			Figures not available		
Direct debits					
Total					

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	thousands				
	1996	1997	1998	1999	2000
AustraclearNZ ¹⁾ :					
fixed interest securities	79	111	129	132	100
discount securities	15	6	5	1	neg.
equities	57	82	98	111	103
cash transfers	62	79	120	121	109
FASTER ²⁾ :					
fixed interest securities	0.8	0.9	0.7	0.8	1.5
equities	397	444	547	546	603

¹⁾ Year ended June.²⁾ Year ended December.

Sources: RBNZ, NZSE.

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	NZD billions				
	1996	1997	1998	1999	2000
AustraclearNZ ¹⁾ :					
fixed interest securities	611	918	1,275	1,568	1,180
discount securities	125	41	34	10	4
equities	13	17	23	27	26
cash transfers	945	868	1,262	1,302	1,303
FASTER ²⁾ :					
fixed interest securities	0.02	0.02	0.04	0.02	0.02
equities	5.36	6.27	8.88	8.87	9.20

¹⁾ Year ended June.²⁾ Year ended December.

Sources: RBNZ, NZSE.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
AustraclearNZ:					
full members	57	65	76	78	82
associate members	32	46	61	85	88
nominated trusts	92	119	132	145	142
other	11	16	16	15	14
Total	192	246	285	323	326
of which:					
banks	nav.	23	26	28	30
other financial	nav.	72	87	104	105
other	nav.	151	172	191	191
FASTER:					
participant broking firms	25	25	24	22	23

As at December.

Sources: RBNZ, NZSE.

PAYMENT SYSTEMS IN THE PHILIPPINES

Philippines

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List of abbreviations

AAIIB	-	Al-Amanah Islamic Investment Bank of the Philippines
ADAPS	-	Automated Debt Auction Processing System
BAP	-	Bankers Association of the Philippines
BRSTN	-	Bank Routing Symbol-Transit Number
BSP	-	Bangko Sentral ng Pilipinas
BTr	-	Bureau of Treasury
COCI	-	Checks and Other Clearing Item
COP	-	Confirmation of Purchase
COS	-	Confirmation of Sale
DBP	-	Development Bank of the Philippines
DDA	-	Demand Deposit Account
DoF	-	Department of Finance
FAS	-	Financial Accounting System
GSD	-	Government Securities Department
GSED	-	Government Securities Eligible Dealer
IBCL	-	Interbank Call Loan
ILF	-	Intraday Liquidity Facility
LBP	-	Land Bank of the Philippines
MICR	-	Magnetic Ink Character Recognition
MIPS	-	Multi-transactions Interbank Payment System
NBQB	-	Non-banks with Quasi-banking functions
PCD	-	Philippine Central Depository
PCHC	-	Philippine Clearing House Corporation
PDB	-	Private Development Bank
PDDTS	-	Philippine Domestic Dollar Transfer System
PDS	-	Philippine Dealing System
RA	-	Republic Act
RCU	-	Regional Clearing Unit
RoSS	-	Registry of Scripless Securities
RP	-	Repurchase Agreements
SMB	-	Savings and Mortgage Banks
SSLA	-	Stock Savings and Loan Associations

Overview

In 1933, the concept of establishing a central bank in the Philippines was conceived by Miguel Cuaderno. The formal preparation for the organization of a central bank started in 1946 upon the instruction of President Manuel Roxas. It was also during this year that the joint Philippine-American Finance Commission was created to study the Philippine currency and banking system, which later recommended the reform of the monetary system, the formation of a central bank, and the regulation of money and credit supply. In August 1947, a Central Bank Council was formed to review the report of the Commission and to prepare the necessary legislation for its implementation. A year after, President Roxas submitted to Congress a bill “establishing the Central Bank of the Philippines, defining its powers on the administration of the monetary and banking system, amending the pertinent provisions of the Administrative Code with respect to the currency and the Bureau of Banking, and for other purposes.” This bill was Republic Act (RA) No. 265, also known as The Central Bank Act. On June 15, 1948, President Elpidio Quirino signed the Charter of the Central Bank into law. However, it was only on January 3, 1949 that the Philippine Central Bank (CB) was inaugurated and formally opened. This served as the impetus in the development and sophistication of the local financial system. In 1972, the scope of authority of the Central bank was expanded from supervision of the banking institutions to include the entire financial institutions such as investment houses, finance companies, fund managers, lending investors and pawnshops. With the passage of Republic Act (RA) 7653, otherwise known as The New Central Bank Act, the BSP has become a central monetary authority on June 10, 1993. The primary objective of the BSP is to maintain price stability conducive to a balanced and sustainable growth of the economy. It shall also promote and maintain monetary stability and the convertibility of the peso. Under Section 3 of this Act, the Bangko Sentral Ng Pilipinas (BSP) shall provide policy directions in the areas of money, banking and credit. It shall have supervision over the operations of banks and exercise such regulatory powers over the operations of finance companies and non-bank financial institutions performing quasi-banking functions and institutions performing similar functions. It shall also establish facilities for payment services such as interbank clearing under such rules and regulations as the Monetary Board may prescribe.

1. Institutional aspects

1.1 Legal and regulatory framework

1.1.1 *Payment instruments and systems*

The Philippine financial system consists of banks and non-bank financial intermediaries. Banks include all financial institutions engaged in the lending of funds obtained from the public, primarily through the receipt of deposits of any kind. Non-banks are financial institutions other than banks whose principal functions include lending, investing or placement of funds or evidence of indebtedness or equity deposited with or otherwise acquired by them, either for their own account or for the account of others.

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The main providers of payment services in the Philippines are banks. All banks and non-banks with quasi-banking functions, including their subsidiaries and affiliates engaged in related activities, are supervised and regulated by BSP.

Under Republic Act No. 7653, otherwise known as the New Central Bank Act, the BSP shall establish facilities for payment services such as interbank clearing under such rules and regulations as the Monetary Board may prescribe.

Other laws related to the banking industry in the Philippines include the following: the General Act of 1949, the Act Liberalizing the Entry and Scope of Operations of Foreign Banks, the Thrift Banks Act of 1995, the Rural Banks Act of 1992. Their respective charters created the specialized government banks, and such charters generally govern their operations.

1.1.2 Securities settlement

With the transfer of the fiscal agency functions from the BSP to the Department of Finance (DoF), the Bureau of Treasury (BTr) has taken the function of booking securities through the Registry of Scripless Securities (RoSS) effective November 4, 1996. RoSS is the official Registry of Scripless Securities maintained and administered by the BTr. All government securities floated/originated by the National Government under its scripless policy shall be recorded in the registry in the name of the Government Securities Eligible Dealer (GSED) by virtue of the auction award made by the Auction Committee. Subsequent transfer of ownership or encumbrance on the scripless securities out of the Securities Account of a GSED are recorded in RoSS into the Securities Account of the counterparty GSED. Unsettled Government Securities floated since November 20, 1995 are registered in RoSS. A complete backroom processing and information system was set up in the offices of the BTr.

Acquisition of securities in the secondary market is recorded in the same manner. A GSED likewise maintains Securities Sub-accounts in the name of its respective clients for the purpose of segregating scripless government securities sold to clients in the secondary and tertiary markets under one account, provided that the GSED maintains complete records of ownership/other titles of their clients in the GSED's own books. GSEDs desiring to achieve Delivery-Versus-Payment (DVP) and Real-Time-Gross-Settlement (RTGS) in their secondary market transactions open a Settlement Account with the BSP or any bank of their choice, which, like the BSP, shall agree to service their settlement of scripless securities trade immediately upon notice of a transaction concluded. All banks/financial institutions, which maintain regular demand deposit accounts with BSP, may act as settlement banks in connection with the government securities trade transactions of RoSS account owners.

1.2 Institutions

1.2.1 Banks

As of end 1999, there were 52 commercial banks, with 4,274 branch offices. Of such commercial banks, 50 were privately owned, including 19 foreign banks. Commercial banks are organized primarily to accept drafts and to issue letters of credit; discount and negotiate promissory notes, drafts, bills of exchange and other evidences of indebtedness; receive deposits; buy and sell foreign exchange; and lend money on a secured or unsecured basis. Expanded

commercial banks, otherwise known as universal banks, are banks that have authority, in addition to commercial banking powers, to exercise the powers of investment houses, invest in the equity of companies engaged in businesses not related to banking and own up to 100% of the equity of financial allied undertakings other than commercial banks. Almost all commercial banks issue their own ATMs. There are three major providers of electronic link of ATMs in the Philippines, and these are inter-connected with each other.

Thrift banks primarily accumulate the savings of depositors and invest them, together with their capital, in secured or unsecured loans, or in financing for home building and home development; in readily marketable debt securities; in commercial paper and accounts receivable, drafts, bills of exchange, acceptances or notes arising out of commercial transactions. Thrift banks also provide short-term working capital and medium-and long-term financing to businesses engaged in agriculture, services, industry, housing and other financial and allied services for its chosen market and constituencies, especially for small and medium-sized enterprises and individuals. There are three types of thrift banks operating in the Philippines. These are Savings and Mortgage Banks (SMBs), Private Development Banks (PDBs) and Stock Savings and Loan Associations (SSLAs). As of end 1999, there were 118 thrift banks, with 1,360 branch offices.

Rural banks are organized primarily to make credit available and readily accessible in the rural areas on reasonable terms. Loans and advances extended by rural banks are primarily for the purpose of meeting the normal credit needs of farmers and fishermen, as well as the normal credit needs of cooperatives and merchants. As of end 1999, there were 806 rural banks, with 1,079 branch offices.

Specialized government banks are organized to serve a particular purpose. The existing specialized banks are the Development Bank of the Philippines (DBP), the Land Bank of the Philippines (LBP) and the Al-Amanah Islamic Investment Bank of the Philippines (AAIIB).

1.2.2 Non-banks with quasi-banking functions

In addition to the foregoing banking institutions, as of end 1999, there were 65 investment houses, 52 finance companies, 22 security dealers/brokers, 8,566 pawnshops, 11 investment companies, 13 lending investors, 171 non-stock savings and loan associations, 8 venture capital corporations, 6 mutual building and loan associations and 2 government non-bank financial institutions that are regulated or supervised by BSP.

1.2.3 Philippine postal corporation

Under Republic Act No. 7354, the Philippine Postal Corporation is authorized to issue domestic and international money orders. These are instruments issued to facilitate transfer of money from one person to another via a local Post Office. Any mailing patron can buy money order checks from their local post office, which may be drawn payable to another person or to the person making such application, if he so desires. Money order checks are then transmitted to the beneficiary either through registered letter or speed airmail. Upon receipt, domestic money orders may be presented for payment at the designated paying office, issuing office or authorized commercial bank within 90 days from date of issue.

Philippines

For services rendered, fees are collected by the issuing post office based on the aggregate or total amount applied for.

1.2.4 Credit, debit and retailer card companies

There are at least ten major credit cards issued in the Philippines. All credit cards in the Philippines have affiliations with major international credit cards such as Visa, MasterCard, Diner's and JCB. Some domestic and international cards have access to the ATM network of banks in the Philippines. Several stores/retailers issue cards for use in their own chains. Among them are Rustan's Department Store and Supermarket, SM Department Store and Landmark Department Store.

2. Payment methods

In the Philippines, payment instruments may be classified into cash or non-cash. Cash is generally paper-based while the non-cash instruments are either paper-based or electronic-based. Non-cash payment instruments may be sub-classified generically into cheque payments, direct fund-transfers and card payments.

2.1 Cash

By law, the Bangko Sentral Ng Pilipinas (BSP) has the sole right and authority to issue currency in the Philippines.

At present, currency notes are issued in denominations of PHP1000, PHP500, PHP100, PHP50, PHP20 and PHP10 and coins in PHP10, PHP5, PHP1, cts.25, cts.10, and cts.5.

Although in recent years there has been an increasing tendency to use alternative payment methods, a large portion of payments to individuals is still made in the form of cash, especially in the areas of retail trade, ground transportation and personal services. This explains the wide increase of cash in circulation from PHP150.329 billion in 1996 to PHP234.361 billion in 2000 or 56% over the last five years. In real terms, the currency in circulation per capita in the US dollar slipped to USD67.72 in 2000 from USD79.75 in 1996. This means that the average working Filipinos now have less cash in their wallets than in 1996. The reasons for this are unclear, but the impact of the devaluation of peso against US Dollar would be one of them.

2.2 Non-cash payment instruments

There are three main non-cash payment instruments/media that are currently used in the Philippines, as follows:

- a. Cheques,
- b. Direct debit and credit transfers, and
- c. Credit and debit cards.

2.2.1 Cheques

Cheques remain as the most widely used instrument for payments in the country in spite of the availability of electronic payment means in the market. This could explain the registered increase of 5.00% in the volume of cheques cleared in the Philippine Interbank Clearing System from 111.98 million in 1996 to 117.59 million in 2000. In absolute terms, the value of cheques cleared in the PCHC increased to PHP773.289 billion (or by 35%) in 2000 from PHP572.244 billion in 1996. This indicates a growing acceptance and usage of cheques as payment instrument as well as an increase in confidence or trust in cheque payments.

2.2.2 Direct debit and credit transfers

The direct debit and credit transfers are used mainly for the settlement of large value payments for small volume transactions such as PHP/USD Transactions, Interbank Call Loan (IBCL) Transactions, and Government Securities Transactions.

The Philippine Interbank Clearing System cleared about 580 thousand credit transfers for USD/PHP transactions in 2000. This was higher compared to 410 thousand in 1996. Understandably, the value of the transactions posted a hefty increase of 117% from PHP7,815.99 billion in 1996 to PHP16,921.74 billion in 2000. On the other hand, the volume of interbank transfers for IBCL decreased to 120 thousand in 2000 (or by 25%) from 150 thousand in 1996. Moreover, the value of interbank transfers for IBCL recorded tremendous growth of PHP1,847.11 billion in 2000 (or by 117%) from PHP1,574.23 billion in 1996. The devaluation of peso against the US dollar from 26.2157 in 1996 to 44.1938 in 2000 may explain the wide increase in the value of credit transfer for USD/PHP transactions while the adoption of Multi-transactions Interbank Payment System (MIPS) may have contributed to the wide increase in the volume and value of interbank transfer for IBCL.

2.2.3 Credit and debit cards

The credit and debit cards are still a relatively underdeveloped industry in the country. The credit exposures by banks decreased to PHP25,931.52 Million in 2000 from PHP33,614.77 Million in 1998 (or about 30%). In 2000, the estimated number of electronic money issued was 14,352 while the estimated monthly transactions were about 3,299. Banks started to issue electronic money only in 2000.

Credit cards

In recent years, credit cards have become increasingly more popular in the country with several large banks issuing internationally accepted credit cards, such as Visa and MasterCard. The main issuers of credit cards in the Philippines are banks. Most of the credit cards in the country enable the cardholder to make purchases or draw cash up to a prearranged ceiling.

Debit cards

In the Philippines, most of the commercial banks and some of the thrift banks issue debit cards. Debit cards allow customers to access their funds in the banks for payments.

3. Interbank settlement systems

Overview

Payments clearing system in the Philippines particularly in Metro Manila and nearby areas (within a 150-km radius from Manila) is the responsibility of the Philippine Clearing House Corporation (PCHC) in coordination with the BSP for the net settlement of funds. The deposit reserves maintained by the banks with the BSP serve as basis for the clearing of checks and the settlement of interbank balances relative to banks' deposit reserves with the BSP. The BSP also provides payment and clearing services through the BSP's Regional Clearing Units (RCU) throughout the country. These RCUs are completely controlled by BSP, which charges administrative and other fees for the maintenance of the clearing facilities. These RCUs operate under the rules, regulations and procedures prescribed by the BSP.

The BAP in coordination with BSP and the PCHC conceived and developed the Multi-transaction Interbank Payment System (MIPS). MIPS is a delivery system, which replaces the previous paper-based instructions, with secure, and electronically transmitted instructions. Large value interbank transactions and bank transfers are cleared through MIPS. These include overnight interbank lending/ borrowing as well as bank-to-bank transfers. Payment instructions no longer pass through the clearing house but are instead directly debited against local banks' demand deposit accounts maintained with BSP. MIPS was adopted for the settlement of interbank loan transactions in October 1995.

At the end of March 2001, the BSP launched the initial phase of a Real Time Gross Settlement System (RTGS). The RTGS is currently limited to interbank call and term loans and government securities under repurchase agreements with the BSP's transactions which, under RTGS, are now settled on a gross, trade-by-trade basis (BSP Circular 266). The RTGS is being implemented through an upgraded, electronic Multi-transaction Interbank Payment System (MIPS2).

The BSP's Monetary Board also approved the establishment of an Intra-day Liquidity Facility (ILF) to support the implementation of BSP Circular 266. The ILF is intended to prevent the possibility of failed settlements through MIPS2 for interbank transactions not covered by circular 266 and which are still being settled on a net (versus gross, trade-by-trade) basis. These interbank transactions include primary auctions and secondary trading of government securities; peso netting for USD-PHP swaps; and lending activities including collections and repayment. The ILF, considered part of the BSP's open market operations, basically operates like a repurchase arrangement backed up by eligible, peso denominated securities issued by the national government.

Settlement of USD transactions in the Philippine Dealing System (PDS) is done via the Philippine Domestic Dollar Transfer System (PDDTS). The PDDTS is a local clearing and electronic communications system operated by the BAP, the PCHC and Citibank, Manila. It provides the banking industry with a facility to move US dollar funds from one Philippine bank to another on the same day, without having to go through correspondent banks in the U.S. This system replaces the FX Clearing and Settlement System, which was primarily designed to handle Overseas Contract Workers (OCW) remittances.

The Philippine Central Depository (PCD) was incorporated on March 31, 1995 to improve operations in equities transactions. It seeks to provide a fast, safe and highly efficient system for equities settlement. PCD uses the Book Entry System (BES) to record ownership of shares. Movement of shares is effected via electronic debit and credit of holdings. Through immobilization, BES reduces the physical movement of stock certificates (scrip). It also discourages fraud attributable to forgery and theft, as well as eliminates inconveniences due to lost certificates. Scripless trading, a system where settlement is carried out via BES, makes investment easier, cheaper and safer.

3.1 PCHC clearing operations (cheques items)

Introduction

The Philippine Clearing House Corporation (PCHC) was formally established on March 10, 1977 by the Bankers Association of the Philippines (BAP) as a private corporation, with a board of directors drawn from participating banks and institutions represented by their bank presidents and senior officers. The corporate goal is to serve the banking community in accordance with the primary purpose of providing, maintaining and rendering effective, efficient, economical and sound exchange practices and promoting faster exchange of values between clearing participants. In line with its primary objective of conducting automated cheque clearing operations, it is responsible in receiving, processing and sorting clearing items delivered to it by all participating banks through PCHC designated carriers, and providing the BSP with the exchange results for settlement.

Other objectives of the PCHC Clearing Operations include the following:

- i. To effect, at a designated place, the daily exchanges between clearing participants of fully Magnetic Ink Character Recognition (MICR) encoded checks and other properly encoded demands;
- ii. To provide reports to the BSP Accounting Department that serve as the basis for the settlement of exchanges;
- iii. To furnish clearing participants with information which will enable them to balance, identify and trace items processed through the clearing operation; and,
- iv. To assist the banking and financial community in the development, design and installation of sound exchange practices intended to promote faster exchange of values between clearing participants.

3.1.1 Ownership

The Bankers Association of the Philippines (BAP) owns the PCHC. It is a private corporation, with a board of directors drawn from participating banks and institutions represented by their bank presidents and senior officers.

3.1.2 Participation

Banks (stockholders/members), financial institutions (associate members) and BSP are all participants in the MICR clearing operations. There are two classes of participants, namely: direct participants and indirect participants.

Direct participants

Direct participants are composed of the following:

- stockholder member (commercial bank),
- non-commercial bank which has met the required PHP1.25 Bio capital structure, and
- affiliates/subsidiaries of stockholder participants, which have been provided a standby LC by the mother institution.

Indirect participants

The following are considered indirect participants:

- non-stockholder member that has a conduit arrangement with a stockholder member, and
- presently a direct participant but will be reverted to an indirect participant if it does not meet the required capital structure equivalent to that of a commercial bank and/or if it fails to subscribe to the capital stock requirement of PCHC for direct participants by year 2000.

3.1.3 Types of transaction

Fully Magnetic Ink Character Recognition (MICR) encoded cheques and other properly encoded demands are cleared through PCHC. These cheques are drawn against Metro Manila and nearby areas.

3.1.4 Operation of system

Each clearing participant, through his representative, shall deliver to the PCHC fully qualified MICR checks grouped in batches composed of a maximum of two hundred checks per batch supported by an “add list”, a batch control slip and a delivery statement. Each participant procures their supply of batch control slips from BAP-accredited security printers with the clearing participant’s name and Bank Routing Symbol-Transit Number (BASTN) preprinted thereon.

Discrepancies between the PCHC computer-generated total and the presenting banks’ Batch Control Slip amount arising from exception conditions such as missing items, free items, erroneous bank’s add-list, etc., shall be reconciled by PCHC by passing adjustment tickets to balance the batch totals. The reconciled and adjusted amount shall be used to credit the bank’s clearing account.

Any check/item sent for clearing through the PCHC on which payment is refused by the drawee bank, in accordance with long standing and accepted banking practices, shall be returned through the PCHC not later than the next regular clearing for local exchanges. The acceptance of the returned check/item by the presenting (collecting) bank is mandatory. Each returned item shall be presented to the Clearing House via the use of MICR Document Carrier Envelopes. These will be processed by the PCHC as a separate job and will not be intermingled with bundles of regular clearing items. Return of such items through the Clearing House Facility after the “reglementary period” shall be subject to penalty.

Items which have been subject to a material alteration or items bearing a forged endorsement when such endorsement is necessary for negotiation shall be returned by direct presentation or demand to the presenting (collecting) bank and not through the regular clearing house facilities within the period prescribed by law for the filing of a legal action by the returning bank/institution against the institution/entity sending the same.

Items originally presented and subsequently returned by the drawee bank may be subject again to clearing for the last and final time. Any subsequent submission and return of the check after the second presentation shall be subject to a penalty of 1/8th of 1% of the amount of the item or PHP1,000.00, whichever is higher, to be imposed by the drawee bank against the presenting bank. However, reclearing of an item previously returned or dishonored for reasons of stop payment order or the account is closed is strictly prohibited.

Special clearing of checks by direct presentation shall be allowed only for regular clearing items or returned items not presented at the PCHC Clearing Window on or before the clearing cut-off time which are as follows:

- **Regular clearing items** to be delivered to the drawee bank’s Central Clearing unit not later than 20:00 of the same day; and
- **Returned items** to be delivered to the presenting bank’s Central Clearing Unit not later than 22:00 of the same day. However, there is nothing to prevent the returning/drawee bank to deliver the returned item directly to the presenting branch.

A Special Clearing Receipt shall be used for regular clearing checks and returned items presented directly to the drawee bank.

Regular clearing checks/items when presented directly to the drawee bank shall be treated as if they were received from normal clearing operations. Accordingly, they shall be subject to return within the 24-hour “reglementary clearing rule” counting from the clearing time on the date of receipt.

3.1.5 Settlement

Clearing balances of participating banks/branches shall be debited or credited, as the case may be, to the clearing accounts of banks’ respective head offices in the BSP in the afternoon of the same day the demands are presented for clearing.

Any bank which incurs an overdraft in its deposit account with the BSP shall fully cover said overdraft, including interest at a rate equivalent to one-tenth of one percent (1/10th of 1%) per day or the prevailing 91-day T-bill rate plus three percentage points, whichever is higher, not later than the next clearing day. The appropriate clearing office (PCHC and the BSP Regional Clearing Office) shall officially notify banks with overdrawn balances.

Settlement of clearing balances with the BSP shall not be effected for any account which continues to be overdrawn for five consecutive banking days until such time that the overdrawn amount is fully covered or otherwise converted into an emergency loan or advances pursuant to the provisions of Section 84 of R.A. No. 7653. Banks may also borrow from other banks through the interbank facility or from the BSP through the overnight or term regular repurchase facilities at existing rates to cover overdrafts.

3.1.6 Risks and risk management

The system permits overdraft and deferral of settlement in the clearing balances of the participating banks/branches with the BSP which may pose credit and liquidity risks. However, the following measures have been taken by the BSP to address the risks posed by the present system:

- Settlement of clearing balances with the BSP shall not be effected for any account, which continues to be overdrawn for five consecutive banking days until such time that the overdrawn amount is fully covered.
- Conversion of the overdraft into an emergency loan or advances pursuant to the provisions of Section 84 of R.A. No. 7653.

Banks may borrow from other banks through the interbank facility or from BSP through the overnight or term regular repurchase facilities at existing rates to cover overdrafts.

3.1.7 Technical aspects

BRSTN

PCHC, upon written request, shall assign the Bank Routing Symbol-Transit Number (BRSTN) of all branches/extension offices/units of Banks desiring to participate in the PCHC Clearing Operations. PCHC shall maintain a register for this purpose and shall keep an updated list of banks/branches' BRSTN available to all clearing participants upon request in writing.

For purposes of inclusion in PCHC's sort pattern program, banks should advise PCHC of the impending participation of their branch/extension offices/units in any of the clearing regions through the submission of the following information: (a) Name of Branch/Extension Office/Unit, (b) Complete Address, (c) Clearing Region where to Participate, and (d) Effectivity Date of Participation.

Bank records of clearing items

Each bank/branch shall maintain adequate records for tracing and reproducing any item lost or destroyed in transit to PCHC, i.e. regular items, return items and special clearing items.

Photocopy of clearing items

PCHC shall maintain microfilm/electronic images of items cleared through its facilities. A photocopy shall be made available upon submission of a request in proper form and duly signed by an authorized bank officer whose specimen signature is on file with PCHC.

A photocopy of an item, which is duly certified by PCHC as such, shall be used as a binding document to debit the corresponding client’s account in case the original item is lost or mutilated.

In case of loss of regular item(s) while in transit to PCHC, a photocopy of such item(s) shall be used as a binding document to debit the client’s account. Authorized officers of the Presenting Bank shall duly certify the genuineness of the photocopy by affixing their signature over their printed names. Provided that should the Drawee Bank so require, the Presenting Bank shall furnish the Drawee Bank a written undertaking (supported by detailed add-list of the lost items) to reimburse the latter for the amount(s) of the item(s) including losses and/or damages arising from a duplication of payment of the item(s) or subsequent return of the photocopy due to fraudulent negotiation thereof.

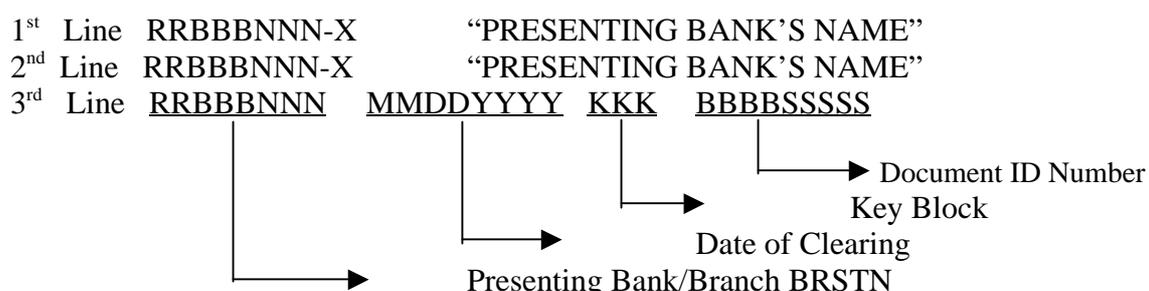
Retention of records by PCHC

PCHC shall furnish duplicate diskette/magnetic tape records of incoming cheques to clearing participants upon request by an authorized officer of the requesting bank/branch provided that the request is made within four (4) clearing days after the original date of preparation of the incoming diskette/magnetic tape. Any request made beyond the period herein prescribed may be entertained on a best effort basis.

PCHC shall keep microfilm/electronic images and duplicate lists of the items processed for a period of five (5) years from the date of clearing.

PCHC tracer/identification band

PCHC shall, in the course of its sorting, print/spray on the back of each item the following Tracer/ID Band:



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The presence of the PCHC Tracer/ID Band on the back of the cheque will serve to certify that the item was cleared through PCHC but still shall not be construed as a legal endorsement.

Quality of cheques/items for MICR clearing

To assure a fast and efficient processing system at all times at the Clearing House, member-participants shall maintain and provide a testing mechanism for the strict monitoring of the production of MICR cheques/items by their accredited printers. Rejects attributable to inferior quality check paper, poor control features and sub-standard printing and/or encoding of the pre-qualified fields shall be subject to the provisions of Penalty on Rejected Items.

3.1.8 Pricing policies

Pricing policies for the services of PCHC to its member clients are based on the following pricing structure:

Item Free

- | | |
|------------------------|--------------|
| • Outward Item | PHP0.40/item |
| • Inward item | 0.40/item |
| • Inter-branch Outward | 0.35/item |
| • Inter-branch Inward | 0.35/item |

Minimum Monthly Charge

- | | |
|---------------------------|-----------------|
| • Greater Manila Branch | PHP1,500/branch |
| • Regional Branch | 800/branch |
| OR | |
| • Bank level charge of... | 10,000/branch |
| Whichever is higher | |

3.1.9 Governance

Implementation of the MICR Clearing Operations in the Philippines is the sole responsibility of the PCHC. The rules, regulations and procedures under which MICR clearing operates are covered by the Operating Guidelines and Procedures approved by the PCHC Board of Directors.

3.2 BSP regional clearing units

Introduction

The BSP provides payment and clearing services through the BSP's Regional Clearing Units (RCU) for all types of cheques and demand drafts drawn by regional and provincial branches of banks not covered by the PCHC clearing operations. These RCUs, which are completely controlled by BSP, operate under the rules, regulations and procedures prescribed by the BSP. There are 27 BSP regional clearing units all over the country that have on-line connections with the BSP's main office for settlement.

3.2.1 Ownership

These 27 RCUs are completely controlled by BSP and operate under the rules, regulations and procedures prescribed by the BSP.

3.2.2 Participation

All participants/members of PCHC clearing operations not covered by the geographical coverage of PCHC are participants in the BSP regional clearing operations.

3.2.3 Types of transaction

All types of cheques and demand draft drawn by regional and provincial branches of banks not covered by the PCHC clearing operations are cleared in the BSP's regional clearing.

3.2.4 Operation of system

Each clearing participant, through its representative, shall deliver his respective demands in sealed envelopes made out separately against other participants. The total of each demand shall be listed in a certified adding machine tape attached to the sealed envelope. In the acknowledgment of receipt of the demands against a participant, the settling clerk for the drawee bank prepares and signs a Clearing Office Statement in duplicate for local clearing.

The original and duplicate of the statement shall be submitted to the Regional Clearing Officer in the regional clearing centers. The original shall be retained and shall be the basis for settlement of clearing balances in the respective deposit accounts with the BSP. The duplicate, duly authenticated by the Regional Clearing Officer concerned, shall be returned to the participant concerned through their clearing representatives. The duplicate shall be the basis of each participant in taking up corresponding entries in their respective books of accounts on the date of clearing.

Demands may be presented directly to the drawee bank/branches, institution or entities at times other than that specified in Item "3.2.2". For this purpose, a Special Clearing Receipt shall be used. The original and duplicate copies of the receipt shall be retained by the sending bank/branch. At the following clearing session, the original of the Special Clearing Receipt shall be presented as a demand against the bank/branch, institution or entity concerned. However, direct settlement between parties concerned may also be effected if they so desire.

Items that should be returned for any reason whatsoever shall be sealed in special red envelopes for presentation not later than the next regular clearing schedule. These shall be considered and accounted for as debits to the demanding banks/branches and credits to the returning banks/branches.

Items which have been the subject of material alteration or items bearing a forged endorsement when such endorsement is necessary for negotiation shall be returned by direct presentation or demand to the collecting bank and not through the regular clearing facilities within the period prescribed by law for the filing of a legal action by the returning bank/branches against the bank branch sending the same.

3.2.5 Settlement

The PCHC settlement procedures also apply for cheques and drafts drawn by regional and provincial branches of banks.

3.2.6 Risks and risk management

The measures taken by BSP to contain the risks posed in the PCHC system also apply to the BSP's RCUs.

3.2.7 Technical aspects

Please refer to item 3.1.7.

3.2.8 Pricing policies

The BSP charges administrative and other fees for the maintenance of the clearing facilities. The clearing fee being charged by the BSP to clearing participants is pro rated based on the participant's number of branches.

3.2.9 Governance

The rules, regulations and procedures under which BSP clearing units operate are covered by the BSP clearing guidelines and procedures issued to all member banks/participants.

3.3 Multi-transaction interbank payment system 2 (MIPS 2)

Introduction

On October 13, 2000, the BSP Monetary Board approved the amendments to the rules on settlement of transactions involving interbank loans and government securities under repurchase agreements with the BSP. Transactions will be settled gross, on a trade for trade basis with finality subject to the availability of balances in the deposit reserves maintained by banks in the BSP.

The MIPS2 allows a more direct interface to the BSP's own computer and accounting systems and achieves settlement finality through the gross settlement of transactions and thereby reduces systemic.

3.3.1 Ownership

The Bankers Association of the Philippines in coordination with BSP and the PCHC conceived and developed the system.

3.3.2 Participation

Banks and non-banks performing quasi-banking functions with Demand Deposit Accounts with the BSP can participate by executing the Participation Agreement.

3.3.3 Types of transactions

Initially, the transactions covered under MIPS 2 are for Interbank Call Loans (IBCLs) and Repurchase Agreements (RPs) with the BSP.

3.3.4 Operation of system

Upon receipt of the electronic fund transfer instruction through the System, settlement of IBCL transactions shall be performed with finality by the BSP through the participants' DDAs.

Debit instructions shall be settled by the BSP on a gross, transaction-by-transaction, First In-First Out basis.

The BSP shall only post debit instructions if the sending participant's DDA is adequately funded. Otherwise, the transaction shall not be posted and shall be held in queue. If a transaction is held in queue due to inadequate DDA balances, other succeeding transactions, which are of lower value, and which are within the available DDA balances shall be posted ahead of the transaction, which was held in queue.

Transactions that remain in queue until the IBCL window closes shall be cancelled from the System.

Participants are endeavored to transmit all repayment instructions for maturing IBCL borrowings during the first hour of operation of the System to improve liquidity in the System.

3.3.5 Settlement

Under this new system, the Interbank loan transactions (call and term) among banks and non-banks financial intermediaries performing quasi-banking functions (NBQBs) and purchase and sale of government securities under repurchase agreements (GS/RP) between and among banks and NBQBs and BSP in connection with the latter's Open Market Operations shall be settled gross, on a trade-for-trade basis and finality subject to the availability of balances in the deposit reserves maintained by banks in the BSP in accordance with the following procedures:

1. The lender, in the case of lending/borrowing and purchaser in GS/RP transaction, and the borrower, in the case of collection/repayment and repurchaser in a GS/RP transaction, should submit an IBCL-MIPS (System) Fund Transfer Instruction (Instruction) to the Philippine Clearing House Corporation (PCHC), which shall forward the transaction electronically to BSP. Each transacting party shall use its confidential ID and password to activate the system and initiate/authorize its transaction. The electronic debit instruction shall undergo System authentication by the PCHC and BSP. Authentication confirms that the Instructions contain the proper approvals from authorized officers of the originating institution.
2. BSP shall settle in the deposit reserves maintained by banks and NBQBs in the BSP the individual interbank loan and GS/RP transaction within the following settlement time:

From 9:00 to 21:45

Only lending/borrowing to cover shortfall in deposit reserves with BSP arising from the results of the AM Returned Checks and Other Clearing Item (COCI) Clearing conducted pursuant to Circular 214, valued on the same date as the date of original presentation of COCI to PCHC and BSP regional clearing centers (RCCs).

From 10:00 to 16:00

All interbank loan transactions and GS/RP transactions to be given value on the date of the loan grant/repayment and GS purchase/repurchase.

From 17:30 to 18:30

Only lending/borrowings to cover the shortfall in reserve deposits with BSP arising from losses arising from the regular afternoon check clearing to be given value on the date of the loan grant/repayment and GS purchase/repurchase.

3. BSP is not obliged to effect the transfer of funds in the deposit reserves maintained by banks and NBQBs in the BSP if there is no sufficient balance in said deposit reserves of the transacting party whose account shall be debited in the BSP books.

Moreover, the BSP recognizes that there are interbank transactions, other than check clearing, that are still settled on net basis. These interbank transactions include secondary trading of government securities and peso netting arising from USD-PHP swaps. In this regard, the BSP has established a fully collateralized intra-day liquidity facility (ILF) to support the implementation of the RTGS through the MIPS2. The ILF provides the smoothing mechanism in the settlement of these interbank transactions, which are not covered by Circular 266 but could cause a failure of settlement of transactions under MIPS. The operation of the ILF is considered part of the BSP's open market operations.

The basic features of ILF are as follows:

1. *Establishment of BSP-ILF-Principal Securities Account and Client Securities Account for each participating bank/NBQB with BTr-RoSS.* The BSP-Accounting (BSP-AcD) shall open a RoSS Principal Securities Account (to be named BSP-ILF) and client Securities Account (CSA-ILF) for each participant (to be named BSP-ILF-Name of Seller/Institution). To establish the CSA-ILF, each RoSS member participating bank/NBQB shall instruct the Bureau of Treasury (BTr) to move from its account with BTr-RoSS to the BSP-ILF account the pool of peso-denominated government securities to be set aside. Non-RoSS participants must first accomplish the required documents for RoSS membership prescribed by BTr. The instruction shall come in the form of "Confirmation of Transfer of Government Securities Sans Consideration" (COT-SC). After updating the RoSS for the instructions from the participating banks/NBQBs, BTr shall transmit the initial CSA-ILF e-file of individual participants to the BSP.
2. *Eligible Securities.* Only government securities listed below that are free and unencumbered shall be eligible for the ILF.

- a. Peso-denominated issues of the National Government (NG) with remaining maturity life of at least eleven (11) days to ten (10) years, including Special Series Treasury Bills used as liquidity reserves.
Special Series Treasury T-Bills used as liquidity reserves under Circular 10 should first be released by the ILF participants before said securities can be transferred to their CSA-ILF account by formally advising RoSS on such transfer.
 - b. USD denominated bonds issued by the NG with remaining life of at least eleven (11) days.
3. *Intraday Bank Limit.* Banks/NBQBs shall set their individual ILF limits based on the amount of government securities delivered to the CSA-ILF pool.
 4. *Valuation of Securities.* The government securities in CSA-ILF shall be valued based on the 11:16 fixing rates on the last banking day of the week when the documents are submitted to BSP, from applicable Bloomberg's MART pages. Securities that are not quoted in said MART pages shall be valued based on the price to be mutually agreed by BSP and the participating bank/NBQB.

Currently, the BSP adopts the following valuation guidelines for the Peso-denominated government securities:

Tenor (Remaining Life)	Valuation
Up to 182 days	90% of market value
More than 182 days but less than 5 years	80% of market value
5 years up to 10 years	70% of market value

5. *Access to ILF and Repayments of O/N-RP.* At the start of the banking day, participating banks/NBQBs shall sell to BSP the securities in the CSA-ILF pool based on the value established in Section 4. BSP shall credit the proceeds of the sale to the respective demand deposit (DD) accounts of the seller with BSP. At 17:30, BSP shall sell back the securities at the same price in accordance with the guidelines stated below.
 - a. In case the DD balance is not sufficient to cover the purchase transaction, BSP and the participating bank/NBQB shall mutually agree on either of two options:
 - i. BSP shall extend an overnight repurchase agreement (O/N RP) at 600 basis points over BSP's lending rate for the day.
 - ii. BSP shall sell back to the participating bank/NBQB only to the extent of the DD balance and the bank shall issue an instruction to BTr to transfer the securities from the CSA-ILF of the BSP ILF principal securities account to BSP regular principal securities account.
 - b. The O/N RP shall be paid not later than 11:00 on maturity date. Unpaid O/N RP shall be converted into an absolute sale to BSP of the collateral.
6. *Changes in Securities in the CSA-ILF Pool.* Participating banks/NBQBs may increase or reduce their intraday bank limit by submitting to BTr an adjusted CSA-ILF file not later than 12:00 noon on the last banking day of the week. BTr shall post the adjusted CSA-

ILF file and transmit the updated CSA-ILF file not later than 9:30 of the immediately following banking day after date of receipt from the participating bank/NBQB.

7. *Transaction fee.* BSP shall collect a commitment fee of 20 basis points per annum on the intraday bank limit and transaction fee of PHP100.00. The cost of maintaining the CSA-ILF to be charged by BTr shall be borne by the participating bank/NBQB.

3.3.6 Risks and risk management

Since transactions are settled gross, on a trade for trade basis and with finality subject to the availability of balances in the deposit reserves maintained by banks with the BSP, risks are eliminated.

Each participant is responsible for ensuring the confidentiality, safety and security of its login IDs, passwords and authentication keys for activating the system and initiating IBCL transactions.

Each participant is legally bound by its electronic fund transfer instruction which it sent through the system without need of any other manually prepared confirmation, paper, or instrument, provided that the same has been authenticated by the BSP and provided further that they comply with the terms and conditions set forth in the Memorandum of Agreement.

The PCHC and the BSP are responsible for ensuring that adequate continuity of business (COB) plans are in place for uninterrupted operations.

3.3.7 Technical aspects

The system is composed of the following components:

- **Front-end software** - This allows each participant to enter its IBCL transactions and transmit the same to the BSP through the Philippine Clearing House Corp. (PCHC) server in a secure manner.
- **PCHC Server** - This receives the electronic transfer instructions from the participants, validates and authenticates each electronic transfer instruction, and immediately relays the same to the BSP through the BSP Gateway.
- **BSP Gateway Server** - It acts as a transit point for the electronic transfer instructions and status files being transferred between the PCHC Server and the BSP's Financial Accounting System (FAS).
- **BSP's FAS** - This is the general ledger system of the BSP wherein all accounting entries to the BSP's books as well as the participants' Demand Deposit Accounts (DDAs) are posted. It also generates the statements of account for the DDAs, which are sent electronically to the participants on a regular basis.
- **BSP's cc:Mail System** - This is being used as the main delivery facility for sending official DDA statements to the participants.

3.3.8 Pricing policies

PCHC charges the amount of PHP100 for each electronic fund transfer instruction sent by the remitting participant. The transaction fee is subject to regular review by the PCHC for adjustment as may be deemed necessary. BSP, on the other hand, charges the amount of PHP20 for each electronic fund transfer instruction received.

3.3.9 Governance

All members are bound to abide by the rules set forth under the memorandum of agreement for “Interbank Call Loan Funds Transfer System”.

3.4 Philippine domestic dollar transfer (PDDTS)

Introduction

PDDTS is a local clearing and electronic communications system operated by the BAP, The Philippine Central Depository (PCD), the Philippine Clearing House Corporation (PCHC) and Citibank, Manila. It is a facility for the banking industry to move US dollar funds from one Philippine bank to another in the same day, without having to go through correspondent banks in the U.S. Each participating bank maintains a US dollar FCDO interest bearing account with the settlement/depository bank (PDDTS account) and which shall be used solely for effecting the credits and debits and other transactions arising from PDDTS transactions as well as payments of transactions and other charges attendant to PDDTS transactions.

3.4.1 Ownership

This local clearing and electronic communications system is operated by the BAP, the Philippine Central Depository (PCD), the Philippine Clearing House Corporation (PCHC) and Citibank, Manila.

3.4.2 Participation

Philippine commercial banks, which allowed to engage in spot transactions at the PDS, are participants in the PDDTS.

3.4.3 Types of transactions

The dollar side of the PDS transactions is settled at the PDDTS. The peso side of the deal is settled via manager’s checks for interbank transactions and via debit/credit of the banks’ regular demand deposit accounts at the BSP for transactions with the BSP.

3.4.4 Operation of system

Citibank operates the system together with the PCD. On-line transfers go directly to Citibank while batch netting is undertaken by the PCD. Settlement is done through book transfers in the US dollar accounts of participants maintained with Citibank Manila. Each participating bank

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maintains a non-checking, interest-bearing FCDO (i.e. US dollar) current account with Citibank, Manila, which acts as their clearing account. Outward transfers from the banks' accounts are effected only at the end of the day, after all regular domestic dollar transfers are processed.

3.4.5 Settlement

At the start of the day, the PCD shall accept the transfer of beginning balances of PDDTS accounts of participants from Citibank. Each participant may then commence sending electronic transfer instructions through the PCD system using Gross Settlement Real Time method (GSRT) anytime from 9:00 to 17:00 of a particular business day via the PCD electronic communications system. PCD shall accept and process these instructions. Upon receipt of said instructions, the PCD system shall automatically access the sending participant's PDDTS account balance. If the participant's account has sufficient funds to cover the transaction, the instruction will be implemented and the transfer effected. Once the transfer is effected, the funds of a particular sending participant become immediately available to the receiving participant and the settlement shall be final and irrevocable.

If the sending bank's PDDTS account balance, as reflected in the PCD system, is insufficient to cover the transfer, the transfer instruction will be placed on queue. Participants who may be temporarily short of funds during the day may then request Citibank for daylight overdraft facility for the queued transactions.

3.4.6 Risks and risk management

PCD sends electronic transfer instructions using Gross Settlement Real Time method (GSRT). The system will automatically access the sending participant's PDDTS account balance for settlement. If the participant's account has sufficient funds to cover the transaction, the instruction will be implemented and the transfer will be effected. Once the transfer is done, funds become immediately available thus the settlement is final and irrevocable. However, if the sending participant PDDTS account balance is insufficient, the transfer of funds will not be implemented and it will be placed on queue. To avoid gridlock and settlement and liquidity risks, participants may request for respective daylight overdraft facility.

3.4.7 Technical aspects

Please refer to items 3.4.5.

3.4.8 Pricing policies

A one time joining fee of PHP250,000.00 (plus 10% VAT) will be charged for each participating bank. While the cost per outgoing or incoming transfer (plus 10% VAT) is PHP40.00. The miscellaneous fees are as follows:

- PHP7.00 per page for ordinary printing within five-day archive.
- PHP10.00 per page for special printing beyond five-day archive.
- PHP10.00 per page plus PHP300.00 per hour for computer time for the restoration beyond five-day archive using back-up tapes.

3.4.9 Governance

The general rules and regulations outlined in the PDDTS basic rules and procedures shall govern the operation of the PDDTS. It covers/includes all types of U.S. Dollar transactions irrespective of the amount as allowed under the regulations of BSP.

4. Securities settlement systems

4.1 Registry of scripless securities

Introduction

The Government Securities Department (GSD) of the BSP was, until recently, responsible for the maintenance of a registry of securities for financial institutions. This registry was called the Book Entry System (BES) and had 951 accounts as of February 27, 1997. In 1988, membership was limited to Accredited Government Securities Dealers (AGSDs). In August 1995, BSP approved the inclusion of insurance companies and mutual benefit associations in the book entry system for government securities. It was believed that the widening of the paperless government securities trading system would eliminate the risk of non-delivery of the securities and reduce administrative costs for both the Government and securities dealers.

The BES recorded transfers of securities ownership through ledger entries. Each participant opened a securities account with the GSD that served as the medium for transfers and registration for its individual holdings. In contrast to the custodianship facility, the system allowed partial withdrawal of securities.

Prior to 1996, while securities are in scripless form, holders can request for issuance of physical certificates.

Cash settlement for transactions under the BES is initiated by the buyer normally through issuance of a manager's / cashier's check for clearing at the PCHC. At the end of the day, results of clearing are forwarded to BSP for posting to respective demand deposit accounts. Check payments are cleared on transaction date. Proceeds of maturing government securities and interest, if any, on BES securities are credited to respective demand deposit accounts of investor banks while those without D/D accounts are paid by check or credited to respective depository banks.

For tighter control and to ensure correctness of securities account balances, the GSD in-house-developed computer system for BES was utilized. Weekly settlements of securities account balances are sent for confirmation to promptly detect any discrepancies.

In November 1995, the conduct of auctions of government securities was transferred from the BSP to the BTr of the DoF.

On November 4, 1996, the BTr assumed the last component of fiscal agency responsibilities from the BSP. BTr established its own system designed to officially register the ownership and

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its variants of scripless/uncertified government securities (GS) from the time of origination to redemption in order to ensure transparency in the GS market, and sustain investors' confidence in the integrity and efficiency of the same market.

RoSS is the official Registry of Scripless Securities maintained and administered by the BTr.

The objectives of the RoSS are as follows:

- i. Registration of ownership and transfers or encumbrances of scripless/uncertified Treasury bills and Treasury bonds.
- ii. All Philippine Government Securities trade on Delivery-versus-Payment (DVP) and on Real-Time-Gross Settlement (RTGS) basis.
- iii. Elimination of potential systemic risk/disruption of the Philippine financial system.
- iv. Lower cost of delivery/settlement through electronic trading.

As of December 1999 there are 365 registered RoSS participants, detailed as follows:

a) Government Securities Eligible Dealers (GSED)	44
b) Non-GSEP	<u>321</u>
	<u>365</u>

All government securities floated/originated by the National Government under its scripless policy shall be recorded in the registry in the name of the Government Securities Eligible Dealer (GSED) by virtue of the auction award made by the Auction Committee.

Subsequent transfer of ownership or encumbrance on the scripless securities out of the Securities Account of a GSED shall be recorded in RoSS into the Securities Account of the counterparty GSED.

Unsettled Government Securities floated since November 20, 1995 are registered in RoSS. A complete backroom processing and information system was set up in the offices of the BTr.

4.1.1 Ownership

With the transfer of the fiscal agency functions from the BSP to the DoF, the BTr has taken the function of booking securities through RoSS effective November 4, 1996. The BTr owns and operates the RoSS system.

4.1.2 Participation

The participants in the RoSS are classified as follows:

- **Government Securities Eligible Dealers (GSED)** - are dealers licensed by the Securities and Exchange Commission to engage in both purchase and sale of government securities. They are acknowledged by the BTr as eligible to participate in the auction upon application and proof of unimpaired capital of at least PHP100 Million, compliance with statutory ratios, and subscription of an electronic link to the BTr's

Automated Debt Auction Processing System and the RoSS, and existence of a Demand Deposit Account with the BSP.

- **Non- Government Securities Eligible Dealers (Non-GSED)** – are dealers which may also engage in the purchase and sale of government securities but only from and to GSEDs. Any institution may be accepted as a non-GSED after submission of proof that they are into buying and selling of securities, application of membership to the RoSS and accomplishment of an Oath of Undertaking that they will abide by all the rules and provisions of the system.

4.1.3 Types of transactions

The RoSS handles the transfer of ownership or encumbrance on the scripless securities out of the Securities Account of a GSED into the Securities Account of the counterparty GSED/non-GSED.

4.1.4 Operation of system

Under the RoSS, GSEDs maintain a Securities account for official recording of scripless government securities awarded to them as a result of an auction. Acquisition of securities in the secondary market is recorded in the same manner.

A GSED likewise maintains Securities Sub-accounts in the name of its respective clients for the purpose of segregating scripless government securities sold to clients in the secondary and tertiary markets under one account, provided that the GSED maintains complete records of ownership/other titles of their clients in the GSED's own books.

GSEDs desiring to achieve Delivery-Versus-Payment (DVP) and Real-Time-Gross-Settlement (RTGS) in their secondary market transactions shall open a Settlement Account with the BSP or any bank of their choice, which, like the BSP, shall agree to service their settlement of scripless securities trade immediately upon notice of a transaction concluded. All banks/financial institutions, which have regular demand deposit account with BSP, may serve as settlement banks in connection with the government securities transactions of RoSS account owners.

GSEDs have the option to: (1) fund their Settlement Account before the start of trading hours or 9:30, or (2) avail of an Overnight Credit Line with the Settlement Bank which shall be deemed drawn whenever the GSED's Settlement Account is negative or insufficient to settle a trade, otherwise the transaction shall be queued until sufficient funds are credited to the Settlement Account.

Before the implementation of the familiarization period for Circular 266, trading starts at 9:30 to 12:00. However under Cir. 266, banks can now deal with BSP as well as among themselves up to 15:00. GSEDs have until 14:00 to register their transactions with ROSS. This will give ROSS sufficient time until 16:00 within which to clear the scripless securities and settle the payment thereof.

Trades can be settled manually or electronically.

For transactions wherein one of the parties does not have the electronic link to the RoSS System or in cases of system breakdown and failure of trade transactions to meet the cut-off time prescribed by RoSS, these are manually settled through physical delivery of the confirmation of outright purchase with corresponding confirmation of outright sale/purchase with resale/etc., by the counterparties to the BTr office. Cash settlement for these transactions will now be in the form of checks.

For transactions to be settled through electronic trading systems, counterparties have to key-in/transmit the details of the trade using the Bridge Interface that is linked electronically to the RoSS.

GSEDs shall ensure that all trades are cleared and settled, having sufficient securities and cash/credit in the corresponding accounts. If for any reason, a trade is not cleared/settled, RoSS shall queue the trade until the GSED corrects the deficiency, in which event, RoSS shall clear/settle the trades queued on a first-in-first-out basis.

On the coupon payments and redemption, the BTr shall credit the Settlement Account of each GSED with the amount of coupon payments, net of tax, on coupon due date. Likewise BTr shall credit the Settlement Account of each GSED with the redemption value of the government securities on maturity date. Amounts due to the owners of a GSED's Sub-Account shall accordingly be indicated in the credit advice.

For government securities issued prior to the origination under the November 20 1995 auction, GSEDs shall settle/clear all transactions pertaining to such securities with BSP's Book Entry System (BES) in accordance with the corresponding settlement arrangement currently being followed by GSEDs.

4.1.5 Settlement

Domestic

Settlement of transactions may be done manually or electronically as follows:

- **Manual Settlement.** For transactions wherein one of the parties does not have the electronic link to the RoSS system or in cases of system breakdown, the buyer of securities prepares a Confirmation of Purchase (COP) while the seller prepares a corresponding Confirmation of Sale (COS) containing all the details of the transaction, i.e. the ISIN Number, issue and maturity dates, face amount, transaction number. The BTr then matches the COP with the COS. Matched transactions are then posted to individual securities accounts. Cash settlement maybe in the form of checks or direct debit against their accounts with depository banks.
- **Electronic Settlement.** For electronic settlement of transactions in the *primary market*, (Auction of T-bills/T-bonds), the BTr through the Bridge system announces, two days in advance, the details of the scheduled offering. The GSEDs can submit their respective bids using the Bridge network, which are electronically linked to the BTr's Automated Debt Auction Processing System (ADAPS) from 10:00 to 13:00. After the cut-off time, the BTr will then array submitted bids after which the Auction Committee will then decide what bids to accept. The BTr then downloads/transmits the accepted tenders to

the RoSS System. Once downloaded, individual security accounts of winning bidders are automatically updated. Cash settlement reports can now be generated and forwarded to the BSP. These cash settlement reports serve as the basis for debiting the demand deposit accounts of the winning GSEDs. For the *secondary market* transactions, the GSEDs/non-GSEDs input settlement instructions for done deals in their Bridge Interface, which is electronically linked to the RoSS system. Each dealer shall use his confidential ID and password to activate the system and authorize every transaction. Once matched, the transaction is sent electronically to the RoSS. Individual accounts are automatically updated after downloading of matched transactions to the RoSS System is completed. For the corresponding cash settlement, the BTr generates and then sends the trade settlement reports to BSP. The BSP, in turn, will post the net trading results in the individual demand deposit accounts.

Under the proposed DVP settlement system, GSEDs shall ensure that all trades are cleared and settled, having sufficient securities and cash/credit in the corresponding accounts. If for any reason, a trade is not cleared/settled, RoSS shall queue the trade until the GSED corrects the deficiency, in which event RoSS shall clear/settle the trades queued on a first-in-first-out basis.

Trans-border trade

GSEDs may settle trades with foreign clients through their account with Cedel and RoSS, subject to the respective agreement with Cedel. This is, however, not yet operational.

Coupon payments/redemption

The BTr shall credit the Settlement Account of each GSED with the amount of coupon payments, net of tax, on due date. Likewise BTr shall credit the Settlement Account of each GSED with the redemption value of the government securities on maturity date. Amounts due to the owners of a GSED's Sub-Account shall accordingly be indicated in the credit advice.

4.1.6 *Risks and risk management*

RoSS will not pose any risk to BTr, as this is a unit under this Office. BTr will see to it that it has full control over its operations.

As to the BSP or the participants, RoSS will not in any way pose any risk, as under the said system, all government securities transactions are uncertified and therefore not negotiable just like under the Book Entry System (BES) of the BSP. The RoSS system can also validate if a participant's securities inventory is insufficient to settle a trade, in which case said transaction will be queued until the deficiency has been corrected. Further, there can be no human intervention under RoSS as it is fully automated.

4.1.7 *Technical aspects*

Please refer to items 4.4. and 4.5.

4.1.8 Pricing policies

Monthly subscription fees are being assessed by the BTr against all banks/ financial institutions and individuals maintaining principal and client securities accounts with the RoSS. Monthly fees range from PHP5000 for each principal securities account to PHP1000 for every client securities account or per individual.

4.1.9 Governance

RoSS is the official Registry of Scripless Securities maintained and administered by the BTr.

4.2 The Philippine central depository (PCD)

Introduction

The Philippine Central Depository, Inc. (PCD) is a private institution that has been organized in March 1995 to implement a book-entry system that will greatly improve the operations of securities transactions. Book-entry system would reduce, if not eliminate, a lot of paperwork involved under present practices. Those who participate in the system would need first to open a security account with PCD and deposit their securities into the account. Any transfer of a particular security (ex. Stock) from one participant to another may conveniently be effected via book-entry, that is, by debiting one account and crediting another without the need to handle the physical certificates or documents. The records of PCD would show what each participant beneficially owns in a particular security.

4.2.1 Ownership

Regulated by the Securities and Exchange Commission, PCD is owned by various financial institutions. Its shareholders are: Philippine Stock Exchange (31.75%), Bankers Association of the Philippines (31.75%), Financial Executives Institute of the Philippines (10%), Development Bank of the Philippines (10%), Investment House Association of the Philippines (6.5%), Social Security System (5%) and Citibank N.A. (5%).

4.2.2 Participation

The following are the participants in the Philippine Central Depository system:

- **Direct Participants** are composed of the Securities Clearing Corporation of the Philippines (SCCP)- as Clearing House, the Philippine Central Depository – for the book entry settlement of equities, the RoSS of BTr – for the book entry settlement of listed Small Denominated Treasury Bonds, the Settlement Banks – for settlement of cash obligations and entitlements, and all operating member-brokers.
- **Indirect participants** are composed of custodian banks, financial institutions and transfers agents.

4.2.3 *Types of transactions*

PCD system mainly handles trades on Listed Equities. However, with the recent listing of the Small Denominated Treasury Bonds (SDT) at the Exchange, settlement for trades on fixed income securities has also commenced.

4.2.4 *Operation of system*

The services shall be performed by each of PCD, PCHC and Citibank in accordance with the following procedures and guidelines:

Clearing

(a) *Gross Settlement Real time Method (“GSRT”)*

- (i) At the start of each day, PCD shall accept the transfer of beginning balances of PDDTS Accounts of Participants from Citibank.
- (ii) Each Participant may then commence sending electronic transfer instructions through the PCD system using GSRT anytime from 9:00 to 17:00 of a particular business day via the PCD electronic communications system (the “PCD System”). PCD shall accept and process these instructions.
- (iii) Upon receipt of said instructions, the PCD system shall automatically access the funds to cover the transaction, the instructions will be implemented and the transfer effected. Once the transfer is effected, the funds become immediately available to the receiving Participant and the settlement shall be final and irrevocable.
- (iv) If the sending bank’s PDDTS Account balance as reflected in the PCD system, is insufficient to cover the transfer, the transfer instruction will be placed on queue. Participants who may be temporarily short of funds during the day may then request Citibank for Daylight Overdraft Facility for the queued transactions. Once approved by Citibank, the latter shall update the relevant PDDTS Account balance and post it on the PCD system in accordance with the schedule agreed upon between Citibank and PCD to enable the PCD system to process and implement the transaction.
- (v) Participants may view the status of their transactions through their on-line access to the PCD System. In addition, PCD and Citibank shall mutually coordinate and cooperate to enable Citibank to regularly update and post account balances of the Participants on a real time basis, as well as receive completed transactions and net debit and credit amounts.
- (vi) Transactions that are still on queue by 18:00 of that particular day shall no longer be processed, and shall be deleted from the PCD System. Each Participant shall be exclusively responsible for its unprocessed transactions as well as consequences thereof.

(b) *End-of-Day Netting Method (“EOD”)*

- (i) In the event that a particular Participant is unable to send transfer instructions using GSRT, Participants may elect to send an electronic summary of outward transfer

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(exclusive of transfers using GSRT) to PCHC through the latter's electronic communications system (the "PCHC System") before 16:00 of a particular business day.

- (ii) Upon receipt of the summary as above mentioned, PCHC shall process the data through its netting program. Citibank will then electronically download the net results for each Participant at 16:30 on the same day. Citibank will then consolidate the net results from the PCHC System with the GSRT results, and post a single entry (debit or credit) to each Participant's PDDTS Account by 18:00 of the same day.
- (c) The instructions given by a Participant to effect a PDDTS transaction or any part thereof, shall constitute the representation and warranty of the Participant to Citibank, PCD and PCHC that the Participant has full power, right and authority to make the instructions and that the transaction covered by the same constitutes an authorized, legal and valid act of the Participant binding on it in accordance with the instructions.

Delivery

To ensure settlement of all PDDTS transactions on a real-time basis, Citibank shall update a Participant's PDDTS Account balance through electronic on-line entries or file interfaces with the PCD System throughout the day, as follows:

- (a) By 7:00 of each business day, Participants who have accounts with Citibank, New York view their beginning balances for the day using Citibanking 2000.
- (b) By 8:00 of each business day, Participants may view transfers from their New York Nostro Account to their PDDTS Accounts. At the same time, Citibank shall interface with and download to the PCD System the information on the beginning balances of the Participants.
- (c) Throughout the day, and at such frequency as may be agreed upon between Citibank and PCD, Citibank shall continue to update the PDDTS Account balances of the Participants in the PCD System, to the end that fund transfer from the Participants' New York, Citibank may, at its discretion and subject to the system capabilities of PCD, create electronic online entries, send a file or utilize other methods acceptable to Citibank and PCD.
- (d) By 16:30 of each business day, Citibank shall download from the PCHC System the net debit or credit amounts for each participant that utilized the EOD method.
- (e) By 18:00 of each business day, Citibank shall interface with the PCD System to accept each Participant's net debit or credit amounts as well as all completed PDDTS transactions.
- (f) Upon receipt of the electronic summary of completed transactions from PCD, Citibank shall immediately implement a final update of the PDDTS Account balance of each Participant (inclusive of transfers using EOD), which may be viewed through the Citibanking facilities provided to each Participant.

4.2.5 Settlement

The securities that are eligible under the book-entry system of PCD are equity securities (stocks listed in the Philippine Stock Exchange) and debt securities (Treasury Bills and Treasury Bonds). There are two types of transactions involving equity securities, namely, those transacted at the Exchange and those dealt outside the Exchange. Transactions that do not pass through the Exchange are settled directly between two counter-parties, such as equity transactions between brokers and custodians and transactions involving debt securities.

All regular transactions in listed securities follow the T+3 settlement cycle, while settlement of SDT-Bonds follow the T+0 Cycle. The cash obligations arising from the Exchange trades are settled or paid through the Settlement Banks. The SCCP effects settlement of trades through DVP. Settlement of Listed Equities is supported by a computerized system called Fintracs that is shared with the PCD and where settlement banks and brokers are connected. Settlement takes effect between 12:00 – 13:30 on the third day after trade date. While settlement of listed SDT Bonds is supported by the PSE-RoSS systems interface. Although not part of the interface, cash settlement is also done via the same settlement banks, with SCCP giving all settlement instructions. Settlement of SDTs takes effect between 12:30 – 13:30 on the trade date (T+0).

4.2.6 Risks and risk management

To minimize risks in securities transactions, the PCD implemented the following measures:

- Move from scrip settlement to scripless settlement (fungible shares) using book-entry-settlement where there is timely settlement of trades on settlement date.
- Immobilization of shares at the depository to greatly diminish if not totally eliminated instances of fraud, forgery and counterfeit certificates.
- Implementation of a DVP method of settlement where principal and daily settlement payment illiquidity risks are eliminated.
- Establishment of a Clearing and Trade Guarantee Fund where there will be an immediate and ready source to cover the temporary illiquid positions of the market player, thus domino effect that could lead to systemic fail is prevented.
- Implementation of Fails Management System where the buying-in of undelivered sold securities of the selling-out of the unpaid bought shares is executed.
- Implementation of Mark to Market Collateral Deposit System that addresses the risks created by price fluctuations faced by trades that have not yet reached their settlement date.
- Shortening of the settlement cycle of listed securities from T+4 to T+3.

4.2.7 Technical aspects

Settlement of Listed Equities is supported by a computerized system called Fintracs that is shared with the PCD and where settlement banks and brokers are connected. Settlement takes effect between 12:00 – 13:30 on the third day after trade date. On the other hand, settlement of listed SDT Bonds is supported by the PSE-RoSS systems interface. Although not part of the

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interface, cash settlement is also done via the same settlement banks, with SCCP giving all settlement instructions.

4.2.8 Pricing policies

Trading of *listed equities* is done in terms of fixed minimum amounts called board lots. Depending on the price range of a particular stock, the unit of trading ranges from 10 to 1,000,000 shares. Cost of transactions therefore varies from company to company since prices of each company differ according to its par value. Orders to be posted shall be limited to a maximum of three fluctuations from the last traded price and a capitalization of PHP30 million pesos per order. Brokers may, however, impose their own limits per order for their trades. Limit orders shall be executed at a price band within the floor (minimum) and ceiling (maximum) price limits established by the Exchange for each security. Outside of the trading band, the price of the security shall be automatically frozen. This band is set not more than 50% up and not more than 40% down on a particular day, to be reckoned from the last closing price or at last posted bid price whichever is higher. While the price of *SDT-Bonds* is quoted as a percent of its face value up to the sixth (6th) decimal place.

4.2.9 Governance

PCD is operating under the rules and regulation of the Security Exchange Commission.

4.2.10 Recent initiatives

The BSP, in coordination with the BAP and PCHC, has just laid the ground for the enhancement of MIPS2 to MIPS2+. This will allow electronic transmission/settlement of the peso leg of government securities and foreign exchange transactions. The BSP will act as the settlement bank.

Finally, the BAP and PCHC are currently planning to jointly operate an electronic funds transfer facility, known as the Electronic Peso Clearing System (EPCS), designed to transfer small ticket items, such as overseas contract workers remittances, from one Philippine bank to another on the same day. The payment process will be similar to the PDDTS' multilateral netting system for dollars. The electronic transmissions of peso transfers will occur between 10:00 and 16:00. Peso net results at PCHC will be transmitted to BSP at 17:00 for posting/settlement at the banks' DDA. BSP will immediately broadcast the results of the position of each participating bank after settlement is completed. The US dollar net results will be forwarded to Citibank for posting. The system will utilize a centralized data entry for payment instructions by the banks using PCHC provided front-end software. Funds will be available to clients not later than two (2) banking days after clearing date for Metro Manila area while not later than three (3) and seven (7) for regional clearing areas and other areas/places, respectively.

4.3 Major projects to be implemented

The Government has laid down the groundwork for a clearing and settlement house that will facilitate foreign investment in debt instruments. This clearing house will reduce risks in non-delivery and allow government securities dealers to link up with international clearing houses such as Cedel and Euroclear. It will transform the settlement system into one, which requires

payment upon delivery of the instruments from the present book-entry system where no physical delivery takes place.

The Government is expected to task the PCDI, a private firm set up by the BAP and the Capital Markets Development Council, to implement the project.

Further, in a bid to finally link the country's debt and equity markets, the BTr has allowed a few government securities to be traded in the local stock market. By allowing the listing of government securities in the stock exchange, participation in the government securities market will be widened. This will result in lower interest rates.

5. The role of the BSP

5.1 Responsibilities

Republic Act No. 7653, otherwise known as the New Central Bank Act, defines the responsibilities and corporate powers of the BSP. The Act requires the powers and functions of BSP to be exercised by the Monetary Board (MB), composed of the Governor of the BSP as chairman, a member of the cabinet, and five (5) members from the private sector, all (the MB members) of whom shall serve full time. BSP's primary objective is to maintain price stability conducive to a balanced and sustainable growth of the economy. The BSP is required to provide policy directions in the areas of money, banking and credit. It shall also supervise the operations of banks.

5.2 Provision of facilities

The BSP provides payment and settlement facilities as discussed above. In addition, those financial institutions that cannot afford to pay the fees, as required under the RoSS, for them to have an access on the system, will be serviced by the BSP by way of sub-accounts.

Local banks maintain only a single settlement account with BSP. Free balances and deposits for reserve requirements are lodged under the same account. Under MB Resolution No. 1231 dated November 27, 1996, banks are required to maintain reserves (at the rate of 9%) against their Peso deposit and deposit substitute liabilities. These may be in the form of demand deposits with BSP or cash held in Treasury's vaults.

In addition to the 9% legal reserve requirements, an 11% liquidity reserve is also imposed against the combined deposit and/or deposit substitute liabilities, which may be held in the form of short-term, market yielding government securities purchased directly from BSP.

The BSP pays interest on deposits maintained by banks. Effective July 1, 1999, banks' deposits with BSP up to 40% of the required reserves (excluding the 11% liquidity reserves) shall be paid interest at 4% per annum based on the average daily balance of the said deposits. Interest is to be credited quarterly.

5.3 Provision of credit facilities

The BSP does not provide automatic credit facilities for settlement of securities/interbank transactions. The banks, however, may use the “RP window” at penalty rates.

5.4 Monetary policy and payment systems

Under the New Central Bank Act, the BSP shall establish facilities for interbank clearing under such rules and regulations as the Monetary Board may prescribe.

Implementation of BSP’s monetary policy is usually carried out through open market operations, imposition of reserve requirements and rediscounting operations.

In conducting OMO, the BSP enters into RP/RRP agreements or engages in the purchase and sale of government securities. BSP’s overnight/term borrowings or lendings are settled by direct debit/credit of the local banks’ Demand Deposit accounts.

BSP also plays an active role in the purchase and sale of securities for investment or reserve requirement purposes. Transfers of securities traded are recorded under the RoSS.

Proceeds of loans rediscounted with BSP are directly credited to the borrower’s Demand Deposit account. Corresponding payments are effected through direct debit of their Demand Deposit account on the maturity date of the loan or maturity date of the collateral, whichever comes first.

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Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Year-end Population (millions)	71.90	73.53	75.16	76.78	78.42
GDP at current prices (PHP millions)	2,171,922	2,426,743	2,665,060	2,976,905	3,302,589
(USD millions) ¹⁾	82,848	82,344	65,171	76,157	74,730
GDP per capita (USD) ²⁾	1,152	1,120	867	992	953
Exchange rate vis-à-vis USD: average	26.2157	29.4707	40.8931	39.0890	44.1938

¹⁾ Derived by dividing GDP in PHP by average annual exchange rate.

²⁾ Derived by dividing Per Capita GDP in PHP by average annual exchange rate.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	2000
					PHP millions
Notes and coins ¹⁾	150,329	181,638	185,592	275,550	234,361
Narrow money supply (M1)	221,957	258,318	281,514	394,127	386,981
Outstanding value on electronic money					
of which:					
<i>card-based</i> ²⁾	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	6.38
<i>network-based products</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>

¹⁾ Currency issue.

²⁾ Banks started electronic money only in late 2000.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	2000
					PHP millions
Cash ratio deposit ¹⁾	42%	33%	29%	17%	32%
Free reserves held at BSP ²⁾	92,929	84,822	54,236	46,176	73,846

¹⁾ Demand deposits of deposit money banks (DMBs) with BSP over Notes and Coins (currency issue).

²⁾ Demand deposits of DMBs with BSP.

Table 4

Institutional framework

(end of 2000)

	Number of institutions ¹⁾	Number of branches	Number of accounts	Value of accounts (PHP billions)
Central Bank	1	19 ²⁾	nav.	nav.
Commercial Banks	45	4,250	nav.	nav.
Thrift Banks	112	1,391	nav.	nav.
Rural Banks	790	1,912	nav.	nav.
Non-Banks	5,165	9,293	nav.	nav.
Total	6,113	16,865	nav.	nav.
of which:				
<i>virtual institutions</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>

¹⁾ Head Office.²⁾ Includes 3 regional offices and 15 regional units (These are all domestic branches).

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
					millions
PCHC ¹⁾	111.98	116.71	112.84	116.21	117.59
MIPS 2 ²⁾	0.15	0.13	0.12	0.17	0.12
PDDTS	0.41	0.48	0.55	0.58	0.58
<i>USD transaction count</i>	<i>0.10</i>	<i>0.10</i>	<i>0.10</i>	<i>0.10</i>	<i>0.10</i>
<i>PHP transaction count</i>	<i>0.31</i>	<i>0.38</i>	<i>0.45</i>	<i>0.48</i>	<i>0.48</i>
PCD/FINTRACS ³⁾	2,273,835.20	1,923,991.53	287,791.46	948,958.60	659,423.90

¹⁾ Volume of clearing items.²⁾ Interbank call loan transactions (IBCL).³⁾ Philippine Stock Market transactions (number of shares).

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
					PHP millions
PCHC ¹⁾	572,244.10	751,740.10	769,902.80	812,801.20	773,289.10
MIPS 2 ^{2,3)}	1,574.23	1,651.01	1,776.68	3,630.16	3,421.34
PDDTS	1,009.22	2,580.37	2,096.51	4,138.66	24,107.69
<i>USD transactions</i>	<i>297.43</i>	<i>351.04</i>	<i>351.04</i>	<i>347.07</i>	<i>359.08</i>
<i>PHP transactions³⁾</i>	<i>18.66</i>	<i>65.70</i>	<i>65.70</i>	<i>147.74</i>	<i>1,052.63</i>
PCD/FINTRACS ⁴⁾	668,866.40	586,172.68	408,679.40	780,963.50	357,659.90

¹⁾ Value of clearing items.²⁾ IBCL.³⁾ PHP billions.⁴⁾ Philippine Stock Market transactions (value).

Table 7

Indicators of use of various cashless payment instruments: volume of transactions

	1996	1997	1998	1999	2000
	millions				
Cheques	111.98	116.71	112.84	116.21	117.59
Payments by debit card (retail)	nav.	nav.	nav.	nav.	nav.
Payments by credit card (retail)	nav.	nav.	nav.	nav.	nav.
Credit transfers (retail)	nav.	nav.	nav.	nav.	nav.
Direct debits (retail)	nav.	nav.	nav.	nav.	nav.
Electronic money ¹⁾	nav.	nav.	nav.	nav.	3,228
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Banks started electronic money only in late 2000.

Table 8

Indicators of use of various cashless payment instruments: value of transactions

	1996	1997	1998	1999	2000
	PHP millions				
Cheques	1,009.22	2,580.37	2,096.51	4,138.66	24,107.69
Payments by debit card (retail)	nav.	nav.	nav.	nav.	nav.
Payments by credit card (retail)	nav.	nav.	25,931.52	30,404.35	33,614.77
Credit transfers (retail)	nav.	nav.	nav.	nav.	nav.
Direct debits (retail)	nav.	nav.	nav.	nav.	nav.
Electronic money ¹⁾	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Banks started electronic money only in late 2000.

Table 9

Payment instructions handled by securities settlement systems: volume of transactions

	1996	1997	1998	1999	2000
ROSS	nav.	nav.	nav.	nav.	nav.

Table 10

Payment instructions handled by securities settlement systems: value of transactions

	1996	1997	1998	1999	2000
	PHP millions				
ROSS ¹⁾	nav.	612,574.22	2,016,077.79	3,427,541.38	3,773,674.96

¹⁾ System started only in 1997. Include primary and secondary trades.

Table 11

Number of participants in securities settlement system

	1996	1997	1998	1999	2000
ROSS ¹⁾	nav.	260	327	365	346

¹⁾ System started only in 1997.

PAYMENT SYSTEMS IN SINGAPORE

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List of abbreviations
Singapore Terms & Terminology

ABS	Association of Banks in Singapore. Refer to Section 1.4.2
ACENET	Refer to Section 3.2.4
ACH	Automated Clearing House. Refer to Section 1.2.2
BCCS	Board of Commissioners of Currency, Singapore. Refer to Section 1.1
BCS	Banking Computer Services Pte Ltd. Refer to Section 1.2.2
CA	Certification Authorities. Refer to Section 1.4.5
Cashcard	A multi-purpose stored value card (also known as e-money) for making small-value retail payments. Refer to Section 2.2.3.3
CCA	Controller of Certification Authorities. Refer to Section 1.4.5
CDP	Central Depository (Pte) Limited. Refer to Section 4.2.1
CTS	Cheque Truncation System. Refer to Section 3.4.1
DCSS	Debt Securities Clearing & Settlement System. Refer to Section 4.2.2
DvP	Delivery versus Payment. Refer to Section 4.2.2
ECS	Electronic Clearing System. Refer to Sections 3.2.1
EGIRO	Refer to Section 3.2.3
EPC	Electronic Payments Committee. Refer to Section 1.4.3
EPTC	Electronic Payments Technical Committee. Refer to Section 1.4.4
FOP	Free of Payment. Refer to Section 4.2.2
IBG	Interbank GIRO. Refer to Section 3.2.3
IDAS	Institutional Delivery Affirmation System. Refer to Section 4.3.3
IFT	Interbank Funds Transfer. Refer to Section 3.3.2
IOB	Internet Only Banks. Refer to Section 1.2.1
MAS	Monetary Authority of Singapore. Refer to Section 1.1
MCB	Minimum Cash Balances. Refer to Section 3.3
MEPS	MAS Electronic Payment System. Refer to Section 1.3.2
MICR	Magnetic Ink Character Recognition. Refer to Section 3.2.1
MLA	Minimum Liquid Asset. Refer to Section 3.3.1
NETS	Network for Electronic Transfers Singapore Pte Ltd. Refer to Sections 1.2.4
QFB	Qualifying Full Bank. Refer to Section 1.2.1
QOB	Qualifying Offshore Bank. Refer to Section 1.2.1
SCHA	Singapore Clearing House Association. Refer to Section 1.1 & 1.4.1
SGDCCS	Singapore Dollar Cheque Clearing System. Refer to Section 3.2.1
SGS	Singapore Government Securities. Refer to Section 1.3.3
SGX	Singapore Exchange. Refer to Section 4.2.2
S.W.I.F.T.	Society for Worldwide Interbank Financial Telecommunications. Refer to Section 1.2.5
USDCCS	United States Dollar Cheque Clearing System. Refer to Section 3.2.2

Overview

A payment system comprises the cultural, political, legal, economic and business practices and arrangements used within a market economy to determine, store and exchange value or ownership of goods and services. In its simplest form, a payment either stems from a trade between buyers and sellers in a market, or from a financial obligation.

Modern payment systems in a market economy can be modeled in three major segments. First, the instruments used to deliver payments, then, second, the clearing and settlement process involved in a payment transaction, and finally the actual transfer of funds between institutions.

Singapore's payment systems have evolved over the years, driven by technological progress, changing consumer needs and development of new financial activities. It has changed from one that was based essentially on paper and cash transactions to one today that has a diverse range of cashless payment instruments, as well as efficient and reliable clearing and settlement systems.

In Singapore, the common methods of making retail payments besides using currency include cheques, interbank GIRO debit and credit transfers as well as payment cards, which includes stored-value, debit and credit cards. Banks' customers can also use their debit cards to make third-party account funds transfers and to make bill payments to selected commercial and government entities via the ATMs. More recently, banks' customers have been able to make bill payments and third party funds transfers through their telephone, mobile and internet banking services.

MAS operates a real-time gross settlement (RTGS) system, MAS Electronic Payment System (MEPS), for large-value SGD interbank fund transfers and the settlement of scrippless Singapore Government Securities (SGS).

1 Institutional aspects

1.1 Legal and regulatory framework

1.1.1 Payment instruments and systems

A number of laws and bye-laws have a bearing on payment instruments and institutions in Singapore.

Cheques and GIRO transactions which are cleared through the Automated Clearing House are regulated by the following laws and bye-laws:

- *Section 59 of Banking Act* allows the Monetary Authority of Singapore (MAS), in conjunction with banks and institutions, to establish a Clearing House to facilitate the clearing of cheques and other credit instruments, and ensure its smooth operation.
- *Banking (Clearing House) Regulations, Cap.19, Regulation 1*, a subsidiary legislation administered by MAS sets the framework with respect to clearing with the Automated Clearing House.
- *The Bills of Exchange Act* governs how cheques are drawn, accepted and paid.
- *The Bye-Laws of the Singapore Clearing House Association (SCHA)* state the rules and regulations for participation in the clearing of cheques and GIRO.

Section 77A of the Banking Act states that only banks authorized by MAS can issue stored value instruments that have multiple payment capabilities.

Section 59A of the Banking Act makes provision for MAS to establish and operate one or more Real Time Gross Settlement (RTGS) systems. MAS is responsible for the smooth operation of the RTGS system and ensures that participants comply with the rules and regulations.

The *Currency Act (Chapter 69)* establishes the Board of Commissioners of Currency, Singapore (BCCS) in 1967. The Act conferred on the BCCS the sole right to issue currencies in Singapore. A notable provision of the Act is that the Singapore Dollar must be 100% backed by external assets. This is achieved through the maintenance of a currency fund consisting of foreign currencies, demand and time deposits, Treasury bills and securities, and gold.

With the increasing trend of electronic transactions, digital signatures are becoming more important, both for identification purposes and to serve as an alternative to hand-written signatures. Digital signatures are also useful in preventing unauthorized alteration to the contents of electronic documents. On July 10, 1998, the *Electronic Transactions Act*, was enacted to provide for the legal recognition of digital signatures, and establish the framework to facilitate electronic commerce transactions in Singapore.

1.1.2 Securities settlement

The Central Depository (Pte) Ltd (CDP), a wholly-owned subsidiary of the Singapore Exchange (SGX), operates the securities clearing and settlement systems for equities traded on Singapore Exchange Securities Trading Ltd (SGX-ST) and corporate debt securities. SGX is presently authorized by MAS under the *Exchanges (Demutualization and Merger) Act* and SGX-ST, under the *Securities Industry Act*. MAS supervises CDP through its regulatory oversight of both SGX and SGX-ST, to ensure orderly and sound clearing and settlement systems.

CDP will be directly authorized as a clearing house under the *Securities and Futures Act (SFA)*, which is expected to come fully into effect from April 2002. The supervisory regime over clearing houses will come under the SFA, under which MAS will have explicit powers to issue directions to and make regulations for clearing houses.

MAS is the fiscal agent of the Singapore Government. The MAS is empowered by the *Development Loan Act* and the *Government Securities Act* to undertake the issue and management of Singapore Government Securities (SGS) on behalf of the Government. MAS also operates the securities clearing and settlement systems for SGS and ensures that participants comply with the rules and practices of the SGS market.

1.2 Institutions

1.2.1 Banks

Singapore's payment landscape is predominantly the domain of banks.

Commercial banks in Singapore are allowed to engage in a wide range of financial services. These include traditional banking services such as loans and deposits, and investment

banking like underwriting and distribution of equity and debt securities, corporate finance, funds management and unit trust management. As at end December 2000, there were 134 commercial banks in Singapore, eight of which were locally-incorporated.

Commercial banks are licensed under the *Banking Act* (Chapter 19). Their activities are also governed by MAS' Notices to Banks and guidelines issued from time to time. There are three categories of commercial banks in Singapore: Full banks, Wholesale banks, and Offshore banks.

Banks are currently the only institutions able to process across all segments of the payment process chain (acquisition, processing, clearing and settlement). However, new payments service providers are expected to play a greater role in the coming years.

Full banks

Full banks are authorized to transact the whole range of banking business, both personal and corporate. These include the operation of current, savings and fixed deposit accounts, financing of exports and imports, transfer of funds, commercial letters of credit, trust receipts, travelers cheques and currencies. Full-licensed banks may also provide advice on trade and investment, foreign exchange regulations, and may furnish credit reports and trade information.

Most full-licensed banks provide the full range of retail payment services such as cheque services, funds transfers, issuance of credit and debit cards, and ATM services. As at end December 2000, there were 31 full-licensed banks, eight of which were locally incorporated banks and the remaining branches of foreign banks. Foreign full banks face some restrictions on the setting up of branches and offsite ATMs. Currently only local banks can provide EFTPOS services (see 3.2.5).

Wholesale banks

Formerly known as Restricted banks, Wholesale banks may engage in the whole range of banking activities afforded to a full-licensed bank except that they may not:

- 1) Accept Singapore dollar fixed deposits of less than SGD250,000 per deposit from non-bank customers.
- 2) Pay interest on Singapore dollar current accounts operated by resident individuals.

As at end December 2000, there were 20 Restricted banks in Singapore, all of which were branches of foreign banks.

Offshore banks

The category of Offshore banks was introduced in 1973 with the aim of improving the scope of activity in the Asian Dollar Market. Offshore banks enjoy similar opportunities as Full and Wholesale banks for businesses in the offshore market, but their scope of business in the Singapore dollar retail market is limited.

In addition to the conditions imposed on Wholesale banks, offshore banks also can not:

- 1) Accept interest bearing Singapore dollar deposits from resident non-bank customers other than approved financial institutions.

- 2) Extend total credit facilities in Singapore dollars exceeding SGD500 million to non-bank customers who are residents of Singapore. Qualifying Offshore banks can offer credit facilities of up to SGD1 billion.

As at end December 2000, there were 83 Offshore banks in Singapore, all of which were branches of foreign banks.

Banking liberalization program

In May 1999, MAS announced a five-year program to liberalize commercial banking in Singapore. This was aimed at promoting a more open and competitive environment and to spur the development and upgrading of local banks.

MAS has granted Qualifying Full bank (QFB) privileges to four foreign banks, Wholesale banking licenses to eight offshore banks and Qualifying Offshore bank (QOB) status to eight Offshore banks. In addition to the normal privileges accorded to a foreign full bank, the QFB privileges allow the banks, inter alia, additional branches and ATMs.

In June 2001, MAS further announced that it would award another two banks QFB status and grant all QFBs enhanced privileges in branching and establishing offsite ATMs¹. In addition, from July 1, 2002, QFBs will be allowed to provide debit services on an EFTPOS services. Restricted and offshore banking licenses (including QOB) will be consolidated into a new wholesale banking license. Wholesale banks will be able to engage in all activities of the restricted banks. For a start, all current restricted banks are renamed wholesale banks and MAS will further handout another 20 wholesale banking licenses within the next 2 years, with priority accorded to existing QOBs.

(More information on the banking liberalization program, including how new licenses are granted, can be found in MAS website at www.mas.gov.sg.)

Internet only banks (IOB)

MAS issued a policy statement on Internet Banking in July 2000. MAS is prepared to grant new banking licenses for Singapore-incorporated banking groups to set up separate banking subsidiaries (including joint venture entities) to pursue new business models, including internet-only banking, outside their existing banking entities. There is currently one bank operating under the IOB business model.

1.2.2 Automated Clearing House (ACH)

The Singapore Automated Clearing House (ACH) operates the Singapore Dollar Cheque Clearing System, the United States Dollar Cheque Clearing System, and the Interbank GIRO System. The operations of the ACH are contracted to the Banking Computer Services Pte Ltd (BCS).

¹ With the second phase of banking liberalization, each QFB is permitted to establish up to 15 locations, of which up to 10 can be branches. The 15 locations can include both branches and off-site ATMs. The sub-limit of 10 branches can include branches and limited-purpose branches.

1.2.3 Credit / charge card operators

The main credit card operators in Singapore are VISA and MasterCard, while American Express and Diners Club are the main charge card operators. These operators provide the international network linkages between the merchant and the card issuing banks and clear their cards' transactions among participating banks. The card operators switch the transaction to the card issuers, who check the credit limit and verify the authenticity of the transaction.

1.2.4 Network for Electronic Transfers (Singapore) Pte Ltd (NETS)

NETS is a nation-wide electronic payment platform, formed in 1985 by a consortium of local banks – the Development Bank of Singapore (DBS), POSBank (POSB)², Oversea-Chinese Banking Corporation (OCBC), Overseas Union Bank (OUB) and United Overseas Bank (UOB). Tat Lee Bank and Keppel Bank joined NETS in 1990 and 1992 respectively³. NETS aims to establish infrastructure, systems and services to facilitate electronic banking services and financial payments. The company commenced operations by offering a nation-wide Electronic Funds Transfer at Point Of Sale (EFTPOS) network, an online debit payment service.

Over the years, NETS has evolved to a multi-service organization, providing a comprehensive range of electronic payment services such as EFTPOS, CashBack, Shared ATM service, CashCard, SET Payment Gateway, NETSCash and Trade Finance service etc.

1.2.5 SWIFT

The Society for Worldwide Interbank Financial Telecommunications (SWIFT) was founded by 239 banks from 15 countries in 1973, with the purpose of providing technology-based communication services across all financial markets through member banks. Today, S.W.I.F.T. provides secure global communication to more than 7,200 financial institutions in 192 countries. The services provided include interfaces, store-and-forward messaging, interactive messaging, file transfers and message routing.

SWIFT was introduced in Singapore in 1979, and by 1983 fifty banks were connected to the network. As at end of December 2000, there were 179 domestic institutional users, of which nine were locally incorporated institutions participating as full members. The remaining domestic institutional users were sub-members and participants, consisting of foreign commercial banks, investment advisors, securities houses and other financial institutions.

1.2.6 Central Depository Pte Ltd (CDP)

Established in 1987, the Central Depository (Pte) Ltd (CDP), a wholly-owned subsidiary of the Singapore Exchange (SGX), operates the securities clearing and settlement systems for equities and corporate debt securities. CDP clears and settles trades in equities listed on a related entity, SGX Securities Trading (SGX-ST), which is also a wholly-owned subsidiary of SGX. CDP acts as the central counterparty for the clearing and settlement of these equities trades. At the same time, CDP provides a clearing and settlement facility for corporate debt securities, but does not function as a central counterparty for this purpose.

² POSB was acquired by DBS in 1998.

³ Keppel Bank and Tat Lee Bank merged in 1999.

Settlement of all SGX-ST traded equities and corporate debt securities is conducted by CDP via a book-entry settlement system.

1.3 The role of other private and public sector bodies

1.3.1 Singapore Clearing House Association (SCHA)

The SCHA is an association formed in December 1980 to establish, manage and administer clearing services and facilities for cheques and debit and credit items of its members. It comprises MAS and the commercial banks in Singapore that wish to become members. As at end of December 2000, SCHA had 48 ordinary members and 87 associate members. The SCHA also establishes the rules on the rights and responsibilities of participating banks as well as the service providers for the various clearing systems.

The SCHA is responsible for the Singapore Automated Clearing House (ACH), which runs the Singapore Dollar Cheque Clearing System, the United States Dollar Cheque Clearing System and the Interbank GIRO System.

1.3.2 Association of Banks in Singapore (ABS)

The ABS is made up of member banks drawn from a wide spectrum of banking entities licensed by MAS. It represents the interests of its members, sets minimum standards of good practice for these members and supports projects that are mutually beneficial.

The ABS also holds regular discussions with MAS regarding industry issues and the promotion of a sound financial system in Singapore. The ABS provides input for legislation and guidelines relating to the industry, including issues on payment and settlement systems.

1.3.3 Electronic Payments Technical Committee (EPTC)

EPTC is an industry-based group established by the Information Technology Standards Committee (ITSC) under the auspices of the Singapore Productivity and Standards Board and the Infocomm Development Authority of Singapore.

Its mission is to identify, review and propose standards for adoption in Singapore in the following areas:

- Electronic bill presentment and payment systems/services
- ePayment infrastructure, systems and services
- Electronic-commerce
- Mobile-commerce
- Public Key Identification/Certification Authority infrastructure, interoperability and connectivity

Member organizations participate in various projects to recommend standards. When standards are established, EPTC will also hold roadshows and workshops to promote the standards to the industry.

As at December 2000, EPTC had over 35 member organizations from the financial sector, including MAS, most major banks, credit card companies, e-commerce systems vendors and payment services firms.

1.3.4 Controller of Certification Authorities (CCA)

As specified under the Electronic Transaction Act, the CCA oversees the activities of certification authorities (CA), by licensing, certifying, monitoring developments and using other controls.

The licensing scheme for CA is voluntary. It promotes high integrity CAs that can be trusted. A licensed CA enjoys the benefits of evidentiary presumption for its digital signatures. A CA wishing to get a license would need to meet stringent licensing criteria in various aspects, including financial soundness, personnel integrity, strict security controls and procedures. The licensing criteria are stipulated in the *Electronic Transactions Act 1998*, *Electronic Transactions (Certification Authorities) Regulations 1999* and the *Security Guidelines for Certification Authorities*.

The CCA is subsumed under the Infocomm Development Authority of Singapore.

2 Payment methods

2.1 Cash

Like most countries, currency remains the most accepted means of payment medium for small value transactions in Singapore.

BCCS has the sole right to issue currency and coins in Singapore.

Notes in circulation are denominated in SGD1, SGD2, SGD5, SGD10, SGD20, SGD50, SGD100, SGD500, SGD1,000, SGD5,000 and SGD10,000. Coins are issued in denominations of SGD0.01, SGD0.05, SGD0.10, SGD0.20, SGD0.50 and SGD1.00. SGD0.01 coins ceased to be issued in 2002, although they remain legal tender.

Singapore dollars in circulation are fully backed by a basket of external assets that include gold and other foreign currencies.

2.2 Non-cash payments

2.2.1 Cheques

Cheques are commonly used in Singapore by consumers for bills and small value payments and among businesses for regular payments such as purchases of goods and services.

The number of cheques cleared by the Automated Clearing House increased by more than 70% from 1989 to 1999. This can be attributed to the increased economic activity in Singapore in that period.

In 2000, the Automated Clearing House (ACH) processed 91 million cheques with a total value of SGD453 billion.

2.2.2 GIRO

The Interbank GIRO (IBG) system was launched in April 1984. It is an offline interbank payment system catering for mainly low value bulk payments. IBG allows a customer of a participating bank to transfer funds, through direct debits or credits, to or from the accounts of customers of any other participating bank. The IBG can be broadly separated into two classes according to the type of transfers: Direct Debit Transfers and Direct Credit Transfers.

Direct debit transfers

In debit transfers, the payee instructs his bank to collect payment from the paying party, often on a recurring basis. Direct Debit payments are pre-authorized by the paying customer, who gives permission to his bank to debit his account upon receipt of instructions initiated by the specified originator. Examples of such pre-authorized recurring payments include utility bill payments or payments for telecommunication services.

Direct credit transfers

In credit transfers, the payer instructs his bank to debit his account and transfer the fund to the payee. In Singapore, most credit transfers are standing order arrangements made by the originator with their bank. The bank then carries out the necessary transfers on a regular specific date, to a specific receiver and for a specific amount. Payroll crediting is the most common direct credit transfer.

Some banks have recently offered direct crediting services to their individual customers, mainly through Internet banking and ATMs. These individual instructions are processed together with the bulk credit instructions for that day.

The number of IBG transactions processed in 2000 was 30 million, with a value of SGD72 billion.

2.2.3 Payment cards

Credit cards

All major credit cards are offered in Singapore. The issuance of credit cards is subject to MAS guidelines and regulations. MAS issues guidelines and regulations on credit card related issues such as the eligibility criteria of card applicants and marketing of credit cards.

Total credit card transactions amount to SGD10.5 billion in year 2000.

Debit cards

Debit cards are broadly categorized into two groups: PIN-based debit cards and signature-based debit cards.

PIN-based debit cards allow cardholders to make payments or withdraw cash from their deposit accounts through an Automatic Teller Machine (ATM) or an Electronic Funds Transfer at Point of Sale terminal (EFTPOS). The payment or cash withdrawal is effected through an on-line transfer of funds from the cardholder's account. (*Please see section 2.2.4 and 2.2.5 for more information on ATMS and EFTPOS.*)

VISA Electron card and the Debit MasterCard are examples of signature-based debit cards in Singapore.

Stored Value Cards

Stored Value Cards (also known as e-money) in Singapore are categorized into Single Purpose Stored Value Cards (SPSVC) and Multi-Purpose Stored Value Cards (MPSVC). Examples of SPSVCs are prepaid phone cards that can only be used to pay for goods and services offered by the issuer. In contrast, a MPSVC allows cardholders to pay for goods and services offered by the issuer as well as merchants or organizations other than the MPSVC issuer.

CashCard is a MPSVC which was launched in November 1996 and it is jointly issued by the 3 local banks⁴. CashCard offers consumers a cashless payment option at a variety of retail outlets, car parks, and vending machines, as well as payment of toll charges at Electronic Road Pricing gantries and the checkpoints between Singapore and Malaysia. In addition, the CashCard can also be used for online purchases with the use of a card reader. The CashCard can be re-used by topping up its value to a maximum of SGD500 at ATMs, selected EFTPOS terminals, automated kiosks⁵ provided by NETS as well as some mobile phones and over the Internet.

Over the years, CashCard has gained increasing acceptance in Singapore. In 2000, the number of CashCard transactions was 100 million with a total value of SGD174 million.

With the incorporation of Visa's stored value mark, Visa Cash, and the adoption of the open Common Electronic Purse Specifications (CEPS), CashCard holders will also be able to transact overseas in the near future.

2.2.4 Automated Teller Machines (ATM)

Automated Teller Machines (ATM) are one of the channels that allow banks' customers to perform routine banking transactions without having to visit a bank branch. The first ATM in Singapore was installed in 1979 by Chartered Bank. Since then, many banks have followed suit, installing their own models of ATMs. Some of the local banks share a common ATM network. MAS limits the number of ATMs owned by foreign banks.

Since their introduction, ATMs have played a major role in promoting a cashless society and in bringing greater convenience to customers. ATMs allow consumers greater ease in making deposits to and withdrawals from their bank accounts. In addition, ATMs also provide other services such as shares applications, third party funds transfers, and bill payments.

As at December 2000, there were 1,787 ATMs in Singapore, representing a penetration rate of about 445 ATMs per million inhabitants.

⁴ The Development Bank of Singapore, Oversea-Chinese Banking Corporation Ltd and United Overseas Bank.

⁵ These automated kiosks include CashCard Automated Machines, NETS Kiosks and CashCard Service Terminals.

2.2.5 Electronic Funds Transfer at Point of Sale (EFTPOS)

The development of Singapore as a cashless society was boosted by the introduction of the EFTPOS service in 1986 by NETS. EFTPOS is a debit card system allowing an ATM cardholder to use his ATM card to pay a merchant for the purchase of goods and services through an on-line transfer of funds from his account.

By year-end 2000, 20,000 EFTPOS terminals were available island-wide at over 12,000 retail outlets including major supermarkets, department stores, petrol stations, government departments and a large number of smaller merchants. In 2000, there were 77 million transactions worth SGD4.8 billion.

The CashBack service was introduced in March 2001 to allow consumers to withdraw cash at selected retail stores through EFTPOS terminals. This service is currently provided free to the ATM cardholders of the five local banks.

2.2.6 Other access channels for banking and payments

Telephone banking

Since the introduction of phone banking in 1982, the range of phone banking services offered has increased. Besides being able to transfer funds and conduct account balance enquiries over the telephone, bank customers can also make bill payments, trade in stocks, and bid for Certificates of Entitlement (COE)⁶.

Mobile banking

More recently, bank customers are able to conduct banking transactions through the display screen features of mobile phones. In addition, they can also pay for some online purchases using their mobile phone instead of providing their credit card details over the Internet. One payment method involves the payer pre-registering their credit card account details with their mobile payment service provider. The payer can then make payments using an ID and PIN as authentication and the payment is processed as a traditional credit card transaction. Another method is one that allows the mobile payment to be reflected as another item in the payer's phone bill.

Internet banking

Internet banking allows consumers to conduct account balance enquiries, fixed deposit placements, demand draft applications and loan applications. In addition, payment services such as funds transfers (including transfers to third parties' accounts with other banks) and bill payments are increasingly available via the Internet.

A number of banks have also launched Internet payment services that enable consumers to pay for their Internet purchases by directly debiting their bank accounts using their normal Internet Banking systems.

⁶ To own a vehicle in Singapore, a COE is required. COEs are awarded based on monthly bidding.

3 Interbank settlement systems

3.1 General overview

The major payment and clearing functions in Singapore are provided by three main organizations.

- a) The Singapore Clearing House Association (SCHA) provides three payments clearing and settlement systems for its member banks. They are the:
 - Singapore Dollar Cheque Clearing System;
 - United States Dollar Cheque Clearing System; and
 - Interbank GIRO System.
- b) NETS manages the clearing process for the local retail payment systems such as the local banks' ATM networks, EFTPOS and CashCard networks.
- c) MAS operates the settlement system for large-value interbank fund transfers, i.e. the MAS Electronic Payment System (MEPS).

The clearing systems provided by the SCHA are operated by the Automated Clearing House (ACH). Obligations arising out of the Singapore Dollar Cheque Clearing System and the Interbank GIRO System are settled across banks' current accounts held at MAS. There is a direct interface between the ACH and MEPS to facilitate daily multilateral net settlement of these payment obligations on a deferred same day basis.

Obligations arising out of the United States Dollar Cheque Clearing System are settled across participants' accounts held with Citibank, the settlement agent. At a stipulated time each working day, the settlement obligations for each participant are sent to Citibank.

Obligations arising out of the systems managed by NETS are settled across participants accounts held with Development Bank of Singapore Ltd (DBS), the settlement bank. NETS advises the multilateral net obligations to DBS for settlement on a deferred basis. For ATM and EFTPOS transactions this will be on a same day basis, however for Cashcard transactions, settlement may occur the next day.

Large-value electronic payments are settled within MEPS. Payment obligations that arise from trading in Singapore Government Securities and in other SGD denominated corporate debt are settled on a Delivery-versus-Payment (DvP) basis via interfaces to the interbank funds transfer system in MEPS (see section 4.2).

3.2 Interbank systems for retail transactions

3.2.1 Singapore Dollar Cheque Clearing System

The current operator for the Singapore Dollar Cheque Clearing System (SGDCCS) is Banking Computer Services Pte Ltd (BCS). Direct participation in the SGDCCS is only available to Ordinary members of the Singapore Clearing House Association (SCHA). Other SCHA members can participate indirectly in the SGDCCS using another participating bank as an agent bank. As at December 2000, there were 41 direct participants and 71 indirect participants in the SGDCCS.

The SGDCCS is a national cheque clearing system. It was first automated in 1982 with Magnetic Ink Character Recognition (MICR) technology. In 1992, it was further enhanced with the establishment of the Electronic Clearing System (ECS). ECS facilitates the electronic transfer of cheque MICR data from banks to the ACH for processing.

The Clearing System was further improved in 1997 when BCS launched the image clearing system. This system allows the image of the inward cheques to be captured in a CD-ROM and sent to the paying banks for verification. This process improves the efficiency of the inward cheque clearing operation. It currently takes one working day for a SGD cheque to be cleared and funds to be released to the payee.

The clearing and settlement process of a SGD cheque is as follows:

1. Payer sends a cheque to Payee.
2. The payee deposits the cheque at the Presenting Bank, which credits the payee's account provisionally ("On Hold" cheques).
3. The Presenting Bank sends MICR information (ECS data) of cheques to ACH. For banks sending ECS data, the corresponding physical cheques can be sent to ACH later in the day.
4. After clearing the cheques and determining the net settlement amount for each participating bank, ACH sends the net clearing figures to MEPS for broadcast and settlement.
5. ACH processes and sorts the ECS data and physical cheques and these are available for collection by the relevant Paying Banks that evening.
6. If the Paying Bank rejects a cheque, it will return the unpaid cheques to the Presenting Bank through the ACH by 12:00 the next day.
7. ACH will process the returned cheques and forward them to the respective Presenting Banks. The settlement amount for both Paying and Presenting Banks will be adjusted accordingly by ACH in the figure sent to MEPS that day.
8. If the cheque is cleared successfully, the Payee can withdraw the "On Hold" funds after 14:00 on the second business day.

ACH transmits the multilateral net positions of all direct and indirect participants to MEPS twice a day on weekdays and once on Saturdays. The cut-off time for transmission of ECS data to ACH for mid-day clearing is 14:30 on weekdays (there is no mid-day clearing on Saturdays). Mid-day multilateral net settlement positions are broadcast across MEPS at 15:05 and banks have until 15:45 to fund any net debit positions whereupon final settlement is effected. For end-of-day cheque clearing, there are two cut-off times for transmission of data to ACH; one for non-ECS physical cheques at 16:00 and one for ECS data at 16:45 on weekdays (12:30 and 13:15, respectively, on Saturdays). End-of-day multilateral net settlement positions are broadcast across MEPS at 17:45 (14:05 on Saturdays) and banks have until 18:15 (14:30 on Saturdays) to fund any net debit positions whereupon final settlement is effected.

A deposited cheque accrues interest from the day it is deposited. However, cheques are not considered paid until the paying bank has had time to validate the cheque and the drawer's capacity to cover it. Paying banks will only notify presenting banks on an exception basis, i.e. only if the cheque has been dishonored (*see points 6 and 7 above*). Generally, "cleared funds" are released at 14:00 the next business day.

3.2.2 USD Cheques

The US Dollar Cheque Clearing System (USDCCS) was launched in 1996 to clear and settle US dollar denominated cheques drawn on banks in Singapore. The system significantly reduced the time needed to clear a US dollar cheque from the previous two to four weeks to only three days. BCS and Citibank are the appointed clearing operator and settlement bank, respectively, for the USDCCS.

For the settlement of USD cheques, participating banks must maintain USD accounts with Citibank with minimum balances of USD 10,000.

The clearing and settlement process for USD cheques is as follows:

1. USD cheques are delivered to ACH by presenting banks.
2. At the end of the first day, ACH will generate a settlement statement to the settlement bank setting out the total credits and total debits of each of the participating banks.
3. The settlement bank then advises participating banks if there will be insufficient funds in their accounts with the settlement bank, based on a comparison of the total debit position against available funds in the participating bank's account. Participating banks are required to meet any projected shortfall.
4. ACH processes and sorts the USD cheques and these are available for collection by the relevant paying banks on the second business day. Settlement occurs on the second business day across participating banks' accounts with Citibank, however the funds are not considered "cleared funds" until the end of day three.
5. All returned unpaid USD cheques are delivered to the ACH at the latest by the morning of the third business day.
6. ACH processes the returned cheques and the relevant presenting banks collect them by noon on the third business day.
7. The customers can withdraw the proceeds after 14:00 on the third business day after their deposit.

3.2.3 Interbank GIRO (IBG)

Interbank GIRO (IBG) is a paperless system that allows a customer of a participating bank to transfer funds, through direct debits and credits, to the accounts of customers of any participating bank. In July 2001, the ACH introduced the eGIRO system, which removes the manual delivery of magnetic tapes between the banks and the ACH by using secured electronic transmission of payment data. Under eGIRO, the entire process of clearing and settlement, including processing of returned and rejected items can be straight through and automated.

The clearing and settlement process for IBG is as follows:

1. The First Party sends the payment instructions to the Originating Bank.
2. The Originating Bank checks the credit limit of the First Party (if it is a direct credit instruction) and sends the payment instructions to ACH for clearing.
3. After determining the net settlement amount for each participating bank, ACH sends the net clearing figures to MEPS for broadcast and settlement.
4. ACH forwards the payment instructions to Receiving Banks for the credit/debit of the Second Party's account.
5. If the payment instruction is rejected, the Receiving Bank will return the rejected instruction to the Originating Bank through ACH the next day. ACH will adjust the settlement amount for both banks before forwarding the rejected instruction to Originating Bank.
6. If the collection (payment) is successful, a credit (debit) statement is generated for the First Party and a debit (credit) statement for the Second Party.

There is one clearing and settlement session for IBG payment instructions on weekdays and one session on Saturdays. Participants are required to send payment instructions to ACH by 12:00 on weekdays and 9:00 on Saturdays. The ACH will send multilateral-net settlement positions to MEPS for broadcast to all banks by 15:30 on weekdays and 12:15 on Saturdays; broadcasts at these times are for information only. The figures are again broadcast at 17:45 (14:05 on Saturdays) and banks have until 18:15 (14:30 on Saturdays) to fund any net debit positions whereupon final settlement is effected.

3.2.4 ATM networks

Most banks in Singapore have proprietary ATM networks, however there are linkages between these networks providing consumers with wider access. There are currently two major ATM networks in Singapore:

- The POSB-DBS ATM network, which was established following the merger of POSB and DBS in 1998. This network is a proprietary based network; and
- The ATMNETS network, a shared ATM service among the other four local banks (United Overseas Bank, Oversea-Chinese Banking Corporation, Overseas Union Bank, Keppel-Tat Lee Bank). In November 2000, these four banks announced plans to consolidate their offsite ATMs under a new entity called ACENET. ACENET will market and manage ATM services for an integrated off-site ATM network. Its implementation is expected to lead to cost savings through economies of scale for the participating banks. It will provide operational and technical services such as ATM cash replenishment, machine maintenance, upgrade of the network as well as the development of infrastructure and other ATM related services.

For transactions using the ATMNETS network, the switching is done by NETS. When a cardholder performs a transaction at an ATM of another bank, NETS switches the transaction to the issuing bank for authorization, which involves verification of the PIN,

checking that sufficient funds are available and authentication of the transaction. The issuing bank then sends its response back via NETS which switches it to the ATM being used and the transaction is completed.

If a cardholder performs a transaction at his own bank's ATM, the transaction does not require any switching, as the issuing bank is able to directly approve the transaction.

ATMNETS transactions are cleared by NETS. NETS calculates the multilateral net settlement positions for each member bank. The net amount is then provided to DBS for direct debiting/crediting of the member banks' accounts with DBS.

Member banks then manage their Nostro accounts at DBS through MEPS.

Cirrus and Plus transactions are respectively cleared by Mastercard and Visa on a similar principle as with NETS. When currency conversions are necessary, the London interbank rate is used. Settlement for these transactions is conducted through the respective card schemes' bankers.

3.2.5 EFTPOS

NETS EFTPOS service was publicly launched in 1986. Currently, NETS owns more than 20,000 EFTPOS terminals, with approximately 9,200 merchants in over 12,000 outlets.

EFTPOS transactions acquired on NETS terminals are routed to NETS for processing. The routing arrangements will vary depending on the card type used in the transaction:

- For debit cards issued in Singapore, NETS dispatches the transaction for authorization to the issuing bank. The issuing bank verifies the PIN, checks that sufficient funds are available, verifies that the transaction is not fraudulent, debits the cardholder's account and informs the merchants of the successful transaction, who in turn delivers the goods/services to the cardholder.
- For Maestro cards and Amex and Diners charge cards, NETS routes the transaction to the card processor according to the branding. The card processor, on behalf of the issuing bank, checks the payment limit, verifies that the transaction is not fraudulent and authorizes the merchant to deliver the good/services.

Point-of-sale transactions are settled across accounts held with the NETS' settlement bank, DBS. NETS clears local debit cards and stored-value card transactions and the settlement occurs via debiting/crediting of the banks' accounts with DBS.

1. NETS first performs multilateral netting to determine a net settlement amount for each member bank.
2. The net amount is then submitted to DBS for debiting/crediting of the member banks' accounts.
3. Member banks then manage their Nostro accounts at DBS through MEPS.

3.3 Real-time gross settlement system - MAS Electronic Payment System (MEPS)

The MAS Electronic Payment System (MEPS) is a real-time gross settlement (RTGS) system developed for large-value Singapore dollar interbank funds transfers and the settlement of scrippless Singapore Government Securities (SGS). The main feature of MEPS is the real-time and irrevocable transfer of funds and SGS. The settlement of the cash leg of SGD denominated corporate and other government debt instruments can also be made through MEPS.

Banks' current accounts held with MAS are structured to facilitate RTGS payments. Within each current account, there are two sub-accounts: the Reserve Account and the RTGS Account. The banks' intra-day Minimum Cash Balances⁷ (MCB) requirement is maintained in the Reserve Account. Funds exceeding the intra-day MCB requirement in the Reserve Account are transferred at the start of the day to the RTGS Account, where they may be used for the settlement of MEPS payments. On an intra-day basis, banks may also draw down the full MCB amount in their Reserve Account to make payments.

3.3.1 Participants

All banks in Singapore are eligible to participate directly in MEPS.

However, banks with a small volume of SGD payments may choose not to participate in the system. Instead, such non-participating banks may appoint participating banks as their agents to make SGD interbank payments on their behalf. To do so, non-participating banks may enter into private agency agreements with any of the participating banks. The terms of such agreements are bilaterally negotiated between the banks, and are outside the ambit of the MEPS. MAS, however, provides some services for these non-participating banks to transfer funds and SGS out from their MAS current accounts and SGS-Minimum Liquid Assets⁸ (MLA) accounts respectively.

There were 90 participating banks in MEPS as at December 2000. The daily turnover value for MEPS averages around SGD35 billion and the average daily volume of transactions is around 7,000.

3.3.2 MEPS –Interbank Funds Transfer (MEPS-IFT)

MEPS consists of two subsystems namely, MEPS Interbank Funds Transfer (MEPS-IFT) subsystem and MEPS Singapore Government Securities – Delivery vs. Payment (MEPS-SGS) subsystem. The MEPS-SGS subsystem is described in more detail in Section 4.2.3.

Under the MEPS-IFT sub-system, interbank funds transfers are made using MEPS messages, derived from SWIFT standards. As long as the paying bank has sufficient funds in its RTGS account, its same day payment instructions will be settled instantaneously and irrevocably.

⁷ Pursuant to Section 40 of the Banking Act, all banks in Singapore are required to maintain minimum cash balances (MCB) with MAS of not less than 3% of the total liabilities.

⁸ Under Banking Act Chapter 19, as part of the MLA requirements, all banks in Singapore must hold Singapore Government Securities at least equal to 10% of total liabilities (10% SGS includes both outright holdings of SGS as well as those held under reverse repo transactions).

MEPS-IFT sub-system only processes same-day value transactions. However, the system also accepts forward-dated transactions up to two working days forward. Such forward-dated transactions will be stored in the host database and are processed on the actual value date.

3.3.3 Credit and liquidity risks and their management

To minimize settlement risk, MAS allows banks to use the full amount of their reserves on an intraday basis. MAS may, where necessary, extend intraday credit through primary dealer banks to resolve systemic payments gridlocks. The intraday credit from MAS must be collateralized with SGS. Such credit is extended at MAS' sole discretion. When deciding whether to extend the intraday credit, MAS takes into consideration various factors, including possible systemic impact on the orderly functioning of the money market and RTGS system.

An end-of-day facility is also provided to allow banks to borrow SGD funds from MAS via overnight repurchase transactions (repos) of SGS. The interest rate to be charged on the overnight repurchase transaction will be 2% above the reference rate. The reference rate is the 1-month SGD SIBOR fixed by the Association of Banks in Singapore (ABS) at 11:00 Singapore time on the same working day.

3.3.4 Management and pricing

MEPS is owned and operated by MAS. All participating banks are contractually bound to operate in compliance with the MEPS operating rules and regulations as stipulated by MAS.

Participating banks are charged on a cost recovery basis. A flat fee is charged for each message, payable by the bank initiating the MEPS message. There is no annual subscription fee or joining fee to participate in MEPS, and no additional charge for real-time current account balance enquiries.

3.3.5 Operations of MEPS

Each participating bank has a front-end system, which is linked to the central host computer at MAS. The front-end system allows a bank to perform data entry, submit payment instructions and make online account enquiries. Submitted payment instructions that are not able to settle due to insufficient funds in a bank's account will be placed in a queue with a priority assigned by the participating bank. All queued instructions will then be settled in accordance to their assigned priority levels on a first-in-first-out (FIFO) basis. The queuing mechanism has the following levels of priority:

- 1 - MAS transactions
- 2 - Cheque/Interbank GIRO (IBG) transactions
- 3 - Banks' urgent transactions
- 4 - SGS transactions
- 5 - Banks' normal transactions
- 9 - Banks' payments on hold

Participants are only able to re-prioritize payments at priority levels 3, 5 or 9. By moving these payments from one of these priority levels to another, banks can effectively determine the settlement sequence of their payments. To illustrate, a bank may not have sufficient balance to settle a priority 3 payment, but has enough to settle its other priority 5 payments.

In this case, all priority 5 payments will not settle until the priority 3 payment is settled. Alternatively, the bank may place the priority 3 payment on hold with a priority 9, allowing its priority 5 payments to be settled first.

The operating hours of the MEPS-IFT sub-system are between 9:00 to 18:30 on Mondays to Fridays, and between 9:00 to 14:45 on Saturdays.

3.4 Special use of interbank transfer systems for international payments

3.4.1 *Traveler's cheques & personal cheques*

Full-licensed banks both offer and accept for negotiation, traveler's cheques that are denominated in major currencies. Visitors from foreign countries can visit these banks to either buy traveler's cheques, or negotiate their traveler's cheques with the banks.

Other than personal and cashier cheques that are drawn on participating banks of the ACH, all other cheques will be settled via correspondent banking.

3.4.2 *International ATM network*

Many ATM terminals are part of the Cirrus and Plus networks operated by MasterCard and VISA respectively. Overseas Credit and Debit cardholders whose cards have such affiliations are able to withdraw local currency via these ATM terminals. Similarly, the credit and debit cards issued by Singapore financial institutions carrying these signs can also be used abroad.

The operating hours of the MEPS-IFT sub-system are between 9:00 to 18:30 on Mondays to Fridays, and between 9:00 to 14:45 on Saturdays.

3.5 Main projects and policies being implemented

3.5.1 *Cheque truncation*

The Singapore Clearing House Association and the Association of Banks in Singapore are jointly developing a Cheque Truncation System targeted for implementation in September 2002. The Cheque Truncation System is a cheque clearing system where electronic images of the cheques are captured at point of deposit and transmitted throughout the entire clearing process. Physical movement of paper cheque will be reduced resulting in a more efficient cheque clearing cycle.

4 Securities settlement systems

The securities market of Singapore comprises Singapore Government Securities (SGS), corporate debts, equity securities and some related derivative products.

The two main providers of securities settlement systems in Singapore are MAS and the Central Depository (Pte) Ltd (CDP).

- a) The MEPS-SGS subsystem at MAS clears and settles SGS trades on a DVP basis.

- b) The CDP is the clearing house for the Singapore equities, corporate bond securities and derivatives markets and has the following systems for clearing and settlement of equities and corporate bond securities:
- Institutional Delivery Affirmation System (IDAS), which is used for custody and settlement of equities traded by institutional clients,
 - Debt Securities Clearing and Settlement System (DCSS) is an electronic book-entry system for the custody and settlement of Singapore dollar statutory board and corporate bonds, and
 - Clearing Operations and Risk Evaluation system (CORE) is the clearing system for all derivatives contracts.

4.1 Singapore government securities

MAS acts as the agent for the Government of Singapore in issuing SGS that comprise Treasury bills (T-bills) and Government bonds. Maturities range from 3 months to 15 years with 3-month and 1-year benchmarks for T-bills and 2-, 5-, 7-, 10- and 15-year benchmarks for bonds. Since May 2000, MAS' issuance program has aimed to build large and liquid benchmark bonds. This has been achieved through larger issuances of new SGS bonds and re-openings of existing issues, thereby enlarging the free float of SGS available for trading.

4.1.1 Trading

MAS issue T-bills and bonds on a regular basis. 3-month T-bills are issued weekly, whilst 1-year T-bills, 2-, 5-, 7-, 10- and 15-year bonds are issued according to an annual issuance calendar, which is usually announced in September for the following year. The exact size of each T-bill and bond auction is typically announced a week ahead of the scheduled auction date. Auction announcements are made via MAS' website and major local newspapers. SGS are not listed on the Singapore Exchange and trading of SGS is done on an over-the-counter (OTC) basis.

SGS primary dealers play a critical role in the growth and development of the bond market by carrying out the following functions:

- i. Provide liquidity to the SGS market by quoting two-way prices under all market conditions;
- ii. Underwrite issuance at SGS auctions;
- iii. Provide market feedback to MAS; and
- iv. Assist in the development of the SGS market.

There are 18 approved secondary dealers among banks, merchant banks and stockbroking firms. In addition, another 98 banks maintain book-entry SGS accounts with MAS for their own trading. Apart from the dealers and brokers, other market participants include finance companies, insurance companies, fund managers, corporations and individuals.

4.1.2 Pre-settlement

Trade confirmation is performed using the MEPS-SGS system. The bond seller keys in the agreed trade details into the MEPS-SGS system. The bond buyer will confirm the same trade in the system. After confirmation, trades move into the settlement phase.

4.1.3 Settlement

The MEPS-SGS system holds government bonds and facilitates the instantaneous and irrevocable transfer of SGS and is linked to the MEPS system to provide DVP for SGS transactions. Under the scripless settlement system, crediting or debiting the securities owner's account through computerised book entries will effect any transfer of securities. The users of the system can choose either DVP-based or FOP-based settlement in the MEPS-SGS system. DVP settlement of SGS transactions occurs on an electronic basis over MEPS and MAS-SGS book entry clearing system. FOP settlement of SGS involves a transfer of SGS without a corresponding funds transfer instruction.

The MEPS-SGS system opens at 9.00 daily to process SGS transactions with payments. Participating banks of MEPS need to maintain two accounts in the MEPS-SGS sub-system:

- **SGS-MLA Account**
To maintain SGS for compliance with the MLA requirements.⁹
- **SGS-Free Account**
SGS holdings in excess of the minimum MLA requirements are maintained in the SGS-Free account. SGS holdings in this account can be used for settlement.

Banks can only sell SGS in the SGS-Free account. Transfers of SGS from the SGS-MLA account to SGS-Free account can only be effected if the value of the remaining SGS in the SGS-MLA account is equal to or exceeds the prudential requirement of 10 percent of liabilities. If this prudential requirement is not met, the transfer is rejected by the system.

If the seller of SGS has insufficient SGS for delivery, the transaction is queued in MEPS until sufficient SGS are made available in the seller's SGS-Free account. When the seller's SGS-Free account has sufficient SGS, the SGS is earmarked for transfer to the buying bank and an IFT payment message is sent to MEPS.

If the buying bank has insufficient funds to pay for the SGS purchase, the payment is queued in MEPS. When the funds become available, the amount is debited from the buyer's RTGS account and credited to the seller's RTGS account. The MEPS-IFT sub-system will simultaneously notify the MEPS-SGS sub-system to transfer the securities to the purchasing bank. Settlement date convention for SGS transactions is T+1.

4.2 Corporate and statutory boards bond

4.2.1 Trading

There have been several landmark bond issues by supranationals, foreign corporates, as well as public sector statutory boards. In 2001, total Singapore dollar and non-Singapore dollar denominated debt issuance were 21.9 billion and 58.7 billion, respectively. Trading of corporate and statutory bonds is done on an OTC basis.

⁹ Please refer to footnote 8.

4.2.2 Pre-settlement

Both the securities buyer and seller input the settlement instruction, containing key details of the trade into the Debt Securities Clearing & Settlement System (DCSS). Upon matching of the settlement instructions, the seller's debt securities are earmarked and the transaction proceeds on to settlement. Matched instruction can only be revoked by the buyer.

4.2.3 Settlement

DCSS commenced operations in 1998 and is an electronic book-entry system for the custody and settlement of Singapore dollar bonds, replacing the need for physical delivery of bond certificates. Bonds transactions can be settled on a DVP or FOP basis. All exchange-listed corporate debt securities are settled on a DVP basis. Cash settlements for trades occur in MEPS. Funds are transferred via MEPS-IFT while securities are simultaneously transferred via the DCSS book-entry system on a gross trade-for-trade basis. A real time DVP arrangement is achieved through a live leased line linkage between DCSS and MEPS. On a FOP settlement basis, the transacting parties use CDP only for securities transfer and will separately arrange for funds transfer.

International central securities depositories (ICSDs) such as Euroclear and Cedel also participate in the Singapore securities market through their respective depository agents in Singapore. The ICSDs have indirect linkages with CDP through their depository agents, which facilitate clearing and settlement for international investors. Bonds can be settled on a DVP or FOP basis.

4.3 Equities

4.3.1 Trading

The Singapore Exchange (SGX), via its subsidiary Singapore Exchange Securities Trading Limited (SGX-ST), provides an electronic platform for the trading of equities. SGX-ST provides a market in a range of domestic and foreign securities that are traded on a scripless basis. As at end-March 2001, SGX-ST had 35 member companies and 47 non-member companies. Members and non-members companies are licensed as Dealers by MAS under the *Securities Industry Act*. As at end-June 2001, there were 491 companies listed on SGX, with market capitalization of SGD361 billion.

All securities certificates are deposited with CDP, a subsidiary of the SGX. Under the scripless settlement system, crediting or debiting the owner's account through computerized book entries will effect any transfer of securities. CDP operates as a central nominee and all deposited securities at the CDP are registered in its name. CDP holds the securities on the owner's behalf but it does not have any right over them.

In December 2001, SGX and the Australian Stock Exchange (ASX) established an active electronic link between the two exchanges' trading and settlement systems. The link allows investors in Singapore and Australia to co-trade selected securities in each other's market directly, through brokers in their own countries, whenever the respective markets are open.

4.3.2 Pre-settlement

The clearing process begins with trade matching, which occurs immediately upon execution of the trade in the Singapore Exchange Securities Order Processing System (SESOPS), a fully automated trading platform. Once the trade is matched, CDP, through novation, becomes a counterparty to each side of the transaction, thus guaranteeing performance to the brokers on each side of the trade.

4.3.3 Settlement

Participants of Clearing and Settlement Framework:

- **SGX Member Companies**
SGX member companies' participation in the system is compulsory.
- **Clearing Members**
Only SGX members companies are clearing members of CDP.
- **Principals**
Principals are companies approved by CDP to settle trades on a DvP basis for their clients. Participation is optional and is by application to CDP. Eligible companies are the custodian banks. To settle trades on a DvP basis, the custodian bank must have access to the clearing and settlement system to affirm trades on a DvP basis, and a settlement bank to settle payment with CDP.
- **Settlement Banks**
Settlement banks are selected by CDP to facilitate the funds settlement between CDP and the principals.
- **Clearing Bank**
The clearing bank is appointed by CDP to settle funds transfer between principals' settlement banks and CDP.
- **International Clearing Agents**
International Clearing Agents such as Euroclear and Clearstream participate through their depository agents in Singapore.

The Institutional Delivery Affirmation System (IDAS) commenced operations in 1997 and is used to settle trades on a DVP basis. Trade settlement consists of two processes: trade affirmation followed by cash settlement. CDP acts as the central counterparty to each affirmed trade and ensures the delivery of securities against payment. Under the IDAS DVP rules, custodian banks must ensure that there are shares to meet delivery obligations before affirming the sale transaction. CDP is irrevocably authorised to debit the securities from the relevant sub-accounts of the custodian bank. The system earmarks the securities to be delivered by moving them from “free” balance to “available” balance. Securities in the “free” balance can be traded by the account holder, but securities in the “available” balance cannot be used by the account holder for any transaction.

Cash settlement in IDAS is on a net basis of all the affirmed purchase and sale transactions for a settlement day. The net paying settlement banks pay to the clearing bank and the

clearing bank in turn pays the net receiving settlement banks on behalf of CDP with cash settlement finality at the end of T+3. Securities are debited from the “available” balance of the seller and credited to the “free” balance of the buyer on T+3 as well.

Risk Management

CDP’s guarantee for DVP trades is supported by undertakings and bank guarantees by the various settlement agents. A settlement agent has to make payment on behalf of its clients once a trade is affirmed. If the settlement agent is unable to make payment on the due date, its settlement bank is obliged to payment on its behalf. In the event that the settlement bank is unable to make payment to CDP, the clearing bank is obliged to make the required payment.

All equities settlements in IDAS are performed on a DVP basis. In addition, CDP has a Clearing Fund that is applied in the event a clearing member is unable to discharge its money obligations to CDP or if CDP suffers any loss as a result of liquidating a clearing member’s position. In addition, SGX maintains a Fidelity Fund to compensate any person, who suffers pecuniary loss through the defalcation of a securities market member or any of its director or employees.

4.4 Derivatives

4.4.1 Trading

The trading of derivatives products is carried out on the Singapore Exchange through its subsidiary, Singapore Exchange Derivatives Trading Limited (SGX-DT). SGX-DT provides investors in Singapore with risk-management and trading facilities, providing futures and options contracts covering interest rates, currencies, stock indices and energy. Trading is mostly done on the Exchange’s Electronic Trading System (SGX ETS). All SGX-DT members may gain direct access to SGX ETS. Corporate non-clearing members, commercial associate members and individual non-clearing members must apply through clearing members. Institutions who are not members of SGX-DT may apply for direct access through an SGX-DT clearing member.

4.4.2 Pre-settlement

SGX Derivatives Clearing (SGX-DC), a subsidiary of SGX, is responsible for clearing of derivatives products. SGX-DC assumes the role of counterparty to all executed trades. Novation occurs as soon as a trade is matched in the SGX-ETS system and transmitted to SGX-DC. As a consequence, all financial obligations arising from the transaction are guaranteed by SGX-DC.

4.4.3 Settlement

SGX-DC revalues all positions carried on clearing members’ books on a daily basis by margining and marking to the latest market prices. SGX-DC computes daily the amount, which each clearing member had made or lost on trades executed in that day and on open positions brought forward using the settlement price. Every clearing member’s margin requirements are subsequently re-computed.

At the end of each clearing cycle, credit/debit instructions are sent to SGX-DC’s settlement banks to instruct them to credit/debit clearing members’ accounts for mark-to-market

profits/losses and margin calls. Upon receiving these settlement instructions, each settlement bank is required to confirm to SGX-DC within a stipulated time via SWIFT that if they are able to carry out the instructions. Rules of the Exchange will be used to handle a situation where a settlement bank cannot provide confirmation to SGX-DC for any clearing member by the deadline.

Risk management

SGX-DC prescribes appropriate margin levels after considering the volatility of the contracts based on their historical prices and qualitative factors that may impact future volatility.

SGX-DC revalues all open positions on a daily basis (called 'Marked-to-Market (MTM)'). The main objective of carrying out MTM is to limit the exposure of SGX-DC to price changes and not allow losses to be accumulated until maturity of the futures contracts to find out that the counter-party Clearing Member is unable to meet its obligations.

4.5 The use of the securities infrastructure by the MAS

The Singapore dollar (SGD) is managed against a trade-weighted basket of currencies of Singapore's major trading partners and competitors. The MAS operates a managed-float exchange regime for the SGD. In other words, there is no official peg for the value of the currency against any other currency or basket of currencies. Instead, it is allowed to fluctuate within an undisclosed policy band. The policy band is usually reviewed every 6 months to ensure it reflects the current underlying fundamentals of the economy. Regular review of the policy band allows the MAS to continually assess the path of the exchange rate in order to avoid a misalignment in the currency value, and also gives the MAS the flexibility to accommodate short-term volatility in the financial markets.

To smooth out short-term fluctuations and to avoid misalignment of the SGD exchange rate, the MAS intervenes in the foreign exchange market from time to time. MAS usually engages in transactions that involve the sale or purchase of US dollars against the SGD. The policy band provides a certain amount of flexibility, which minimizes the need for constant intervention. However, the buying and selling of US dollars against the SGD will have an impact on the liquidity in the banking system. To manage the liquidity in the banking system, MAS also conducts money market operations to ensure there is an appropriate level of liquidity in the banking system. The money market instruments used include foreign exchange swaps or reverse swaps, direct lending to or borrowing from banks, repurchase (repos) or reverse repurchase (reverse repos) agreements in Singapore Government Securities (SGS) and direct purchase or sale of SGS.

4.6 Major projects and policies being implemented

4.6.1 Straight-Through-Processing (STP)

SGX started its STP project in January 2001 by forming an industry-working group to develop the business case report. The 'Baseline Vision' of the STP initiative includes developing common messaging standards; developing the Participant Access Module (PAM) and building the Central Pre-Matching Utility (CPM). The STP Business Case report is finalised and SGX will also be finalising the business and technical architectures.

5. Role of the central bank

The Monetary Authority of Singapore (MAS) was established as a statutory board under the Monetary Authority of Singapore Act in 1970. Its mission is to promote sustained non-inflationary economic growth, and a sound and progressive financial services sector. Except for the issuance of currency, which is entrusted to BCCS, MAS performs all the functions normally associated with a central bank.

5.1 Provision of settlement facilities

The MAS acts as a settlement agent for the banking institutions in Singapore, by allowing funds transfers to take place across the banks' settlement accounts held with the MAS. The MAS is also the operator of the MAS Electronic Payment System (MEPS), Singapore's high value RTGS system (see section 3.3).

MEPS is also designed to handle the settlement of scripless Singapore Government Securities (SGS). Participating banks hold SGS accounts with MAS, which are debited or credited with SGS when transactions are executed. Payment obligations that arise from trading in Singapore Government Securities and in other SGD denominated corporate debt may be settled on a Delivery-versus-Payment (DVP) basis via interfaces to the interbank funds transfer system in MEPS (see sections 4.2 and 4.3).

The MAS also handles government-related payments and receivables that usually take the form of funds transfers between the accounts of the government's accounts with the MAS and with the banks.

5.2 MAS role in the development and regulation of payment systems

As part of its mission to promote a sound and progressive financial services sector, MAS oversees the payment system to ensure its overall safety, efficiency and development. MAS thus puts in place or facilitates relevant policies, practices and principles used throughout payment, clearing and settlement systems in Singapore.

MAS has explicit legislative powers to establish and operate RTGS systems, oversee the management of the cheque and Interbank GIRO systems and regulate the issuance of multi-purpose stored value cards. These powers are spelt out under the various Acts and Regulations as highlighted in Section 1.1. In addition, MAS exercises oversight in other payment areas indirectly through banks. MAS has good working relationships with payment system participants and stakeholders which complements its legislative roles in the respective systems. MAS often relies on extensive industry consultation to ensure its objectives for the payment system are achieved.

MAS also has legislative powers with respect to securities clearing and settlement systems, as outlined in Section 1.1.2. MAS' oversight responsibilities and regulatory powers for securities clearing and settlement systems will be significantly enhanced with the *Securities and Futures Act*, which is expected to come fully into effect from April 2002.

5.3 Monetary policy & payment system

Singapore's monetary policy aims to promote sustained and non-inflationary growth for the Singapore economy and is centered on the exchange rate.

MAS manages the Singapore dollar against a basket of currencies of Singapore's main trading partners and competitors. The trade-weighted Singapore dollar is allowed to float within an undisclosed target band. MAS reviews the level and width of the band periodically to ensure that it is consistent with economic fundamentals and market conditions. MAS also intervenes in the foreign exchange market from time to time to ensure that movements of the Singapore dollar exchange rate are orderly and consistent with the exchange rate policy. The MAS manages the bulk of Singapore's official foreign reserves, except for foreign assets held by BCCS to back the currency in circulation.

Other monetary policy instruments include the discount rate, open market operations and reserve requirements for deposit taking institutions as provided by the Banking Act.

The ability of the MAS to implement monetary policy and effectively regulate the supply of SGD liquidity in the banking system relies on the availability of a robust and efficient technological and institutional framework, or transmission mechanism. Singapore's RTGS system, MEPS, is the interbank payment system through which MAS carries out its monetary operations, and to this extent, it is important that the system is designed and operated in such a way that does not create unanticipated or unnecessary delays or difficulties for MAS to achieve its monetary policy objectives.

Changes in specific design aspects of the payment system can give rise to implications for the conduct of monetary policy. To this extent, MAS ensures that any changes to the payment system are pursued in a coordinated and complementary manner with monetary policy implementation processes.

STATISTICAL TABLES

Singapore

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (thousands)	3,670	3,794	3,922	3,951	4,018
GDP (SGD millions)	128,201	140,228	137,464	142,111	159,042
GDP per capita	34,928	36,963	35,050	35,969	39,585
Exchange rate vis-à-vis USD:					
<i>year-end</i>	1.3998	1.6755	1.6605	1.6660	1.7315
<i>average</i>	1.4089	1.4973	1.6730	1.6975	1.7288

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	SGD millions 2000
Banknotes and coins ¹⁾	10,293	10,704	10,146	11,315	11,289
Transferable deposits ²⁾	16,747	16,807	17,093	19,794	21,973
Others	nap.	nap.	nap.	nap.	nap.
Narrow Money Supply (M1) ³⁾	27,040	27,511	27,239	31,109	33,262
<i>Memorandum items:</i>					
Broad money supply (M3) ⁴⁾	148,495	160,766	173,581	186,184	182,913
Transferable deposits in foreign currencies	759	809	485	551	563
Outstanding value on e-money schemes					
of which:					
<i>on card-based products</i> ⁵⁾	2	6	24	28	38
<i>on network-based products</i>	nap.	nap.	nap.	nap.	nap.

¹⁾ Currency in active circulation.

²⁾ Demand deposits of private non-bank customers resident in Singapore.

³⁾ Currency in active circulation and demand deposits.

⁴⁾ Summation of M1, finance companies and Post Office Savings Bank's (POSB) net deposits with non-bank financial institutions as well as total quasi money. POSB merged with the Development Bank of Singapore Limited in 1998.

⁵⁾ Outstanding NETS CashCard proceeds.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	SGD millions 2000
Transferable balances held at central bank	7,095	7,702	5,431	7,524	5,691
of which:					
<i>required reserves</i>	7,052	7,606	4,339	5,942	5,376
<i>free reserves</i>	43	96	1,092	1,582	315
Transferable balances held at other banks	nav.	nav.	nav.	nav.	nav.
<i>Memorandum item:</i>					
Institutions' borrowing from central bank	0	255	63	30	165

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (SGD billions)
Central bank	1	1	140 ¹⁾	5.69
Credit institutions	217 ²⁾	702 ²⁾	nav.	184.96 ³⁾
of which:				
<i>banks</i> ²⁾	140 ²⁾	538 ²⁾	nav.	171.32 ³⁾
<i>merchant banks</i>	63 ²⁾	63 ²⁾	nav.	nav.
<i>finance companies</i>	14 ²⁾	101 ²⁾	nav.	13.65
Postal institution	nap.	nap.	nav.	nav.
Total	218	703	nav.	nav.
of which:				
<i>virtual institutions</i>	1	nap.	nav.	nav.
Branches of foreign banks	132 ²⁾	201 ²⁾	nav.	nav.

¹⁾ Includes local and foreign banks.²⁾ As at end March 2000.³⁾ Non-bank customer deposits.

Table 5

Payment instructions handled by selected interbank funds transfer systems: volume of transactions

	1996	1997	1998	1999	2000
					millions
Singapore dollar cheque clearing system	82.50	87.52	87.34	92.18	91.26
United States dollar cheque clearing system	0.11	0.19	0.28	0.38	0.39
IBG clearing system	32.11	36.48	34.44	29.38	29.98
EFTPOS	42.39	50.86	57.90	65.74	76.93
Shared ATM	13.80	15.20	15.50	10.10	8.54
SHIFT / MEPS ¹⁾	1.54	1.80	1.88	1.87	1.91

¹⁾ MEPS replaced SHIFT in July 1998.

Table 6

Payment instructions handled by selected interbank funds transfer systems: value of transactions

	1996	1997	1998	1999	2000
					SGD billions
Singapore dollar cheque clearing system	581.08	608.44	459.24	489.28	453.22
United States dollar cheque clearing system ¹⁾	4.87	10.98	12.23	15.08	21.12
IBG clearing system	59.98	73.84	69.50	66.10	72.12
EFTPOS	2.79	3.44	3.53	4.10	4.75
Shared ATM	3.00	3.40	3.50	2.40	2.04
SHIFT / MEPS ²⁾	7,612.74	9,729.34	9,042.94	9,236.62	9,580.52

¹⁾ Aggregated figures converted at end of year exchange rate.²⁾ MEPS replaced SHIFT in July 1998.

Table 7

Indicators of the use of various cashless payment instruments: volume of transactions

	1996	1997	1998	1999	millions 2000
Instruments					
Cheques ^{1,2)}	82.61	87.71	87.62	92.56	91.65
Payments by debit card ³⁾	56.19	66.06	73.40	75.84	85.47
Payments by credit card	nav.	nav.	nav.	nav.	nav.
Credit transfers ^{1,4)}	13.55	15.08	15.65	13.89	14.60
Direct debits ^{1,5)}	20.10	23.20	20.66	17.36	17.29
Card-based electronic money	0.03	0.68	26.32	76.96	100.10
Network-based electronic money	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Interbank transactions only.

²⁾ Include both SGD and USD cheques.

³⁾ Summation of Shared ATM and EFTPOS transactions.

⁴⁾ Summation of IBG and MEPS transactions.

⁵⁾ Interbank Giro transactions.

Table 8

Indicators of the use of various cashless payment instruments: value of transactions

	1996	1997	1998	1999	SGD billions 2000
Instruments					
Cheques ^{1,2,3)}	585.95	619.42	471.47	504.36	474.33
Payments by debit card ⁴⁾	5.79	6.84	7.03	6.50	6.79
Payments by credit card ⁵⁾	6.99	7.92	7.69	8.95	10.56
Credit transfers ^{1,6)}	7,657.80	9,784.53	9,096.94	9,287.64	9,633.94
Direct debits ^{1,7)}	14.91	18.65	15.50	15.08	18.69
Card-based electronic money	neg.	0.01	0.04	0.09	0.17
Network-based electronic money	nav.	nav.	nav.	nav.	nav.
Total	8,271.44	10,437.37	9,598.67	9,822.62	10,144.49

¹⁾ Interbank transactions only.

²⁾ Include both SGD and USD cheques.

³⁾ USD cheques converted at end of year exchange rates.

⁴⁾ Summation of Shared ATM and EFTPOS transactions.

⁵⁾ Include credit and charge cards.

⁶⁾ Summation of IBG and MEPS transactions.

⁷⁾ Interbank Giro transactions.

Table 9

Transfer instructions handled by securities settlement systems: volume of transactions

	1996	1997	1998	1999	2000
SGX (millions of securities traded)	33,066	52,232	74,244	155,803	99,301
CDP (millions of securities)	33,066	52,232	74,244	155,803	99,301
DCSS	nap.	nap.	92	627	1,666
SHIFT/MEPS (millions of Government Securities) ¹⁾	0.02	0.02	0.02	0.02	0.02

¹⁾ MEPS replaced SHIFT in July 1998.

Table 10

Transfer instructions handled by securities settlement systems: value of transactions

	1996	1997	1998	1999	2000
					SGD billions
SGX	88.8	114.3	98.7	196.9	172.0
CDP	88.8	114.3	98.7	196.9	172.0
DCSS	nap.	nap.	0.2	0.9	5.0
SHIFT/MEPS ¹⁾	nav.	nav.	62.0 ²⁾	144.1	173.5

¹⁾ MEPS replaced SHIFT in July 1998.

²⁾ From July 1998 to December 1998.

Table 11

Number of participants in securities settlement systems

	1996	1997	1998	1999	2000
SGX					
Members companies	33	33	31	30	32
Stockbroking members	118	122	108	111	126
Dealers	830	867	868	1,052	1,118
Remisers	2,265	2,323	2,240	2,443	2,530
CDP					
CDP depositors (in thousands) ¹⁾	920	948	980	1,012	1,080
CDP depository agents ¹⁾	99	93	95	90	87
DCSS	nap.	nap.	53	57	63
SHIFT / MEPS ²⁾	143	152	154	142	140

¹⁾ As at end of June.

²⁾ As at end of March. MEPS replaced SHIFT in July 1998.

PAYMENT SYSTEMS IN THAILAND

Thailand

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List of abbreviations

AOM	Automatic Order Matching
ATM	Automated Teller Machine
B/C	Bill for Collection
BAHTNET	Bank of Thailand Automated High-value Transfer Network
Thai BDC	Thai Bond Dealing Centre
BOT	Bank of Thailand
CAT	Communications Authority of Thailand
DVP	Delivery Versus Payment
ECH	Electronic Clearing House
ECHFEP	Electronic Clearing House Front End Processor
ECS	Electronic Check Clearing System
EDC	Electronic Data Capture
EFT	Electronic Funds Transfer
EMS	Express Mail Service
ILF	Intraday Liquidity Facility
MAC	Message Authentication Code
MAI	Market for Alternative Investment
MICR	Magnetic Ink Character Recognition
ORFT	Online Retail Funds Transfer
PCC	Processing Center Co., Ltd.
PT	Put Through
SD	Settlement Date
CSD	Central Securities Depositories
SEC	Securities and Exchange Commission
SET	Stock Exchange of Thailand
STP	Straight Through Processing
TBA	Thai Bankers' Association
TGS	Thai Government Securities
THB	Thai Baht
TSD	Thailand Securities Depository Co., Ltd.

1. Institutional aspects

1.1 Legal and regulatory framework

There is currently no explicit legislation on payment systems in Thailand. The Bank of Thailand (BOT), however, has considered the introduction of a *Payment Systems Act* as of December 2001. Current legislation pertaining to payment systems includes the following.

The *Bank of Thailand Act* of 1942 stipulates the roles of the central bank in the payment system, including the issuing, managing, and printing of notes and bank notes; the management of the country's reserves, and the operation of the inter bank clearing system. In addition, the BOT issues regulations and guidelines for its payment services.

The *Commercial Banking Act* of 1962 empowers the BOT to directly supervise Thai commercial banks and local foreign bank branches.

The *Currency Act* of 1958 concerns currency operations such as the issuance of notes.

The Civil and Commercial Code is referred to for other financial papers that are used as a means of payment such as checks, bills of exchange, and promissory notes.

Currently, there is no specific legislation governing electronic funds transfer. Therefore, commercial banks have set guidelines and conditions of use for their clients. The Civil and Commercial Code is referred to in case of disputes arising from electronic funds transfer.

Recent legal developments include planned amendments to the *Bank of Thailand Act* empowering the BOT to regulate and support the set-up of clearing and settlement systems across financial institutions and/or payment systems. In addition, the draft *Financial Institutions Act*, currently under parliamentary review, empowers the BOT to propose a royal decree to regulate businesses that pertain to deposit taking from the public, credit extension, or other financial businesses.

1.1.1 *Payment instruments and systems*

The BOT has established regulations and guidelines specifying the rights, responsibilities, and conditions for members using central bank payment services. They include the BOT Regulation on BAHTNET of 2001 (originally of 1995), the BOT Regulation on ECS of 1996, the BOT Regulation on Media Clearing of 1997, the BOT Regulation on Interbank Settlement for Clearing Houses Operating Outside Bangkok of 1996, and as amended in 1997, the BOT Regulation on Interbank Settlement for Provincial Check Clearing in Bangkok of 1997, and the BOT Regulation on Reporting the Net Clearing Position of Interbank Provincial Check Collection in Bangkok of 1999.

The BOT has also issued operating guidelines for commercial banks to protect consumers due to the lack of an electronic fund transfer law, as earlier mentioned. They include the Commercial Bank's Guideline on Electronic Funds Transfer of 1994, the BAHTNET Funds Transfer Guideline for Commercial Bank's Customer Service of 1999, and the Media Clearing Guideline for Commercial Bank's Customer Service of 1997.

The *Electronic Transactions Act*, giving the legal recognition of electronic data messages, was enacted on December 4, 2001 and enforced on April 3, 2002. In addition, the National

Thailand

Electronics and Computer Technology Center is currently working on four related legislations. Drafts of the *Universal Access Act* and *Data Protection Act* are awaiting parliamentary review, while the planned *Computer Related Crime Act* and *Electronic Funds Transfer Act* are undergoing the drafting process.

1.1.2 Securities settlement

The BOT oversees the cash leg operations of its payment services under its rules and regulations, particularly for the Bond Registry System, the Book Entry System and BAHTNET.

The Securities and Exchange Commission (SEC) was established under the *Securities and Exchange Act* of 1992 to supervise and develop the primary and secondary markets of the country's capital market as well as financial or securities related participants and institutions. Its primary roles are to formulate policies, rules and regulations regarding the supervision, promotion, and development of securities businesses as well as other activities pertaining to the securities business. In addition, the *Securities and Exchange Act* empowers the SEC to supervise securities exchanges which include the Stock Exchange of Thailand (SET). The SET is considered as an important secondary market for trading securities which were initially issued and offered for sale to the public in the primary market.

The *Securities and Exchange Act* allows the Thailand Securities Depository Co., Ltd. (TSD), a subsidiary of the SET, to act as a clearing house to provide services for the clearing and settlement of securities traded as well as other related services. In the operation of the clearing house, the TSD complies with the rules, conditions and procedures as specified in the notification of the SEC.

1.2 Institutions

1.2.1 Providers of payment services

Commercial banks throughout the country provide paper-based payment media, such as checks and drafts, as well as non-paper-based payment services, such as electronic funds transfer (EFT) and automated teller machines (ATM), to individuals and legal entities in general.

Specialized banks, for example the Government Savings Bank, the Government Housing Bank, the Bank for Agriculture and Agricultural Cooperatives, and the Export-Import Bank of Thailand, can issue checks to their clients and provide funds transfer services to the general public.

1.2.2 Providers of securities services

The TSD was established as the only clearing house and Central Securities Depository Center (CSD) for Thai securities. The TSD's main function is to develop and promote back-office systems for the after-trade services provided for all types of equities and debt instruments in Thailand. At present, the TSD provides securities clearing and settlement, securities deposit, withdrawal, transfer and pledge, as well as securities registration for both listed and non-listed companies in the SET. Since September 8, 2000, the TSD clears and settles trades on a Delivery Versus Payment (DVP) basis with funds settled electronically through BAHTNET and the use of settlement banks instead of physical checks.

1.2.3 Other service providers

The Communications Authority of Thailand (CAT) provides payment services such as postal and money orders. Some are cash exchangeable at any post office location. Others require the payee to exchange for cash at specified locations only. They can be sent both domestically and abroad via normal post, express mail service (EMS), or telegraph. In addition, the CAT has extended its payment services to include the payment of utility bills such as for electricity, water, and telephone charges, as well as payment for annual car taxes and traffic violation penalties, and funds transfer services with a number of commercial banks. The main advantage of using postal payment services is that they provide convenient methods of payment and funds transfer to the general public, particularly those in the rural areas, as there is a post office in every district. However, post offices currently do not provide electronic funds transfer services. The CAT operates under the *Postage Act* of 1934 and the Ministry of Transport and Communication's ministerial regulation.

1.2.4 Role of other private and public sector bodies

The Thai Bankers' Association (TBA) is the collaboration of commercial banks registered in Thailand. The association's involvement with the Thai payment system concerns carrying out of the BOT policy with regards to the development of the online retail funds transfer (ORFT) system, which responds to the public needs for small-value inter bank funds transfer services. A number of institutional "Clubs" have been created under the association to seek coordination and cooperation in providing payment services to ensure that funds transfer transactions and various forms of payments between banks proceed smoothly. For example, such clubs include the Banking IT Club, the Credit Card Club, the Branch-Operation Manager Club, and the Provincial Bank Club and others. Furthermore, the TBA plays an important role as the representative of Thai banks, advising the BOT and other government agencies on the development of, and the issuance of regulations concerning, various payment and payment system innovations in order to ensure fairness to all parties concerned.

The Foreign Banks' Association is the collaboration of foreign commercial banks' branches, Bangkok International Banking Facilities, and representative offices. Its purpose is to work jointly with the BOT and the TBA on matters related to the payment system.

The Processing Center Co. Ltd. (PCC) was established with a shared investment by a number of Thai commercial banks and private companies to function as a back-up computer center for stockholders and to provide check-sorting services for a number of Thai commercial banks. Subsequently, when Thai commercial banks reached the BOT-initiated agreement to combine ATM networks into a common ATM pool, PCC's role was changed to a switching center, processing information and calculating fees incurred by banks. Moreover, when the TBA introduced the plan to develop the ORFT system, PCC was entrusted with developing the system on the existing ATM network.

2. Payment methods

2.1 Cash payment

Cash consists of notes and coins. It is the dominant payment method with notes accounting for 96% of the total cash in circulation while coins, which are minted and distributed by the Ministry of Finance, making up the remaining amount. Since cash is a basic means of

payment, it is used as an index to measure purchasing power through the money supply (M1), which includes cash and current account deposits held at commercial banks. During 1996 – 2000, currency grew at an average rate of 8.6%, accounting for 73% of the money supply (M1) at end of period average.

2.2 Non-cash payment

The number of deposit accounts with commercial banks was approximately 45 million, amounting to THB 4.9 trillion or around 90% of gross national product, as of end-2000. These deposit accounts form the basis from which customers can use account-related and non-cash payment facilities, including paper-based payments such as checks and drafts along with paperless means such as prepaid debit transfers, credit cards, ATM cards, and electronic funds transfer.

2.2.1 Paper-based payments

Paper-based payments include payment orders, checks, bill of exchange and promissory notes.

The payment order is a form of payment in which the customer orders the bank to transfer funds from one's account to a beneficiary or to another bank account via the telegraph, the post, the telephone or through wireless means.

The check is a means of payment in which the payer orders the bank to debit one's current account and credit the payee's account unconditionally. It is one of the most common forms of payments due to its convenience, unlimited order amount, and wide acceptance in business circles.

The bill of exchange is a means of payment in which the payer orders a third party to act on one's behalf to pay the payee. It is issued under designated conditions and time periods, which may be pre-determined or may totally depend on the payee.

The promissory note is a means of payment in which the issuer promises to pay a certain amount to the beneficiary when the amount is due, for example, at maturity.

2.2.2 Electronic payments

Electronic payment methods include preauthorized credit and debit transfers, BAHTNET funds transfer and other electronic banking services.

Preauthorized credit and debit transfers, introduced by commercial banks in 1987, started with the transfer of salaries from the employer's account into the employees' accounts held at the same bank. This method is also commonly known as a direct credit service. Apart from this, a direct debit service was introduced for transactions that occur on a recurring basis, namely utility bills and credit card payments. In the past, these types of services entailed funds transfers executed internally within the same bank, while cross-bank transfer services were not available. In January 1997, the BOT introduced Media Clearing as a retail funds transfer service for direct crediting and direct debiting across different banks (see section 3.2.3). Member banks, however, still currently use only credit funds transfer services.

BAHTNET is a large-value funds transfer system linking its users to the BOT current account system. It is a service designed for commercial banks and financial institutions with BOT accounts as well as for the general public who would use the third-party service to transfer funds from one's account to the beneficiary at another bank (see section 3.1.1).

Other electronic banking services take different forms such as office banking, home banking or tele-banking. Such electronic services enable customers to instantly access their account balance information and other information on an on-line basis using a telephone or a personal computer. The customer receives a password which will be used as a key to access the bank's computer system and to perform such transactions as account balance inquiry, requesting a letter of credit, funds transfer and other types of payment. In addition, many commercial banks have developed their network to allow corporate customers to perform large-value and import/exported-related transactions over the bank's network via the Internet.

2.2.3 Payment cards

Credit cards

Credit cards imply a “pay later” type of payment. Credit cards issued by commercial banks rapidly grew in popularity among consumers in Thailand. By the end of 2000, there were some 1.8 million credit cards, as compared with 1.5 million in 1997. The value of transactions totaled THB 178 billion, or about THB 14.9 billion per month on average. However, the use of credit cards abroad in 2000 amounted to THB 8.6 billion, a year-on-year increase by about 16% from the end of 1999, due to the economic condition and consumption patterns. The minimum rate for deferred payments stipulated by the BOT is a payment of 10% of the amount due or a minimum payment of THB 2,000.

Debit cards and ATM cards

Debit cards imply a “pay now” type of payment. They are used in conjunction with the cardholders' saving or current accounts. Generally, the issuer would develop ATM cards into debit cards. Examples include cards issued by Bangkok Bank, Thai Farmer's Bank, and Siam Commercial Bank. Examples of international debit cards include Maestro and Visa Electron Cards. By December 2000, there were some 20.7 million ATM cards, or nine times the amount of credit cards. The widespread acceptance of the debit card system, along with commercial bank efforts to develop their ATM cards into debit cards and to increase the number of EFTPOS service points, should contribute towards the reduction of cash usage.

Prepaid cards

Prepaid cards imply a “pay before” type of payment. They are designed to expedite transactions for low-value goods or services such as the use of public telephones, car parking, expressway, or public bus fares, which are items normally paid with coins. The most commonly used prepaid cards are telephone cards issued by the Telephone Organization of Thailand. Other prepaid cards are issued for cinema tickets and public bus fares, but their usage is still comparatively limited.

2.3 Recent developments

2.3.1 *On-line retail funds transfer*

On-line retail funds transfer (ORFT) is a funds transfer system being developed by the TBA on advice from the BOT. It would enable a customer of one commercial bank to make small-value funds transfer to the transferee at other banks on an on-line basis. ORFT would be a further development of the ATM system in which interbank retail funds transfer could be performed on an on-line basis through an interbank network using the ATM platform.

2.3.2 *Electronic commerce payments*

There is a growing trend toward greater use of electronic commerce in Thailand, with government and private sector units realizing the importance and potential of electronic commerce throughout the world. The government established the Electronic Commerce Working Group, with representatives from various public and private sector organizations, to meet and discuss policies, guidelines, and standards with regards to the technical, commercial, regulatory, and security considerations. This is to ensure that the development of electronic commerce and smart card technology continue to evolve effectively in a common direction. Currently, most of electronic commerce payments are done via credit card and intrabank funds transfer where they are applicable.

3. Interbank settlement systems

3.1 Large-value payment systems

3.1.1 *BAHTNET*

The Bank of Thailand Automated High-value Transfer Network (BAHTNET) is a large-value, on-line and real-time gross settlement (RTGS) system. BAHTNET provides finality and irrecoverable funds transfer across the accounts of member institutions held at the BOT. BAHTNET is designed as an interbank funds transfer system for commercial banks and financial institutions with BOT accounts, as well as for third party credit transfers by the general public who can use the service to transfer funds nationwide. Furthermore, it also handles current account inquiries, general messaging, message broadcast and multilateral funds transfer. BAHTNET has been re-developed to incorporate a real-time automated DVP system for Thai Government Securities (TGS), as of December 11, 2001.

Ownership

BAHTNET is owned, operated and regulated by the BOT, and governed under the BOT Regulation on BAHTNET of 2001.

Participation

BAHTNET has 59 member institutions as of December 2001, including 31 commercial banks, twelve finance and securities companies, six specialized banks, six departments in the BOT, one government organization and the TSD. 34 institutions participate as SWIFT members with their own workstations, while 25 institutions participate as non-SWIFT

members with their BOT web stations. The remaining two institutions are associated members.

Types of transactions

BAHTNET handles funds transfer and securities related transactions. Fund transfer transactions range from interbank payments, internal funds transfer and foreign exchange related transactions initiated between institutions or on behalf of their customers. At this stage, securities transactions incorporate only outright trading of government securities among participants. Additionally, participants can provide securities transfer services for their customers by directly accessing their customer accounts in the settlement agent scheme.

Operation of the system

BAHTNET operates during weekdays from 8:30-17:30, except on bank holidays. The Payment Systems Group is directly responsible for overseeing operations in close co-operation with the Information Technology Group. BAHTNET adopts the SWIFT message format and uses the SWIFT network as the main message carrier in order to meet international standards, to create the capability to support future financial development, and to facilitate connection to members' and international payment systems. However, the BOT web-based system has been internally developed to facilitate participants who may not be currently ready to utilize SWIFT. In addition, the BOT web station is also offered as a monitoring tool for all participants to perform account balance or account movement inquiries, queue management, messaging services and reporting facilities.

Settlement

BAHTNET transactions are settled across participant accounts at the BOT on a RTGS basis, and so carry no credit risk.

Risks and risk management

The BOT focuses on the elimination of liquidity risk in the system by implementing the following mechanisms:

Queuing mechanism and gridlock resolution. These are tools that have been developed to handle the queue of funds transfer instructions that are unable to be settled due to the inadequacy of funds in the sending institution's account. Payment instructions remain queued until the sender has sufficient funds to settle them. When several instructions from various institutions stand in the queue, the system will search for the group of instructions and calculate the net position of each institution. If the net balance of each related institution is a positive amount, the system will then process all the related instructions simultaneously. This would reduce the liquidity needs in the system. These mechanisms were put in place on August 11, 1997 and allow participants to manage their queues by reordering the priority of their transactions.

Intraday liquidity facilities (ILF). ILF provide participants with access to collateralized overdraft at the BOT. The facility is limited to 30% of the allocated loan window credit line, which must be collateralized by government bonds. Members are charged for using the facility, which was introduced on February 1, 1999. The BOT terminated this cap of 30% of the loan window credit line on March 10, 2000, and currently allows members unlimited collateralized use of the facility without charges during the day.

Thailand

High-value check migration. Interbank loans, interbank foreign exchange, funds transfer for non-residents, and government securities settlement have been settled through BAHTNET since March 10, 2000. Previously, these types of transactions have accounted for over 80% of check clearing transactions. This change is an important development to reduce settlement risk.

Use of credit balance. The BOT has considered allowing member banks to use the credit balance from the normal round of check clearing operations to settle any drawn ILF credit line or other funds transfer transactions in BAHTNET. This may reduce short-term interest rate fluctuations in the money market, reduce the cost burden of member banks, and reduce liquidity risk in the system. However, members must have an allocated ILF credit line above 10% of the average funds transfer value in BAHTNET in the past two weeks. Also, the BOT will treat the ILF backed-up bonds as a collateral for the use of the check clearing credit balance. Previously, the BOT did not allow for the use of the credit balance from the normal round of check clearing and held such credit balance until the return round of check clearing returned has been settled the following morning.

30-70 percent measure. The BOT requires participants in BAHTNET to send funds transfer instructions amounting to at least 30% of their daily average funds transfer value prior to 12:00 and at least 70% prior to 15:00. This condition was imposed in early-2001 and is aimed to ensure the smooth operation of the settlement process and to avoid the heavy congestion of instructions, particularly in the afternoon, and liquidity management problems.

Technical aspects

The BOT uses a V-shape message topology. A business message flow may involve several message transfers. With the V-shape topology, the BOT will always serve as one end of each message transfer, for example as the message sender or receiver. The sender and the receiver of a message transfer can use either SWIFT or the BOT web station. The BOT expects that this additional complexity can be reduced by a design that incorporates a message-oriented middleware and its appropriate adapters to transform and automatically route messages.

Pricing policies

Since the policy aims to discourage the sending of transactions through the web, transactions sent through SWIFT are granted a discount whereas transactions sent through the web are charged at a premium price. BAHTNET fees are set to encourage members to submit funds transfer instructions early in the day. There are three time zones with ascending fee rates. The first time zone operates from 8:30-12:00 (with the lowest charge), followed by the second time zone from 12:00-16:00, and finally the third time zone (with the highest charges) after 16:00.

Governance

Currently, BAHTNET is operated and monitored by the Payment Systems Group under the policy approved by Payment Systems Committee.

3.2 Small-value payment systems

3.2.1 *Electronic Check Clearing System*

Ownership

The Electronic Clearing House (ECH) was established by the BOT on July 16, 1996 to operate the Electronic Check Clearing System (ECS), to act as a center for exchanging checks between member banks, and to set regulations concerning interbank electronic check clearing. ECS relies on the electronic data read from the checks, rather than on the physical checks themselves, for purposes of calculating net clearing positions and customer account posting.

Participation

ECS members must be a commercial bank under the *Commercial Banking Act* or a specialized bank established under a specific law. As of September 30, 2001, there were 36 ECS member banks, including the BOT. This covers all member bank branches in Bangkok, Nonthaburi, Pathumthani, and Samutprakarn, as well as a number of branches in Samutsakorn, Ayutthaya, Nakornprathom, Ratchaburi, Saraburi, and Chachoengsao, totaling some 1,819 bank branches. The BOT plans to expand the scope of ECS operations to cover other provinces in the near future.

The ECS system can handle both on-line and off-line transactions of member banks. On-line members send check data to the ECH via computer and communication networks. Alternatively, off-line members deliver physical checks to the ECH, who then read the check data and input the information into the system on their behalf. At present, all ECS members are on-line members.

Types of transactions

Payment instruments that are processed through the ECS include checks, drafts, bills of exchange, and promissory notes denominated in THB. However, ECH member banks must issue these instruments or have their payments guaranteed by ECH member banks.

Operation of the system

Normal round clearing. With the ECS, customers can deposit their checks at member banks almost at any time during banking hours. Each member bank determines their own cut-off time (approximately between 13:00-14:00) within which customers depositing checks will have their accounts credited and checks will be sent for collection on the same day. Customers can draw against the deposits on the next business day.

Once on-line member banks have received customer checks, they will read and transmit the check data on the code line, encoded with Magnetic Ink Character Recognition (MICR) printing, to the ECH electronically within the time limit. Alternatively, off-line member banks send physical checks to the ECH for data capture. Both sources of check data are combined to determine the preliminary net clearing positions, which will be advised to member banks.

Thailand

The ECS extracts and sends information on high-value checks (with amounts from THB 10 million and above) to member banks for verification or rejection. Information on rejected high-value checks is removed from the new net clearing positions. Details of accepted checks are used by the paying bank to debit the paying customer accounts. The net clearing balances are settled through BAHTNET. In the evening of the same day, on-line member banks send the physical checks to the ECH for reading, sorting, and verifying against the electronic information received during the day. The physical checks are sorted by the paying banks, bank branches, and account numbers, and used for verification purposes by the paying banks. Checks sorted by banks or branches and accounts are ready for each member to pick up early the next morning.

Return round clearing. On the morning of the next business day, member banks would send information on returned checks, including reasons explaining why the checks were returned, on-line or off-line to the ECH, for return-round net clearing position calculation and settlement via BAHTNET. The information on good checks are sent to the receiving banks which release hold on their paid customers' accounts. The returned checks are physically delivered to the ECH, who distribute them to sending banks.

Settlement

The ECS calculates net clearing positions and prepares the electronic data for settlement via BAHTNET, using its multilateral funds transfer function. Member bank accounts at the BOT will be debited or credited according to their net clearing positions. Credited banks are not able to use the transferred funds for further transactions until the return round of settlement on the next day has finished.

Member banks can begin to accurately manage their funds as soon as they receive the preliminary net clearing positions (by around 15:45). If a debited bank found its BOT account balance to be insufficient for settlement, then it could borrow from another bank or from the money market. If the required amount cannot be deposited in the debited bank's BOT account within the time limit, which is 17:15, then that round of settlement is deemed void. A new net clearing position is calculated, but with all items transacting with that particular bank excluded from the new calculation. The settlement proceeds as normal for the remaining banks. The same settlement failure rule applies to the return round, except that the normal round settlement is re-calculated.

Risks and risk management

Security and risk management. As a data security measure, the system employs secret codes in data transmission. The Message Authentication Code (MAC), calculated from the incoming data for each item, is sent together with each data transmission to a paying bank. The paying bank debits its client account and prepares the return check data, which is sent back to the ECH the next day. The system checks that the MAC value on the incoming message is identical to the one sent out by the ECH. In the event that a member bank is unable to send information on-line, and has to rely on recording media, the system provides alternate secret codes.

Because check information received electronically is used to calculate net clearing positions, the system minimizes operational risk from data transmission by separating out high-value checks, which can significantly affect the net clearing positions, and allows paying banks to examine or reject them by 16:00, before daily settlement commences around 17:15. Finally,

operational procedures and contingency plans have been set up to handle emergency situations that may prohibit normal settlement procedures.

Contingency plans. The BOT has set up a backup site for the ECH at its head office (Bangkhunprom) to handle any emergency situation that should prevent the ECH from operating. The backup site can operate the entire check clearing process. In addition, the BOT has outlined operational procedures for handling varying degrees of emergency affecting member banks or the ECH itself. For example, should a member bank be unable to send check information to the ECH via a leased line, a dial-up line is used. Should an on-line operation fail, recording media can be used. And should a member bank be unable to prepare check data, the physical checks can be delivered to the ECH for processing.

Technical aspects

The ECS relies on check data sent by member banks to the ECH, who must have the necessary equipment and computers to read, receive, send, and process the data. Each on-line member bank is required to have a reader/encoder in order to be able to read the data printed on the code line of each check as well as encode the cash amount on each check with MICR ink type E-13B. These encoded checks are then sent to the ECH in the evening. Each member bank must have a centralized information system that processes information from its branches and sends it to the ECH electronically via an Electronic Clearing House Front End Processor (ECHFEP). The ECH uses a router, connected to member banks' ECHFEP machines, and a host machine, which processes check data sent by member banks to the ECH, and controls the operations of six reader/sorter machines. Each reader/sorter can read data stored in the code line at a rate of 1,700 checks per minute, sorting them according to bank branches and account numbers. The data read is verified against the information sent electronically by on-line member banks.

Pricing policies

The ECH is a non-profit operation. For ECS settlement and check sorting by banks, sending banks are charged THB 0.20 per check, while paying banks are charged THB 0.40 per check. For sorting by bank branches and account numbers, the paying bank would be charged THB 0.60 per check. Moreover, in order to account for the quality of incoming checks, the ECH would charge THB 5 for repairing each faulty check should the number of checks rejected by the reader/sorter machines exceed 3% of the check volume. At the same time, commercial banks charge their current account customers THB 2 per check, and the customers are subjected to a further THB 3 per check for a duty stamp with BOT consultation on the setting of fees charged to bank customers to ensure that the overall fee structure is appropriate.

Governance

Section 12 (16) of the Royal Decree Regulating the Affairs of the Bank of Thailand (1942) stipulates that operating an interbank clearing system constitutes a central banking responsibility, to be undertaken by the BOT. As such, the Regulation of the Bank of Thailand on the Interbank Electronic Clearing in Bangkok of 1996 was issued to ensure smooth operations of the ECS among member banks. This regulation specifies the roles and responsibilities of member banks, operational procedures and other related operations. The regulation also stipulates that the BOT should resolve any problems relating to the interpretation of the rules. Moreover, should a dispute arise concerning interbank clearing, as

per the regulation, an arbitration panel appointed by member banks and by the BOT would constitute the final arbiter.

3.2.2 Provincial Check Clearing

Ownership

The BOT and commercial banks have joint ownership of the provincial check clearing system.

Participation

Members of a provincial check clearing house consist of the BOT and commercial banks operating under the commercial banking law as well as specialized banks established under specific laws. There were 17 member banks, including the BOT, as of December 31, 2000. Once the upgrading of provincial clearing houses is completed, there would be over 3,000 branches belonging to provincial clearing houses, with a particular branch being able to join more than one clearing house.

Types of transactions

Payment instruments that are processed through the ECS include checks, drafts, bills of exchange, and promissory notes denominated in THB. However, ECH member banks must issue these instruments or have their payments guaranteed by ECH member banks.

Operation of the system

Daily operations of the one-day clearing system are across off-line computer systems developed by the BOT for purposes of supporting member banks and clearing house operations.

Normal round clearing. When a member bank branch receives checks deposited by customers, individual check information is entered into the system. The physical checks are sorted by bank, and sent to the main branch for compiling. The main branch sends the physical checks, together with the media containing check information, to the clearing house by 13:00. The clearing house then prepares a net clearing position report for each bank branch. The in-clearing data is stored on media and is distributed to member banks together with a report. The net clearing positions, combined with those from the return round, are sent to the BOT via file transfer for settlement via BAHTNET on the same working day.

Return round clearing. On the next working day, the paying bank sorts out returned checks and enters the check information, together with the reasons for returning, to the system. For remote branches, facsimiles are used in place of physical checks. The main branch compiles the returned check information and delivers the returned checks or facsimiles to the clearing house by 9:00. The clearing house then prepares a net clearing position report for each bank branch. The information on the returned checks is stored on media and distributed to banks together with a report. From there, the net clearing positions await those from the normal round for combined settlement on the same day.

The BOT has improved the provincial check clearing system in order to speed up and improve the efficiency of provincial check clearing, to reduce the cost and risk associated

with check payments, and to facilitate cash management for member banks. The improvements include the following.

Upgrading of provincial clearing houses. The provincial clearing houses were upgraded to reduce the three to seven days required to clear a check to a one-day clearing process. This entailed expanding the coverage of the clearing center to include various districts within the province and others in neighboring provinces. Originally, the system only handled the main district. Operational efficiency has been improved through the introduction of computer systems and improvements in the interbank settlement process. Operations are centralized through the BAHTNET system. The BOT, in conjunction with member banks, upgraded the check-clearing center at Phuket on September 15, 1997, and has expanded the program to other provinces, with the target of covering all 71 provinces.

Improvement of provincial B/C procedures. The provincial bill for collection (B/C) procedures (for clearing checks originating from different provincial clearing house domains) has been improved to reduce the 7-15 days previously required to within six working days. In the initial phase, the BOT has issued a BOT regulation requiring member banks to report B/C results to customers within the time limit. Subsequently, the BOT intends to reduce the time required further. The collecting bank has two alternatives for sending B/C for funds collection.

In the first method, the collecting bank sends checks to its branch that is located within the same clearing house as the paying bank. The checks then enter one-day clearing. Once the B/C results are known, the agent branch then notifies the original branch that called for collection.

In the second method, the collecting bank sends checks to the paying bank's headquarter via the ECH, who then calculates the net clearing positions for the member banks. The paying bank notifies its counterparty, the collecting bank, of the B/C results and records the information for the ECH, who then carries out interbank settlement via BAHTNET. This method is generally used when the collecting bank does not have a branch within the same clearing center as the paying bank.

Both methods are based on an agreement reached among member banks, which requires that the sending of B/C for funds collection should not exceed 15 working days. With the new BOT regulation, both methods must take no more than 6 working days. Developments to improve system efficiency and achieve one-day clearing depends on the member banks' readiness with regards to acquiring the on-line signature authentication technology necessary for bank branches throughout the country to be able to authorize checks on-line.

Settlement

For each upgraded provincial and district clearing house, the BOT has developed check settlement operations into a standardized and centralized system, which enables more effective cash management by member banks. By 15:00, clearing houses throughout the country send net clearing position information via file transfer to ECH, using encryption for data security. At the ECH in Bangkok, the information is decrypted and a net clearing position is calculated for each member bank. The BOT regional branch confirms the net clearing position with each member bank in the region. The ECH will notify member bank headquarters of their net clearing positions before 16:00, and carry out settlement through BAHTNET by 16:30. Member banks with a positive settlement balance can immediately use the funds.

Risks and risk management

The BOT has drawn up the following contingency plans. Each clearing house must procure computer, telecommunication, and electrical backup systems, and staff must be trained to be able to replace each other and operate manually. Moreover, there must be protection measures against computer viruses. Member banks are also required to secure backup machines at the main branches, which must be able to handle equipment failures at the main branches, as well as at smaller branches.

Contingency plans must be developed for each clearing house and member bank. For example, should a member bank be unable to deliver the check data to the clearing house, whether due to recording failure at the main branch or at any other branch, the main branch will report the net clearing positions against each bank in aggregate to the clearing house. Manual operations will be used in case the normal process fails to function.

In the event that a clearing house is unable to send net clearing positions to the BOT via file transfer, the facsimile is used. Should the facsimile fail, other means of communication, such as mobile telephones or radio communications are used. If no other means is available, settlement is postponed to the next day.

Technical aspects

The necessary processing equipment includes the following. For the clearing house, requirements include microcomputers with laser printers, fax modems, facsimile machines, a backup power system (UPS), and telephone lines. For member banks, requirements include microcomputers with printers.

Pricing policies

In order to reduce settlement risk in provincial check clearing, the BOT encourages the use of a centralized settlement system. The BOT charges a bank a non-profit seeking fee of THB 1,000 per bank branch per year.

Governance

The BOT Regulation on Interbank Settlement for Clearing Houses Operating Outside Bangkok of 1996, and as amended in 1997, specifies the authority, roles and responsibilities for the BOT in its capacity as the settlement service provider to member banks. The regulation also stipulates that member banks abide by the BOT notification concerning guidelines, procedures, and timeframes involved in interbank settlement, issued as per the regulation on settlement.

For B/C, the TBA has specified B/C regulations and procedures limiting B/C collection time within 15 days since 1981. In 1999, the BOT issued a regulation requiring member banks to notify B/C results to customers within six working days. When sufficient progress made six day B/C collection possible, the BOT issued a regulation requiring member banks to notify B/C results to customers within six days. This applies to both types of B/C collection.

In respect of interbank settlement for B/C operations, the BOT issued the Bank of Thailand Regulation on Settlement of Inter-Provincial Check Clearing of 1997. This specifies the authority, roles and responsibilities for the BOT in its capacity as the settlement service provider to member banks, and spells out the member bank practices with regards to

preparing B/C data of successfully collected B/C, for purposes of settlement within the specified timeframe.

3.2.3 Media Clearing

Ownership

The BOT developed an off-line retail funds transfer system, called Media Clearing, which started operations on January 16, 1997. Media Clearing is a convenient means of payment for a customer making interbank preauthorized debit and credit transactions that have large volumes and regular payment intervals. The BOT has full ownership of Media Clearing.

Participation

A member bank must be an ECH member and officially authorized by the BOT to operate in Media Clearing. As of December 2000, member banks totaled 28, including 13 Thai commercial banks, two specialized banks, and 13 foreign commercial banks.

Types of transactions

Media Clearing provides two types of funds transfer services. A credit transfer moves funds from the customer's account at one bank to another account at a different bank. This includes salary, dividend, and interest payments. A debit transfer is a pre-authorized funds transfer in which a customer has made an advanced agreement with a bank for their account to be debited according to contractual terms such as payments for insurance premium, mortgage and utility bills.

Operation of the system

The BOT urged all member banks to send funds transfer data via an online file transfer system, as compared to off-line, using web technology in December 2000. Further changes were made in February 2001 which enabled member banks to send funds transfer data from one to seven days prior to the value date. The ECH acts as a center for receiving and sorting retail funds transfer data, and calculating net balances for interbank settlement.

Media Clearing operations include the following. First, a service client prepares funds transfer or pre-authorized account debit details for a member bank. Second, a member bank sorts out and verifies in-house transactions before compiling other banks' funds transfer information for forwarding. Third, the ECH verifies the information in the funds transfer data. Where there are errors, the payment media is returned to member banks along with an error report for further correction. Funds transfer data are compiled for sorting, after which the ECH calculates and records each bank's funds transfer details, and returns them to member banks for further processing. Fourth, on receiving the funds transfer data and the preliminary net clearing positions, member banks check the stored information and post them to the customers' accounts accordingly. Unsuccessful, or returned items, are sent back to the ECH on the next working day. Fifth, when the ECH receives the returned items from member banks, it verifies the information, sort the items, and send the returned items to the transferor banks. Lastly, member banks receive information on the returned items, which are used to adjust customers' accounts and to notify them accordingly. Member banks also receive the inter bank net clearing positions, which is useful for fund management before settlement via BAHTNET on the value date.

Thailand

Settlement

The ECH calculates the net clearing position and performs settlement via BAHTNET. This includes debiting the net debtor banks' accounts and crediting the net creditor banks' accounts with the BOT based on the amounts calculated on the value date. Should a net debtor bank have insufficient funds to cover payments in its BOT account and be unable to deposit sufficient funds within the time limit, then that settlement will be deemed void. Other banks are notified and a new settlement calculation is made, excluding items involving the defaulting bank. New net clearing positions are posted to member banks, followed by further crediting or debiting according to the new calculation.

Risks and risk management

Since Media Clearing shares computer resources with the ECS, it also benefits from a backup site located at the BOT head office (Bangkhunprom). As with the ECS, programs and the most recent data are backed up at the backup site at the end of each day.

Each step involved in the sending and receiving of funds transfer data between member banks and the ECH uses file authentication data security measures so that both counter parties will be confident that the data is free from tampering during transmission. Moreover, each item processed at the ECH is protected by item authentication.

Technical aspects

Member banks use a computer to record funds transfer information in accordance with specified standards. Funds transfer data are sent to the ECH via online file transfer systems using Web Technology or through an off-line system using electronic media such as magnetic tapes or discs. The data is then processed through shared resources with the ECS.

Pricing policies

The BOT charges sending banks THB 0.60 per transaction for sorting and settlement services. Commercial bank charges customers THB 3.50 per transaction for the sending bank and THB 5.90 per transaction for the receiving bank. The BOT provides Media Clearing services to encourage the use of electronic media in place of cash or checks for making payments. This is aimed at improving the efficiency and cost effectiveness of the economic system as a whole. The pricing of services is based on creating the incentives to use the system, rather than based on a profit motive. In order to motivate member banks to send information well in advance, which would help evenly space out the ECH's workload, fees are calculated at different rates, depending on the time the information is sent. If member banks send information many days in advance, fees would be reduced accordingly.

Governance

The Bank of Thailand Regulation on the Interbank Retail Funds Transfer System (Media Clearing) of 2000 is applied to both member banks and the ECH. In accordance with the regulation, there are three additional BOT notifications on procedures, service fees, and operating hours for the interbank retail funds transfer system. The Media Clearing Guideline for Commercial Bank's Customer Services are a set of guidelines issued for member banks to follow in making funds transfer agreements with their clients to ensure consumer protection.

3.2.4 *ATM Pool*

Automated Teller Machines (ATM) is among the more popular banking services introduced by Thai commercial banks. Since its introduction, the BOT encouraged commercial banks to share ATM machines in order to minimize investment costs. In the initial phase, there were two ATM networks, namely BANKNET, led by Bangkok Bank, and SIAMNET, led by Siam Commercial Bank and Thai Farmer's Bank. In 1993, the BOT pushed commercial banks toward establishing a common ATM Pool as a single ATM network operating throughout the country. The public's acceptance of ATMs and appreciation of the convenience this offered encouraged foreign banks to join the network. At the end of 2000, there were 5,865 ATM machines nationwide, with daily transactions and values averaging approximately 1 million transactions and THB 3.5 billion, respectively.

Transactions operated on an ATM machine owned by a different bank are processed by the PCC, which acts as the switching center for the interbank ATM network. Each commercial bank calculates its own net clearing positions by 9:00 of the next working day. Bangkok Bank acts as a settlement bank, and each ATM pool member opens a current account with Bangkok Bank. Commercial banks with net debit clearing positions transfer funds to their Bangkok Bank accounts via BAHTNET by 15:30. Thereafter, Bangkok Bank settles the accounts by 17:00. Fees that commercial banks charge each other for using another bank's ATM are settled once a month by the same method, with PCC calculating the net clearing positions.

3.2.5 *EDC Network*

The Electronic Data Capture (EDC) machine is a device that a credit card issuing bank installs at a retail store. Its main function is to authorize or reject the use of credit cards by cardholders. In addition, EDC machines can be used with debit, ATM, and stored-value cards, provided a pin pad or a chip reader is added. Presently, a typical shop may have many EDC machines, each of which takes only one type of card, so that there would be, for example, one for Visa and one for MasterCard. This is due to the fact that each bank wants to maximize transactions for which they are acquiring banks. This trend results in there were approximately 90,000 EDC machines, as of late-2000, throughout the country, a rather high figure in comparison with the values of card usage. Most EDC machines are installed within major metropolitan areas.

Settlements between issuing and acquiring banks can be categorized into the two following types. First, for settlements between domestic institutions, the credit card companies, particularly MasterCard International, processes the information received from member banks and notify each institution of its net clearing positions. In Thailand, Chase Manhattan Bank is the settlement bank for every bank that offers credit card services. It debits the net paying banks' accounts and pays banks with positive net positions with cashier checks by 11:30 of each day. Settlement is considered complete once all the cashier checks are effective. Second, for settlements involving financial institutions abroad, the credit card companies process the information received from member banks and notify the net clearing positions as well as the agreed-upon currency conversion rates, with representative banks abroad acting as the settlement banks.

3.3 Major projects and policies being implemented

3.3.1 *BAHTNET*

BAHTNET will be developed and enhanced continuously in order to respond to the rapid changes in business needs and technology. Moreover, the BOT is currently studying the development of a cross-border capability of BAHTNET.

3.3.2 *ECS service expansion*

There are currently plans to extend the service area of interbank clearing of the ECS to cover other nearby provinces, as check transactions between the capital and those provinces would be reduced to one-day clearing.

3.3.3 *B/C operations development*

The BOT, together with member banks, have planned to reduce the clearing process for B/C from six to three working days. This system is planned to be implemented in Bangkok in the third quarter of 2002 and will expand to other provinces, with the target of covering all provinces by the end of 2003.

3.3.4 *Media Clearing*

During 2001-2002, the BOT plans to improve Media Clearing to be a fully web based technology system with an on-line feature and a same day cycle, which will allow member banks to send funds transfer data within the effective date. Moreover, this system will be the national infrastructure for the retail funds transfer system, which will support government transactions and electronic commerce transactions of the business sector.

4. Securities settlement systems

The TSD clears and settles all securities traded on the SET and the Market for Alternative Investment (MAI) on the third business day following the trading day (T+3). At present, the settlement of securities is effected by transfers on the book entry system with cash settlement occurring through electronic fund transfer. To deliver securities, members maintain valid securities in their securities depository account in any amount sufficient for securities clearing and settlement as indicated in the netting report by 13:00 on the third day following the trading day (T+3). On the other hand, members whose position is in credit will receive the securities in the amount entitled to them in their securities depository account at 13:00 on T+3, and can withdraw or transfer their securities after 14:30 on that day.

4.1 Equity securities

There are 28 brokerage firms and 380 listed companies in the SET, as of October 2001. Equity securities (e.g., common stocks) of these public companies are traded via the SET's computer system, which subsequently transmits matched transactions to the sole registrar of listed securities, which is TSD. The majority of equity securities are dematerialized and held on a scripless basis in book-entry system as encouraged by the TSD.

The TSD utilizes a multilateral netting mode of settlement for securities traded on the SET and the MAI. On day T+3, settlement of equity securities occurs with payment on a net securities and net funds basis. The payment is done via BAHTNET and the settlement banks. Settlement of securities is done on the book entry system.

4.1.1 Trading

Market overview

A wide range of securities is traded on the SET. This includes common shares, preferred shares, unit trusts, warrants, debentures and convertible debentures. At the end of September 2001, there were 380 common shares issues, twelve preferred shares issues, nine unit trusts issues, 36 warrants and four derivative warrants. The total trading value was approximately THB 109.9 billion. The SET maintains the authority to list or delist any securities traded on the Exchange, in line with the *Securities and Exchange Act (1992)*.

Trading systems

Trading on the SET has been fully-computerized since April 1991. The "Automated System for the Stock Exchange of Thailand", or ASSET, enables trading to be efficient, equitable and liquid. In the ASSET trading system, two principal methods of trading are available: Automatic Order Matching (AOM) and Put Through transactions (PT).

The AOM performs the order matching process according to price then time priority, without human intervention. After brokerage houses electronically send buy or sell orders from their offices to the SET mainframe computer, the ASSET system implements an order queuing process and arranges the orders according to a price-then-time priority. This means orders are first grouped according to price, with the best price taking precedence. Then, within each price group, orders are arranged according to time. In terms of the matching process, there are two matching procedures: continuous order matching and call market matching. Continuous order matching operates during the regular trading session. The ASSET continuously matches the first buy and sell orders in the queue, and at the same time, confirms each executed transaction via the member's (broker's) terminal. The call market system is utilized in calculating the opening and closing price of a security at the opening and closing times of the trading hours. The system allows brokers to enter their orders to be queued for matching at a specified time and at the single price which generates the greatest trading volumes of that particular stock.

The PT provides a facility for brokers to advertise their buy or sell interests by announcing bid or offer prices. Any interested members can deal directly with each other, either on behalf of their clients or for themselves. The price can be adjusted during the negotiation; hence, the effective executed price may not be the same as that advertised and may not follow the price spread rules. After concluding negotiations, dealers must send details of the result to the ASSET for recording purposes.

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The SET trading days are Monday through Friday. Trading activities are divided into two sessions, morning and afternoon (see below).

9:30 – 10:00	Pre-opening Period
10:00 – 12:30	Morning Trading Session
12:30 – 14:00	Intermission
14:00 – 14:30	Pre-opening Period
14:30 – 16:30	Afternoon Trading Session
16:30 – 17:00	Off-hours Trading

On the main board, a minimum transaction taking place at any time must constitute at least one board lot or multiple thereof. The SET has set a standard trading board lot of 100 shares for all securities traded on the main board; however, securities priced at THB 500 or above, one “Board Lot” contains 50 shares. In addition, the Thai Trust Fund (TTF) has been established where currently there are twelve unit trusts trading on the SET (see below).

Main Board	Trading of common stocks, preferred stocks, warrants and unit trusts in full board lots
Big Lot Board	Trading of stocks with either a trading volume of at least 1 million shares, or a trading value of at least 3 million THB
Foreign Board	Trading of stocks registered under a foreigner’s name
Odd Lot Board	Trading of common stocks, preferred stocks, warrants and unit trusts in less than one board lot
Special Board	Trading of government bonds, state enterprise bonds, debentures and convertible debentures

4.1.2 Pre-settlement

Trade confirmation

After trading transactions are executed, brokers will confirm them to investors on the trading day. However, in case of foreign investors who have an account with the custodians, there must be a confirmation of the transactions between brokers and custodians. On T+1, brokers initiate ‘send and receive’ and custodians confirm the transactions after getting the instruction from their clients. On T+3, custodians are required to send a final confirmation to the settlement system of the TSD by 10:30. The pre-settlement between brokers and custodians is to confirm which transaction will be settled on T+3 at 13:30.

Clearing house

At present, the TSD acts as the only clearing house in Thailand under the supervision of the Securities and Exchange Commission (SEC). Members of the clearing house are divided into two types as the following: (1) General members refer to members of the Clearing Fund; that is, brokers and sub-brokers and (2) Associate members refer to non-members of the Clearing Fund; that is, custodian banks.

A legal entity who wants to use securities clearing and settlement services needs to seek permission from the TSD by submitting an application form for membership according to each type of the market they trade. Clearing house members must possess the following qualifications: (1) Must be a legal entity whose shareholders’ equities are not less than THB 150 million; (2) Must be allowed to trade on the SET, the MAI, and the Thai Bond Dealing

Centre (Thai BDC); (3) Must maintain the net capital ratio as regulated by the SEC (for those who are required by the SEC only); (4) Must deposit the securities with the TSD as required by the clearing house; and (5) Must be a member of the Clearing Fund, except for associate members.

As soon as the TSD has considered the applicant qualified, the clearing house will allow that firm to become a member, and then the firm must open a securities account with the TSD. If clearing house members fail to abide by the above regulations, the clearing house shall instigate the following series of actions: (1) warning; (2) penalty; (3) temporary suspension of service; and (4) termination of membership.

Apart from the above measures where membership can be terminated, the clearing house can also terminate membership in the following cases: (1) failure to maintain membership qualification requirements; (2) member's operation and financial status are such that they may cause damage to securities clearing and settlement among members; and (3) resignation from membership. Members whose membership has been terminated are liable to pay back any outstanding debts owed to the clearing house.

STP capability

Expanding on the issue of straight through processing (STP) initiatives, the TSD conducted a preliminary study on the possibility of implementing STP in the Thai capital market in June 2000. The study covered two major areas. The first concerned the theoretical background and benefits of applying STP in the Thai capital market. The second involved a survey on the technology used by TSD members to determine the common features in communication platforms and infrastructure systems. Survey results revealed that TSD members currently use various message standards, and depend heavily on manual processing of transactions. STP implementation can, therefore, be seen as a means to streamline the processes. It is expected that reducing manual hand-offs will help reduce human errors and thus settlement risks in post trading activities and, ultimately, increase efficiency.

In an attempt to stimulate the Thai capital market towards implementing STP, the TSD has engaged a consulting firm to assist in a feasibility study on STP implementation in the Thai financial services market. The objectives of this project are to define the problems of current trading and settlement activities and to develop an STP strategy and implementation plan. The scope of the study primarily involves collecting data from the Thai financial services market, investigating, and recommending the appropriate strategies for implementing STP in the market. The study will help determine the future state of the STP environment. However, it requires industry-wide co-operation and action. Once the feasibility study is completed, the final report will be published for industry reference.

4.1.3 Settlement

Settlement cycle

At present, all securities traded on the SET and MAI are settled on T+3. However, the TSD is undergoing a feasibility study on shortening the settlement cycle from T+3 to T+1.

Governance, participation and risk management

Members of the CSD must be participants who trade securities or bonds on the SET, the MAI, or the Thai Bond Dealing Centre (Thai BDC). The CSD members comprise the following: (1) brokers, (2) sub-brokers, (3) custodians, and (4) any juristic person who is allowed to be an eligible depositor as stipulated by the SET.

To ensure stability and avoid any damages resulting from default in the securities clearing and settlement, the TSD established the Clearing Fund in March 1995. The fund consists of contributions from the SET and from the fund's members, comprising brokers and sub-brokers.

Both brokers and sub-brokers are required to pay in contributions to the fund as follows: (1) entrance fees of THB 900,000 and (2) monthly distributions of 0.008% of the net value of all the securities' transactions of each fund member each month, but not less than THB 1,000 per month.

In the event that a fund member is in default for the securities clearing and settlement under the procedural regulations of the clearing house, the fund manager may use the fund's money to pay the clearing house for the transaction under default, together with the damages, by drawing funds in the following order: (1) contribution to the fund by the defaulting fund member; (2) contribution to the fund by other fund members; and (3) contribution to the fund by the SET.

After utilization of the fund, the defaulting fund member is obliged to repay to the fund the full amount of the fund's paid money, together with the interest from the date of the fund utilization. If the defaulting fund member fails to do so, the fund manager may suspend the clearing and settlement in the deposit account of the defaulting fund member, as reported on the date of the fund utilization until the payment, together with interest, is made to the fund. However, in the event that the value of the securities is not sufficient to cover the utilized amount, the fund manager may require the defaulting fund member to place collateral in full. In this case, the defaulting fund member must place such collateral, at the latest, on the business day following the day the fund's money was used.

In addition to the Clearing Fund, the TSD is well aware of risks that may occur in the clearing and settlement system, and has continuously developed risk management schemes such as the establishment of the Clearing Fund, the provision of the securities borrowing and lending, as well as the implementation of several risk management measurements since 1996 as follows.

The first measure concerns membership requirements (modified and in effect since September 1999). Due to the implementation of many risks management tools, the TSD has eased up membership requirements for maintenance of shareholders' equities from THB 400 million to THB 150 million. However, this measurement applies to securities trading on the SET only. If there is trading of new products in any other markets, this measurement will be further reviewed.

The second measure concerns financial monitoring (in effect since October 1997). The TSD has required its members to submit monthly reports on their net capital financial status, including income and expenses in order to verify their qualifications as specified by the clearing house; monitor their financial status and liquidity, as well as analyze their financial ratio in order to prevent any risks to the system as a whole. In addition, according to rules

and regulations of the Securities and Exchange Commission, the TSD has required its members to maintain a net capital ratio of not less than 7% of general debts since January 2001. If a member fails to maintain the required net capital ratio, a placement of collateral as specified by the clearing house is required.

The third measure concerns the settlement cap (in effect since February 1999). The TSD uses this measurement to monitor the capabilities of members in securities clearing and settlement by limiting their settlement value at no more than eight times the amount of net capital level. If the settlement value of any member exceeds the limitation, that member needs to place collateral on the day upon receiving the report from the clearing house.

The final measure concerns the early warning system (in effect since December 1999). By using an early warning system, the TSD is able to monitor any risks from pending settlement value, where the acceptable loss has a probability of 5%. This loss probability is obtained by using value at risk and mark-to-market techniques, which monitor risks from volatility of securities prices and the concentration of portfolio investment. If any member has a loss probability of 5% or more, that member is required to place collateral on the same day upon receiving the report from the TSD.

The first measure is enforced upon general and associate members. The second, third and fourth measures are enforced upon general members only. Eligible collateral includes cash, bank guarantees, government bonds, and SET 50 securities. In the case of government bonds and/or SET 50 securities, the TSD will adjust the securities value by marking-to-market on a daily basis, as well as setting a haircut at 23%. In the event that any member fails to place the collateral, that member will be fined or have their membership terminated.

Central counterparty

The TSD acts as the central counterparty for all traded securities transactions on the stock exchange. The service is opened to general clearing members only (brokers and sub-brokers). It represents a significant counterparty exposure for participants. Should the central counterparty fail, then both the buyer and seller could lose the principal involved in all trades. The period of exposure to the TSD as counterparty is short; the asset commitment periods being only 1.5 hours and 0.5 hour for sellers and buyers respectively. Ultimately, the members' protection from this counterparty risk is a function of the TSD's financial health and its risk containment model. The TSD has a good record of earnings and adequate risk containment controls. The TSD central counterparty guarantee on transactions is effective on T+3 and extends only to general clearing members.

The TSD does not act as the central counterparty for government securities and money market instruments, as well as when a transaction is executed on a gross settlement basis. Clearing members face minimal counterparty exposure to one another in the settlement process. The majority of clearing members' counterparty exposure is transferred to the TSD.

Payment

The TSD has implemented DVP to the clearing and settlement system since September 8, 2000. The main objectives are to reduce risks to the clearing house, which acts as a guarantor of the system; to boost confidence in the system; to enhance liquidity in the market; and to support cross-border trading and shortening of the settlement cycle in the future.

With DVP, the TSD uses BAHTNET and the settlement banks instead of physical checks. On T+3, the net-buy clearing members are required to maintain a sufficient amount of money for their settlement banks to transfer into the TSD's account opened at that settlement bank, and then to the TSD's account at BAHTNET accordingly. After that, payment will be transferred to the settlement banks whose position is net-sell in order that they credit the money to their net-sell clients.

4.2 Corporate debt securities

Currently, the TSD facilitates the book entry system for dealers to settle scripless corporate bonds. Dealers have to clear and settle among themselves, as the TSD does not act as the clearing house for corporate bonds traded in the Thai BDC. It can either be a scrip or scripless system, depending on the counterparty of that transaction. For its payment, participants can then clear the transactions by themselves.

4.3 Government securities

Debt securities of the government sector in the Thai capital market consist of Thai Government Securities and government guaranteed securities (TGS), including non-guaranteed state enterprise debt securities. TGS include Thai government bonds, state enterprise debt securities guaranteed by the Ministry of Finance, BOT bonds, including those of the Financial Institutions Development Fund (FIDF), the Property Loan Management Organization (PLMO), Treasury Bills and Debt Restructuring Bills. As of end-October 2001, the value of outstanding TGS amounted to THB 1.6 trillion. A majority of TGS in issue includes government bonds valuing at approximately 42.49%.

4.3.1 Trading

Market overview

The BOT acts as the main depository and registrar for the TGS. The clearing and settlement of the TGS are normally undertaken by the BOT. Holders of the TGS comprise of all banks, authorized finance companies and finance/securities companies, and individuals. The average daily value of trading in 2001 (January-October) amounted to THB 6.64 billion. Besides being held for investment, the TGS is qualified both as a liquidity reserve asset and as collateral for the BOT's facilities, including the repurchase (R/P) market, the intraday liquidity facility (ILF) and end of day liquidity. Hence, transfer of TGS ownership has to be effected each time at the BOT.

Trading systems

The trading of the TGS can be performed through two channels. The first channel is trading through the primary market, which is the market for new issues of TGS. They include government bonds where the Ministry of Finance assigns the BOT to manage government bond sales, state enterprise debt securities where the Comptroller General Department informs financial institutions to bid for the management of state enterprise debt securities sales, and state enterprise debt securities and other bonds where the issuers set the sale methods on a case by case. The second channel is trading through the secondary market, which is a market where the TGS are bought and sold after the original trade in the primary market. Sellers and buyers can either trade the TGS among themselves or with financial institutions. Moreover, sellers and buyers can trade through the informal market, which is

over-the-counter, and where prices, payment, settlement and other conditions are determined between counterparties, and ownership transfer is notified to the registrar.

4.3.2 Pre-settlement

Trade confirmation

TGS deposited with the BOT, who acts as the registrar, may be kept in either the Bond Registry Account (scrip) or the Book Entry Account (scripless), which are maintained in two systems operated by the BOT, namely the Bond Registry System and the Book Entry System, respectively. The Bond Registry System requires dealers to make an endorsement on the back of the certificates at the BOT, while the Book Entry System requires dealers to immobilize their TGS certificates at the BOT. After the seller and the buyer have completed the TGS trade, which is usually an over-the-counter trade, the counterparties will pre-settle with the BOT in each system. In the Bond Registry System, the seller and buyer have to physically submit the original written instructions and scrip certificate, respectively, in order to instruct the BOT to transfer the TGS ownership. In the Book Entry System, participants have to physically submit the instruction to notify the BOT. The instructions may be sent by fax, while the originals can be later sent to the BOT before 10:00 the following day. However, if there is an agreement for the TGS to be transferred on the day of the notice, the originals should be sent before 15:30 of that day.

Clearing house

There is no clearing house for TGS as settlement is done on a gross basis.

STP capability

The BOT realizes that it is necessary for data transfers to be able to move quickly and efficiently between members' system within BAHTNET with no exposures incurred. BAHTNET has been re-developed for improving convenience and services to members by employing features such as STP, which aims to eliminate the redundancy of data entry work.

4.3.3 Settlement

Settlement cycle

The TGS payment and settlement process is currently based on two working days after trading (T+2). However, it can be completed simultaneously on the same day as the trading date if settlement is done on a real-time automated DVP system. The settlement processing cycle of the TGS in the Bond Registry System and the Book Entry System at the BOT are final within the settlement date, whereby the settlement date is varied on an agreement between the seller and the buyer.

Central Securities Depositories

The BOT acts as the Central Securities Depositories (CSD) for TGS. The CSD provides registry, depository, clearing and settlement services for the TGS. TGS owners at the CSD are classified into two types, namely individuals and institutions, who usually maintain the TGS in their account (the Bond Registry Account for scrip or the Book Entry Account for scripless) at the Deposits and Debt Instruments Group of the BOT.

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The BOT's duty covers issuance, registration and related services such as interest payment and redemption of the TGS. The Bond Registry System maintains records of all holdings in scrip form, serves the issuing, sells ownership transfer, and makes coupon payments and redemption of securities to clients ranging from individuals to institutions. The Book Entry System has the prime records of the scripless holdings. Currently, the BOT encourages holders of TGS to shift the holding from scrip to scripless form by using the pricing scheme in order to improve efficiencies in the transfer process and to facilitate the DVP process in BAHTNET.

Payment

Payment for TGS transactions can be done through checks or BAHTNET for members holding accounts with the BOT. Check payments by buyers can be done on the settlement date (SD) and be final by 14:00 on SD+1. But if the buyer makes a payment via BAHTNET for the TGS in the Book Entry System, members can either do the payment through a semi-automated DVP system (for the transaction can not be done through a fully-automated DVP system) or a real-time automated DVP system. In the case of a semi-automated DVP system, payment will be made by the buyer on the settlement date through BAHTNET to the BOT by 14:00 on SD; whereby the BOT acts as the central counterparty, and the BOT will hold the funds until the seller has instructed the Book Entry System to transfer the title to the buyer. At the point the funds will be transferred to the seller's current account through BAHTNET, the TGS will be transferred to the buyer's account through the electronic Book Entry System in real-time. In a real-time automated DVP system, TGS transfer transactions can be completed directly in the DVP process. The funds and the TGS will be transferred between counterparties through BAHTNET in real-time gross settlement. In addition, the BOT enforced upon members who have traded the TGS in the wholesale markets to change the means of settlement from checks to BAHTNET to eliminate counterparty credit exposures and help reduce settlement risks.

4.4 Major projects and policies being implemented

4.4.1 Shortening of the settlement cycle

In its role as clearing house, the TSD realizes that longer settlement cycle translates to more risks to the clearing and settlement system as well as lower investor confidence. Therefore, the TSD has initiated a study on shortening the settlement cycle from T+3 to T+1 in order to reduce associated risks to the clearing house system as well as increase market liquidity because investors will receive their money or assets faster. This should also encourage investment in the stock market. The tentative implementation date is during 2005 (depending on trends in the United States).

4.4.2 Straight through processing

The TSD has also initiated Straight Through Processing (STP) by undertaking feasibility studies on its implementation. The studies are expected to be completed by February 2002, and any further developments will be carried out according to the study results. The aim of the STP project is to increase the efficiency of data processing by reducing manual interventions in routine processing and creating a standard for sending an order for trading through the securities clearing and settlement system. STP, therefore, is considered an important tool that can shorten the settlement cycle and boost the probability of cross-border trading in the future. The tentative implementation date is the first quarter of 2002.

4.4.3 100 percent scripless program

The TSD has initiated a 100% scripless program in order to help reduce operational costs related to share certificates, such as printing and maintenance of the share certificates, and the cost of replacing lost share certificates. This project is expected to result in more efficient securities' clearing and settlement systems as well as better risk management processes. The 100% scripless program will bring traded securities into the scripless system as soon as issuing companies appoint the TSD as their registrar of shares. The new share certificates will then be recorded electronically in the issuing company's account, and the shareholders can proceed with any task in the usual way once they have deposited their securities with their brokers. The tentative implementation date is the first quarter of 2002.

4.4.4 Clearing and settlement of corporate bonds

Formerly, the clearing and settlement of corporate bonds was done on the date of T+2. In 1999 the BondNet system linking the Thai BDC and the TSD ceased operations and as a result, the TSD terminated this service. Members then cleared and settled trades among themselves. This, of course, caused great inconvenience to members and increased operational costs. Therefore, in 2002, the TSD has plans to develop a clearing and settlement system to support bond trading in both the SET and the Thai BDC. Moreover, the TSD has plans to develop risk management tools, including rules required for members and similar regulations, in order to provide more convenient services for all involved. The tentative implementation date is during the second quarter of 2002.

4.4.5 Real-time depository records

In a concerted effort to make the clearing and settlement system more efficient, the TSD has initiated a project called 'Real Time Depository Records' (RTDR). This is a new style of securities depository, in which deposit accounts have been transformed from omnibus accounts into individual accounts under the names of the brokers/sub-brokers. This method allows investors or issuing companies to check the correctness and completeness of their share holdings at any time. Furthermore, as the TSD will send a monthly statement to individual investors through the brokers/sub-brokers, the securities depository system will become more transparent and secure, leading to greater efficiency in the overall system. The tentative implementation date is during the third quarter of 2002.

4.4.6 IPO process

The objective of the Initial Public Offering (IPO) process project is to speed up the registration process and reduce the time between the IPO and the start of trading. A longer period between the IPO and trading translates into higher cost for investors as well as higher risk due to changes in stock prices. The tentative implementation date is during the fourth quarter of 2002.

4.4.7 Clearing and settlement of interest rate futures

To encourage the stability of the overall derivative trading system and support government policy in developing the Thai capital markets, the TSD plans to develop risk management measurements, a clearing and settlement system, plus rules and regulations to support the trading of interest rate futures, which are new products to the SET. The tentative implementation date is during the fourth quarter of 2002.

4.4.8 Central ID

The concept of Central ID is to create a single identification (ID) number for each investor when contacting either the SET or the TSD. This aims to streamline and reduce redundancy in investor information. Furthermore, with a Central ID, it will be more convenient to invest in the stock market through the existing database. The tentative implementation date is during the fourth quarter of 2002.

5. Role of the central bank

5.1 Provision of settlement accounts

The BOT maintains deposit accounts for banks and financial institutions, thus providing interbank settlement services through its payment services, namely BAHTNET, ECS and Media Clearing (see section 3).

5.2 Operator of payment systems

Since 1992, the BOT has been engaged in the development of the payment system as the financial infrastructure for banks, financial institutions, government agencies, and other institutions that maintain deposit accounts with the central bank. In order to reduce risk and improve efficiency in the payment system, the BOT develops and provides services in areas that need to be undertaken by the public sector, in activities that contribute to the economic, and financial development of the country. The BOT supports payment system developments undertaken by the public and private sectors in order to ensure that the country's overall payment system is fully integrated and contributes to overall economic efficiency. Also, the BOT encourages the market mechanism in the setting of appropriate fee structures, and supervises and oversees the payment systems, including systems operated by the BOT and those operated by the private sector, in order to ensure safety, convenience, and standards that meet international best practices.

5.3 Operator of securities settlement systems

The BOT, being the sole registrar for TGS, operates two systems: the Bond Registry system, whereby dealers must endorse on the back of the certificates at the BOT; and the Book Entry system, whereby dealers must immobilize their bond certificates at the BOT. The BOT holds securities accounts for all banks, authorized finance companies and finance/securities companies, including individuals. TGS are normally cleared and settled by the BOT (see section 4.3).

5.4 Oversight of payment systems

The BOT supervises the payment system to ensure: the minimization of risk, particularly systemic risk; fairness to all parties involved; the system is efficient, encompassing convenience, fast services, low payment costs, reliability, and flexibility in dealing with varying operating conditions; and flexibility of payment choice for service users. The objectives are to be achieved by: encouraging financial institutions to employ RTGS instead of net settlement when making certain types of payment transactions, thereby reducing systemic risk; issuing relevant regulations and guidelines to ensure orderliness of system usage by members, shoring up public confidence and protecting consumers; promoting

relevant legislation to serve as the legal infrastructure for the payment system; coordinating with and supporting the development of payment systems that belong to the public and private sectors, for example, in the form of consultation, participation in working groups, and insurance of guidelines to support system development; and finally, intervention in the case of there are disputes or public petitions.

5.5 Facilitator of payment systems

The BOT acts as a facilitator in the process of outlining frameworks and development directions related to the country's payment systems. This has included the development of a payment strategy, called 'Payment 2004', to chart a road map for developing national payment systems between 2002-2004.

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STATISTICAL TABLES

Thailand

Table 1
Basic statistical data

	1996	1997	1998	1999	2000
Population (thousands)	60,116	60,816	61,466	61,661	61,878
Gross domestic product (THB billions) ¹⁾	4,622.8	4,740.2	4,628.4	4,615.4	4,900.3 ²⁾
Exchange rate vis-à-vis USD ³⁾	25.34	31.37	41.37	37.84	40.16

¹⁾ GDP at current price.

²⁾ Preliminary figures.

³⁾ Annual average.

Sources: Bank of Thailand and Department of Local Administration.

Table 2
Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	THB billions 2000
Banknotes and coins ¹⁾	371	400	376	587	475
Transferable deposits ²⁾	119	94	123	102	118
Narrow money supply (M1) ³⁾	423	428	441	575	525
<i>Memorandum items:</i>					
Broad money supply (M2) ⁴⁾	3,726	4,339	4,753	4,854	5,032
Outstanding value on e-money schemes	nav.	nav.	nav.	nav.	nav.

¹⁾ Consists of banknotes and coins in circulation outside the Bank of Thailand.

²⁾ Demand deposits held by government, commercial banks, businesses, the household sector and other financial institutions.

³⁾ M1 consists of currency and demand deposits held by businesses, the household sector and other financial institutions.

⁴⁾ M2 consists of M1 plus business and household time and savings deposits in the commercial banking system.

Source: Bank of Thailand.

Table 3
Settlement media used by banks

	1996	1997	1998	1999	THB billions 2000
Balances held at central bank	75.1	73.8	80.1	50.3	52.0
Required reserves ¹⁾	251.4	255.2	274.5	281.9	291.7
Free reserves ¹⁾	49.1	216.4	508.8	477.2	889.3
Transferable deposits at other banks	10,109	13,886	5,902	32,915	32,941
<i>Memorandum item:</i>					
Institutions borrowing from central bank	53.8	313.1	154.5	48.3	25.5

¹⁾ As of December 22. Sum of required and free reserves does not total balances held at central bank.

Source: Bank of Thailand.

Table 4**Institutional framework***(as at end-December 2000)*

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (THB millions)
Central bank	1	4	1,201	519,001
Commercial banks	13	3,194	44,983,370	4,626,006
Specialized banks:				
Government Savings Bank	1	577	13,672,897	312,409
Government Housing Bank	1	68	360,238	213,843
Bank for Agriculture and Agricultural Cooperative	1	504	10,000,000 ¹⁾	196,414
Branches of foreign banks	21	21	194,266	257,552
Post Office	1	1,170 ²⁾	nap.	nap.
Total	39	5,538	69,211,972	6,125,225
of which:				
<i>virtual institutions</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>	<i>nav.</i>

¹⁾ Approximated figure.²⁾ As of September 2000.

Cooperative, and the Communications Authority of Thailand.

Agricultural Cooperative, and the Communications Authority of Thailand.

Table 5**Payment instructions handled by selected interbank settlement systems: volume of transactions**

	1996	1997	1998	1999	thousands 2000
Paper-based:					
ECS	70,793	65,165	52,476	51,380	53,312
Provincial check	23,085	20,614	16,966	17,417	18,381
Automated:					
BAHTNET	100	178	243	255	642
Media Clearing ¹⁾	nap.	274	1,405	2,786	4,104

¹⁾ Media Clearing commenced operations in early 1997.

Source: Bank of Thailand

Table 6**Payment instructions handled by selected interbank settlement systems: value of transactions**

	1996	1997	1998	1999	THB billions 2000
Paper-based:					
ECS	120,782	136,679	75,422	65,510	25,436
Provincial check	2,494	2,056	1,544	1,416	1,507
Automated:					
BAHTNET	8,177	14,525	16,464	6,602	61,883
Media Clearing ¹⁾	nap.	8	58	81	120

¹⁾ Media Clearing commenced operations in early 1997.

Source: Bank of Thailand.

Table 7

Indicators of the use of various cashless payment instruments: volume of transactions

	1996	1997	1998	1999	thousands 2000
Cheques ¹⁾	93,878	85,779	69,441	68,797	71,694
Payments by credit card	nav.	nav.	nav.	nav.	nav.
Credit transfers ²⁾	100	178	243	255	642
Direct debits ³⁾	nav.	274	1,405	2,786	4,104
Card-based electronic money	nav.	nav.	nav.	nav.	nav.
Network-based electronic money	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Interbank transactions in ECS only.

²⁾ Interbank transactions and third party funds transfer in BAHTNET.

³⁾ Interbank transactions in Media Clearing which commenced operations in January 1997.

Source: Bank of Thailand.

Table 8

Indicators of the use of various cashless payment instruments: value of transactions

	1996	1997	1998	1999	THB billions 2000
Cheques ¹⁾	123,276	138,735	76,966	66,926	26,943
Payments by credit card	149	149	147	151	170
Credit transfers ²⁾	8,177	14,525	16,464	6,602	61,883
Direct debits ³⁾	nav.	8	58	81	120
Card-based electronic money	nav.	nav.	nav.	nav.	nav.
Network-based electronic money	nav.	nav.	nav.	nav.	nav.
Total	nav.	nav.	nav.	nav.	nav.

¹⁾ Interbank transactions in ECS only.

²⁾ Interbank transactions and third party funds transfer in BAHTNET.

³⁾ Interbank transactions in Media Clearing which commenced operations in January 1997.

Source: Bank of Thailand.

Table 9**Transfer instructions handled by securities settlement systems: volume of transactions**

	1996	1997	1998	1999	2000
	millions				
Bond registry system: ¹⁾					
Equity securities ²⁾	nap.	nap.	nap.	nap.	nap.
Government securities	neg.	neg.	neg.	neg.	neg.
Book-entry system: ¹⁾					
Equity securities	1.89	1.26	1.06	1.12	1.00
Government securities	neg.	neg.	neg.	neg.	neg.

¹⁾ Inter-bank transactions only.

²⁾ Equity securities settlement is done through the book-entry system (scripless) only.

Sources: Bank of Thailand, Clearing House of the Thailand Securities Depository Co., Ltd (TSD).

Table 10**Transfer instructions handled by securities settlement systems: value of transactions**

	1996	1997	1998	1999	2000
	THB billions				
Bond registry system: ¹⁾					
Equity securities ²⁾	nap.	nap.	nap.	nap.	nap.
Government securities	17	115	958	800	988
Book-entry system: ¹⁾					
Equity securities	204	233	174	251	161
Government securities	14	135	88	70	345

¹⁾ Inter-bank transactions only.

²⁾ Equity securities settlement is done through the book-entry system (scripless) only.

Sources: Bank of Thailand, Clearing House of the Thailand Securities Depository Co., Ltd (TSD).

Table 11**Number of participants in securities settlement systems**

	1996	1997	1998	1999	2000
Bond registry system:					
Equity securities	nap.	nap.	nap.	nap.	nap.
Government securities	nav.	nav.	5,328	13,141	16,540
Book-entry system:					
Equity securities	77	102	64	59	58
Government securities	nav.	nav.	55	418	974

Sources: Bank of Thailand, Clearing House of the Thailand Securities Depository Co., Ltd (TSD).

ANNEXES

ANNEX 1

COMPARATIVE TABLES

Table 1

Notes and coin in circulation ¹⁾

(end of year)

	1996	1997	1998	1999	2000
	Total (USD millions) ²⁾				
Australia	15,634	13,771	13,987	16,086	14,918
China	106,071	122,926	135,335	162,526	177,009
Hong Kong	9,891	10,404	10,479	12,806	11,770
Indonesia	9,296	3,414	4,766	7,688	6,959
Japan	423,211	405,887	471,446	581,944	539,145
Korea	18,305	10,916	11,318	17,003	14,000
Malaysia	7,522	5,509	4,803	6,521	5,858
New Zealand	1,059	931	896	1,099	924
Philippines	5,734	6,163	4,539	7,049	5,303
Singapore	7,353	6,389	6,110	6,792	6,520
Thailand	14,641	12,751	9,089	15,513	11,828
	Value per inhabitant (USD) ²⁾				
Australia	849	740	742	844	774
China	87	99	108	129	137
Hong Kong	1,537	1,603	1,601	1,938	1,766
Indonesia	47	17	24	38	34
Japan	3,362	3,217	3,727	4,594	4,248
Korea	402	238	245	365	298
Malaysia	355	254	217	287	252
New Zealand	285	248	236	288	241
Philippines	80	84	60	92	68
Singapore	2,003	1,684	1,558	1,719	1,623
Thailand	244	210	148	252	191
	As a percentage of GDP				
Australia	3.8	3.9	4.0	4.0	4.1
China	13.0	13.7	14.3	16.4	16.4
Hong Kong	6.4	6.1	6.4	8.1	7.2
Indonesia	5.4	6.6	11.0	15.4	18.2
Japan	9.6	10.1	10.5	11.6	12.1
Korea	3.7	3.4	3.1	4.0	3.4
Malaysia	7.5	7.6	6.4	7.5	6.5
New Zealand	1.6	1.7	1.7	2.1	2.1
Philippines	6.9	7.5	7.0	9.3	7.1
Singapore	8.0	7.6	7.4	8.0	7.1
Thailand	8.0	8.4	8.1	12.7	9.7
	As a percentage of narrow money ³⁾				
Australia	20.6	19.5	19.9	19.6	19.6
China	30.9	29.2	28.8	29.4	27.6
Hong Kong	38.6	42.8	45.5	48.5	45.0
Indonesia	35.1	36.3	41.0	46.8	44.6
Japan	26.1	25.8	25.3	24.8	25.0
Korea	39.1	44.1	38.4	43.9	37.5
Malaysia	31.4	33.8	33.7	33.7	28.5
New Zealand	14.2	14.2	13.2	14.1	13.3
Philippines	67.7	70.3	65.9	69.9	60.6
Singapore	38.1	38.9	37.3	36.4	33.9
Thailand	87.7	93.5	85.3	102.1	90.5

¹⁾ For explanation of figures see relevant country tables.²⁾ Year-end figures converted at end-of-year exchange rates. For Indonesia, Philippines, and Thailand, year-end figures converted at average exchange rates.³⁾ Narrow money: M1.

Table 2

Transferable deposits held by non-banks ¹⁾

(end of year)

	1996	1997	1998	1999	2000
	Total (USD millions) ²⁾				
Australia	60,404	56,810	56,450	66,183	61,324
China	237,557	297,700	335,185	391,120	465,022
Hong Kong	15,745	13,878	12,536	13,615	14,392
Indonesia	17,198	5,996	6,886	8,733	8,636
Japan	1,199,022	1,166,490	1,389,698	1,764,630	1,618,030
Korea	28,535	13,841	18,143	21,739	23,308
Malaysia	16,423	10,779	9,445	12,808	14,726
New Zealand	6,425	5,701	5,901	6,751	6,075
Philippines	3,777	3,891	3,312	4,494	4,405
Singapore	16,747	16,807	17,093	19,794	21,973
Thailand	4,696	2,997	2,973	2,696	2,938
	Value per inhabitant (USD) ²⁾				
Australia	3,279	3,051	2,996	3,474	3,181
China	194	241	269	311	359
Hong Kong	2,446	2,140	1,915	2,061	2,159
Indonesia	87	30	34	43	43
Japan	9,526	9,246	10,987	13,929	12,748
Korea	627	301	392	466	496
Malaysia	776	497	426	564	633
New Zealand	1,727	1,516	1,557	1,772	1,586
Philippines	53	53	44	59	56
Singapore	3,260	2,644	2,625	3,007	3,159
Thailand	78	49	48	44	48
	As a percentage of GDP				
Australia	14.7	16.0	15.9	16.6	17.0
China	29.0	33.1	35.4	39.5	43.1
Hong Kong	10.2	8.1	7.7	8.6	8.9
Indonesia	10.1	11.5	15.9	17.5	22.6
Japan	27.2	29.0	31.0	35.1	36.3
Korea	5.8	4.3	4.9	5.2	5.7
Malaysia	16.4	14.9	12.6	14.7	16.4
New Zealand	10.0	10.2	11.3	12.9	13.8
Philippines	0.2	0.2	0.1	0.2	0.1
Singapore	13.1	12.0	12.4	13.9	13.8
Thailand	2.6	2.0	2.7	2.2	2.4
	As a percentage of narrow money ³⁾				
Australia	79.4	80.5	80.1	80.4	80.4
China	69.1	70.8	71.2	70.6	72.4
Hong Kong	61.4	57.2	54.5	51.5	55.0
Indonesia	64.9	63.7	59.1	53.2	55.4
Japan	73.9	74.2	74.7	75.2	75.0
Korea	60.9	55.9	61.6	56.1	62.5
Malaysia	68.6	66.2	66.3	66.3	71.5
New Zealand	85.8	86.7	86.8	86.6	87.3
Philippines	44.6	44.4	48.1	44.6	50.3
Singapore	61.9	61.1	62.8	63.6	66.1
Thailand	28.1	22.0	27.9	17.7	22.5

¹⁾ For explanation of figures see relevant country tables. For Philippines, figures for transferable deposits are those for demand deposits.²⁾ Year-end figures converted at end-of-year exchange rates. For Indonesia, Philippines, and Thailand, year-end figures converted at average exchange rates.³⁾ Narrow money: M1.

Table 3

Settlement media used by banks ¹⁾*(end of 2000)*

	Banks' reserves at central bank (USD billions) ²⁾	Banks' reserves at central bank as a percentage of narrow money ³⁾	Transferable deposits at other banks (USD billions) ²⁾	Transferable deposits at other banks as a percentage of narrow money
Australia	0.4	neg.	0.9	1.2
China	193.5	30.1	102.4	0.2
Hong Kong	neg.	neg.	nav.	nav.
Indonesia	3.1	20.0	26.2	168.3
Japan	36.9	1.7	37.8	1.8
Korea	6.4	17.3	1.5	4.1
Malaysia	5.1	24.7	0.4	2.1
New Zealand	neg.	0.1	0.3	4.4
Philippines	1.7	19.1	nav.	nav.
Singapore	3.3	17.1	nav.	nav.
Thailand	1.3	9.9	820.2	62.7

¹⁾ For explanation of figures see relevant country tables.²⁾ Year-end figures converted at end-of-year exchange rates. For Indonesia, Philippines, and Thailand, year-end figures converted at average exchange rates.³⁾ Narrow money: M1.

Table 4

Institutional framework ¹⁾*(end of 2000, unless otherwise noted)*

	Number of institutions offering payment services ²⁾	Number of central bank branches ²⁾	Number of bank branches ²⁾	Number of post office branches ²⁾	Others ^{1, 2)}	Total number of branches offering payment services ²⁾
Australia	29.1	0.2	259.5 ³⁾	232.3	63.4	555.5
China	29.1	1.7	nav.	1.9	37.9	nav.
Hong Kong	23.1	0.0	241.3	nap.	19.7	241.3
Indonesia	44.7	0.2	96.1	nav.	nav.	96.3
Japan ⁴⁾	21.7	0.3	314.4	190.4	nap.	505.1
Korea	0.5	0.3	130.1	59.3	nap.	189.7
Malaysia	2.8	0.2	121.9	nap.	18.7	140.8
New Zealand	43.3	0.3	221.7	nap.	nav.	nav.
Philippines	78.0	0.2	96.3	nap.	118.5	215.1
Singapore ⁵⁾	38.6	0.2	174.7	nap.	nap.	175.0
Thailand	0.6	0.1	70.5	18.9 ⁶⁾	nap.	89.5

¹⁾ For explanation of figures see relevant country tables.²⁾ Per million inhabitants.³⁾ As of end of June 2000.⁴⁾ As of end of March 2001.⁵⁾ As of end of March 2000.⁶⁾ As of end of September 2000.

Table 5

Use of cashless payment instruments ¹⁾*(total number of transactions in millions)*

	1996	1997	1998	1999	2000
	Cheques				
Australia ²⁾	983.0	986.0	928.0	806.0	856.0
China	441.5	459.8	458.6	440.0	454.1
Hong Kong	140.8	149.9	135.8	134.1	138.6
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	296.0	283.4	260.1	239.3	225.9
Korea	1,147.0	1,222.0	1,012.0	1,027.0	1,092.0
Malaysia	96.1	104.8	133.2	154.1	164.8
New Zealand	349.0	342.0	292.0	277.0	250.0
Philippines	111.98	116.71	112.84	116.21	117.59
Singapore ³⁾	82.6	87.7	87.6	92.6	91.7
Thailand ³⁾	93.9	85.8	69.4	68.8	71.7
	Payments by credit/debit cards				
Australia	679.0	815.0	983.0	1,172.0	1,322.0
China	106.2	117.0	146.1	329.1	685.2
Hong Kong	nav.	nav.	nav.	nav.	nav.
Indonesia	nav.	nav.	27.3	42.6	56.7
Japan	1,132.3	1,275.7	1,497.5	1,517.8	2,010.6
Korea	153.7	178.1	195.4	276.9	470.8
Malaysia	nav.	nav.	nav.	nav.	67.9
New Zealand	288.0	402.0	504.0	595.0	678.0
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore ⁴⁾	56.2	66.1	73.4	75.8	85.5
Thailand	nav.	nav.	nav.	nav.	nav.
	Credit transfers ⁵⁾				
Australia ²⁾	434.0	467.0	482.0	529.0	635.0
China	90.8	122.4	125.5	176.5	240.1
Hong Kong	nav.	13.5	14.8	15.5	16.6
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	1,042.8	1,105.5	1,143.2	1,166.9	1,215.4
Korea	791.0	893.0	893.0	1,004.0	1,225.0
Malaysia	nav.	nav.	nav.	nav.	nav.
New Zealand	220.0	280.0	259.0	271.0	305.0
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore	13.6	15.1	15.7	13.9	14.6
Thailand	0.1	0.2	0.2	0.3	0.6
	Direct debits				
Australia ²⁾	107.0	114.0	151.0	202.0	248.0
China	2.1	4.9	8.7	14.0	19.4
Hong Kong	nav.	31.7	32.7	33.5	35.2
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	nav.	nav.	nav.	nav.	nav.
Korea ³⁾	237.0	336.0	410.0	453.0	579.0
Malaysia	nav.	nav.	nav.	nav.	nav.
New Zealand	36.0	45.0	49.0	58.0	73.0
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore ³⁾	20.1	23.2	20.7	17.4	17.3
Thailand	nav.	0.3	1.4	2.8	4.1

¹⁾ For explanation of figures see relevant country tables. For China, figures are estimated.²⁾ Annual figures estimated using survey data from the month of May.³⁾ Interbank transactions only.⁴⁾ Figures for debit card only.⁵⁾ For Australia, figures exclude high-value transfers. For Japan, Korea, and Thailand, figures include interbank transfers. For Singapore, interbank transfers only.

Table 6

Use of cashless payment instruments ¹⁾*(number of transactions per inhabitant)*

	1996	1997	1998	1999	2000
	Cheques				
Australia ²⁾	53.4	53.0	49.3	42.3	44.4
China	0.4	0.4	0.4	0.3	0.4
Hong Kong	21.9	23.1	20.8	20.3	20.8
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	2.4	2.2	2.1	1.9	1.8
Korea	25.2	26.6	21.9	22.0	23.2
Malaysia	4.5	4.8	6.0	6.8	7.1
New Zealand	93.8	91.0	77.0	72.7	65.3
Philippines	1.6	1.6	1.5	1.5	1.5
Singapore ³⁾	22.5	23.1	22.3	23.4	22.8
Thailand ³⁾	1.6	1.4	1.1	1.1	1.2
	Payments by credit/debit cards				
Australia	36.9	43.8	52.2	61.5	68.6
China	0.1	0.1	0.1	0.3	0.5
Hong Kong	nav.	nav.	nav.	nav.	nav.
Indonesia	nav.	nav.	0.1	0.2	0.3
Japan	9.0	10.1	11.8	12.0	15.8
Korea	3.4	3.9	4.2	5.9	10.0
Malaysia	nav.	nav.	nav.	nav.	2.9
New Zealand	77.4	106.9	133.0	156.2	177.0
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore ⁴⁾	15.3	17.4	18.7	19.2	21.3
Thailand	nav.	nav.	nav.	nav.	nav.
	Credit transfers ⁵⁾				
Australia ²⁾	23.6	25.1	25.6	27.8	32.9
China	0.1	0.1	0.1	0.1	0.2
Hong Kong	nav.	2.1	2.3	2.4	2.5
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	8.3	8.8	9.0	9.2	9.6
Korea	17.4	19.4	19.3	21.5	26.1
Malaysia	nav.	nav.	nav.	nav.	nav.
New Zealand	59.1	74.5	68.3	71.1	79.6
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore	3.7	4.0	4.0	3.5	3.6
Thailand	neg.	neg.	neg.	neg.	neg.
	Direct debits				
Australia ²⁾	5.8	6.1	8.0	10.6	12.9
China	neg.	neg.	neg.	neg.	neg.
Hong Kong	nav.	4.9	5.0	5.1	5.3
Indonesia	nav.	nav.	nav.	nav.	nav.
Japan	nav.	nav.	nav.	nav.	nav.
Korea	5.2	7.3	8.9	9.7	12.3
Malaysia	nav.	nav.	nav.	nav.	nav.
New Zealand	9.7	12.0	12.9	15.2	19.1
Philippines	nav.	nav.	nav.	nav.	nav.
Singapore ³⁾	5.5	6.1	5.3	4.4	4.3
Thailand	nav.	neg.	neg.	neg.	0.1

¹⁾ For explanation of figures see relevant country tables.²⁾ Annual figures estimated using survey data from the month of May.³⁾ Interbank transactions only.⁴⁾ Figures for debit card only.⁵⁾ For Australia, figures exclude high-value transfers. For Japan, Korea, and Thailand, figures include interbank transfers. For Singapore, interbank transfers only.

Table 7

Features of selected interbank funds transfer systems ¹⁾

(end of 2000)

	Type ²⁾	Owner/manager ³⁾	No. of participants (of which: direct)	Processing ⁴⁾	Settlement ⁵⁾	Membership ⁶⁾
Australia						
SWIFT PDS	L	PA	53 (53)	RTT	RTGS	RM
RITS	L	CB	54 (54)	RTT	RTGS	RM
China						
EIS	L	B, CB	20,000 ⁷⁾	RTT, M	GS, BN	RM
Hong Kong						
HKD CHATS	L, R	CB	151 (151)	RTT	RTGS	RM
USD CHATS ⁸⁾	L, R	B	102 (62)	RTT	RTGS	O
Indonesia						
BI-RTGS ⁹⁾	L	CB	123	RTT	RTGS	RM
Japan						
FXYCS	L	B	250 (42)	RTT	N, RTGS	RM
BOJ-NET Funds Transfer System	L	CB	398 (398)	RTT	RTGS ¹⁰⁾	RM
Korea						
BOK-Wire	L	CB	132 (132)	RTT	RTGS	O
Malaysia						
RENTAS	L	CB	89 (89)	RTT	RTGS	RM
New Zealand						
ESAS	L	CB	13 (13)	RTT	RTGS	RM
Philippines						
MIPS ¹¹⁾	L	CB, PA	97	RTT	RTGS	RM
PDDTS	R	B, CB, PA	46	RTT	RTGS	RM
Singapore						
MEPS	L	CB	136 (92)	RTT	RTGS	O
Thailand						
BAHTNET	L	CB	77 (58)	RTT	RTGS	RM

¹⁾ For additional information see relevant country chapters.²⁾ L = large-value system, R = retail system.³⁾ B = banks, CB = central banks, PA = payment association.⁴⁾ M = manual, ACH = automated clearing house (offline), RTT = real-time transmission.⁵⁾ N = multilateral netting, BN = bilateral netting, RTGS = real-time gross settlement, GS = other gross settlement.⁶⁾ O = open membership (any member can apply) or RM = restricted membership (subject to criteria).⁷⁾ An exact figure is not available.⁸⁾ Introduced on August 21, 2000.⁹⁾ Introduced on November 17, 2000.¹⁰⁾ Settlement on a net basis was abolished in January 2001.¹¹⁾ Interbank call loan transactions.

Table 7 (continued)

	Degree of centralization ¹⁰⁾	Pricing ¹¹⁾	Closing time for same-day transactions in local time (time on Saturday)	Number of transactions (thousands) ¹²⁾	Value of transactions (USD billions) ^{12, 13)}	Ratio of transactions value to GDP (at annual rate) ¹²⁾
Australia						
SWIFT PDS	C	F	16:30	3,657	10,287	28.5
RITS	C	F	16:30	42	897	2.5
China						
EIS	D	S	17:30	31,600	2,845	2.6
Hong Kong						
HKD CHATS	C	F	17:30 (12:00)	3,410	11,670	71.8
USD CHATS ¹⁴⁾	C	F	17:30	185	242	4.5
Indonesia						
BI-RTGS ¹⁵⁾	C	N?	17:00	81,141	138	3.6
Japan						
FXYCS	C	V ¹⁶⁾	13:45 (N)/17:00 (G)	9,298	57,961	12.2
BOJ-NET Funds Transfer System	C	V ¹⁶⁾	17:00	4,715	328,430	69.2
Korea						
BOK-Wire	C	F	17:00 (13:30)	1,407	16,664	36.4
Malaysia						
RENTAS	C	F+V	17:30 (12:00)	1,441	2,996	33.4
New Zealand						
ESAS	C	F	8:40 next business day	714	3,194	69.8
Philippines						
MIPS ¹⁷⁾	D	V	18:30	120	77	1.0
PDDTS	D	V	16:00	580	1	0.01
Singapore						
MEPS	C	V	18:30 (14:25)	1,908	5,533	60.3
Thailand						
BAHTNET	C	V	17:30	642	1,541	12.6

¹⁰⁾ Geographical access to the system: C = centralized (one processing center only) or D = decentralized.

¹¹⁾ Prices charged to participants: F = full costs (including investments), V = variable costs, S = symbolic costs (below variable costs), N = no costs.

¹²⁾ Interbank transactions only.

¹³⁾ Converted at yearly average exchange rates.

¹⁴⁾ Introduced on August 21, 2000.

¹⁵⁾ Introduced on November 17, 2000.

¹⁶⁾ Prices are set on the principle that the institutions that are to benefit from online processing should pay the relevant charges.

¹⁷⁾ Interbank call loan transactions.

Table 8

Operating hours of selected large-value interbank funds transfer systems

(end of 2000, unless otherwise noted)

	Gross (G) or net (N)	Opening/closing time for same-day value in local time (time on Saturday)	Settlement finality in local time (time on Saturday)	Cut-off for all third-party payment orders (time on Saturday)	Cut-off for international correspondents' payment orders in local time (time on Saturday)	Memo item: Standard money market hours in local time (time on Saturday)
Australia						
SWIFT PDS	G	9:15-16:30	9:15-16:30	16:30	16:30	9:15-16:30
RITS	G	9:15-16:30	9:15-16:30	16:30	16:30	
China						
EIS	G, N	8:30-17:30	8:30-17:30	-	-	9:00-16:30
Hong Kong						
HKD CHATS	G	9:00-17:30 (12:00)	9:00-17:30	17:00 (11:30)	17:30	9:00-17:30
USD CHATS	G	9:00-17:30	9:00-17:30	17:00	17:30	
Indonesia						
BI-RTGS	G	6:30-17:00	17:00	16:30	17:00	8:00-17:00
Japan						
FXYCS	G, N	9:00-13:45	14:30 ¹⁸⁾	13:45	13:45	
BOJ-NET Funds Transfer System	G ¹⁹⁾	9:00-17:00	9:00-17:00	17:00	17:00	9:00-17:00
Korea						
BOK-Wire	G	9:30-17:00 (13:30)	9:30-17:00 (13:30)	17:00	nap.	9:30-17:00
Malaysia						
RENTAS	G	8:00-18:00 (13:00)	17:30 (12:00)	16:00 (11:30)	nap.	8:00-18:00 (14:00)
New Zealand						
ESAS	G	9:00-8:40 next business day	-	8:40 next business day	8:40 next business day	8:00-16:30
Philippines						
MIPS	G	10:00-18:30	10:00-18:30	16:00	nap.	nap.
PDDTS	N	9:00-17:00	9:00-17:00	16:00	nap.	nap.
Singapore						
MEPS	G	6:00-20:00 (15:00)	9:00-18:30 (14:30)	18:30 (14:45)	nap.	9:00-18:30 (15:00)
Thailand						
BAHTNET	G	8:30-17:30	8:30-17:30	14:30	nap.	8:30-17:30

¹⁸⁾ Since January 2001.¹⁹⁾ Settlement on a net basis was abolished in January 2001.

Table 9

Features of selected securities settlement systems

(end of 2000, unless otherwise noted)

	Type ¹⁾	Owner/manager ²⁾	No. of participants (of which: direct)	Settlement of cash leg ³⁾	Securities settlement (delivery) ³⁾	Delivery lag (T+n)
Australia						
RITS	G	CB	138	RTGS	RTGS	T, T+3
Austraclear	G, O	O	619	RTGS	RTGS	T, T+3
CHES	E	SE	160	RTGS, N	RTGS, N	T+3
China						
Government	G, E	O	705 (600)	N	GS	T+1
Hong Kong						
CMU	G, O	CB	179/203 ⁴⁾	G, N	G, N	T+0
CCASS	E	SE	570	G, N	G, N	T+2
Indonesia						
BI-SKRIP	G	CB	nav.	RTGS, N	RTGS, N	T ⁵⁾
C-BEST	E	O	nav.	N	N	T+4
Japan						
BOJ-NET JGB						
Services	G	CB	371/421 ⁶⁾	RTGS ⁷⁾	RTGS ⁷⁾	T+0-T+3 ⁸⁾
JASDEC	E	B, SE, O	296 ⁹⁾	G, N	G, N	T+3
Korea						
KSE Stock	E	SE	51 (51)	N	N	T+2
KOSDAQ	E	O	64 (64)	N	N	T+2
KSE IDM	G	SE	82 (82)	N	N	T+0
KSE GBM	G, O	SE	64 (64)	N	N	T+0
OTC	G, O	O	nav.	RTGS	RTGS	T+0
Malaysia						
RENTAS	G, O	CB	66	RTGS	RTGS	T+0
SCANS	E	SE	74	N	N	T+3
New Zealand						
AustraclearNZ	G, E, O	CB	326 (312)	RTGS	RTGS	T+0
FASTER	G, E, O	SE	23 ¹⁰⁾	RTGS, N	RTGS	T+1.2 ¹¹⁾
Philippines						
ROSS	G, E	O	346	G/N	N	T+0
Singapore						
MEPS-SGS	G	CB	136 (92)	RTGS	G	T+0
CDP	E, O	SE	87 (31) ¹²⁾	N	G	T+3
DCSS	O	SE	63 (63)	G	G	T+n ¹³⁾
Thailand						
Bond registry system	G	CB	16,540 (16,540)	N	G	T+2
Book-entry system ¹⁴⁾	G, E	CB, TSD	974 (974), 58 (58)	RTGS/N, N	RTGS/G, N	T+2, T+3

¹⁾ G = government securities, E = equity, O = other.²⁾ B = banks, CB = central banks, SE = stock exchange, O = other.³⁾ G = gross settlement, N = net, RTGS = real-time gross settlement.⁴⁾ Number of recognized dealers/CMU members.⁵⁾ Coupon payment is calculated on T-2 before maturity.⁶⁾ Number of participants in book-entry/registration systems.⁷⁾ Settlement on a net basis was abolished in January 2001.⁸⁾ T+3 is the norm for outright transactions. Most repo transactions are settled on a T+2-T+3 basis. Settlement for the BOJ's market operations takes place on a T+0-T+3 basis.⁹⁾ As of end of March 2001.¹⁰⁾ Number of participant broking firms.¹¹⁾ On average: depending on the type of instrument and other conditions associated with the trade.¹²⁾ Number of depository agents as at end of June 2000.¹³⁾ By mutual agreement between counterparties.¹⁴⁾ Comma (,) separates government securities from equity; and slash (/) means there are two types of settlement.

Table 9

Features of selected securities settlement systems (continued)

	DVP mechanism		Central securities depository	Cash settlement agent ¹⁵⁾	Number of transactions (thousands)	Value of transactions (USD billions) ¹⁶⁾	Ratio of transactions value to GDP (at annual rate)
	¹³⁾	Intraday finality ¹⁴⁾					
Australia							
RITS	Model 1	Y	RITS	CB	101	1,127	3.1
Austraclear	Model 1	Y	Austraclear	CB	193	1,388	3.8
CHESS	Model 1, 3	Y	TNSC	CB	14,797	217	0.6
China							
Government	Model 2	N	CDC, SD&C	CB, B, O	1,979,800	488	0.5
Hong Kong							
CMU	Model 1, 3	Y	CMU	CB	52	761	4.7
CCASS	Model 3	N	CCASS	B	36,867	402	2.5
Indonesia							
BI-SKRIP	Model 1, 2	Y, N	BI	CB	20,905,820,000	nav.	nav.
C-BEST	Model 2	N	C-BEST	B	108,680,000	6	0.1
Japan							
BOJ-NET JGB							
Services	Model 1	Y	CB	CB	2,073/143 ¹⁷⁾	96,452/4,136 ¹⁷⁾	20.3/0.9 ¹⁷⁾
JASDEC	Model 3 ¹⁸⁾	Y	JASDEC	CB, B	34,710	nav.	nav.
Korea							
KSE Stock	Model 3	Y	KSD	B	nav.	555	1.2
KOSDAQ	Model 3	Y	KSD	B	nav.	512	1.1
KSE IDM	Model 3	Y	KSD	CB	nav.	18	neg.
KSE GBM	Model 3	Y	KSD	B	nav.	6	neg.
OTC	Model 1 ¹⁹⁾	Y	KSD	CB, B	nav.	936	2.0
Malaysia							
RENTAS	Model 1	Y	CB	CB	52	nav.	nav.
SCANS	Model 2	N	MCD ²⁰⁾	B	2,354	64	0.7
New Zealand							
AustraclearNZ	Model 1	Y	NZCSD	CB, B	312 ²¹⁾	1,147 ²¹⁾	25.1
FASTER	Model 1	Y	-	SE	605	4	0.1
Philippines							
ROSS	Model 1 ²²⁾	Y	GSED	CB	nav.	85	1.1
Singapore							
MEPS-SGS	Model 1	Y	CB	CB	21	100	1.1
CDP	Model 2	Y	CDP	B	99,301,000	99	1.1
DCSS	Model 1	Y	CDP	CB	1.7	3	0.03
Thailand							
Bond registry system	Model 1	Y	CB	CB	neg.	25	0.2
Book-entry system ²³⁾	Model 1, Model 3	Y, N	CB, TSD	CB	11.25, 1000	9, 4	0.1, neg.

¹³⁾ Model 1: transfer instructions for both securities and funds are settled on a trade-by-trade basis. Model 2: Securities transfer instructions are settled on a gross basis while funds transfer instructions are settled on a net basis. Model 3: transfer instructions for both securities and funds are settled on a net basis.

¹⁴⁾ Y = yes, N = no.

¹⁵⁾ B = banks, CB = central banks, SE = stock exchange, O = other.

¹⁶⁾ Converted at yearly average exchange rates.

¹⁷⁾ Figures for book-entry/registration systems.

¹⁸⁾ For stocks traded on the Tokyo Stock Exchange and Osaka Securities Exchange since May 2001.

¹⁹⁾ Free-of-payment delivery basis.

²⁰⁾ Malaysian Central Depository Sdn Bhd.

²¹⁾ Figures for the year ending in June.

²²⁾ Modified model 1. Funds settle on different system, i.e., MIPS.

²³⁾ Comma (,) separates government securities from equity.

Table 10

Direct participants in central bank funds transfer systems

(end of 2000)

	Total direct participants	Deposit-taking institutions	Non-deposit taking institutions, of which:				
			Central bank	public authorities	postal institution	securities companies	others
Australia							
RITS	54	50	1	0	0	1	2
China							
EIS	20,000	nav.	2,190	nav.	nav.	nav.	nav.
Hong Kong							
HKD CHATS	151	0	1	0	0	0	0
USD CHATS	62	0	1	0	0	0	0
Indonesia							
BI-RTGS	123	nav.	nav.	nav.	nav.	nav.	nav.
Japan							
BOJ-NET Funds Transfer System	398	337	0	0	0	57	4
Korea							
BOK-Wire	132	65	0	0	0	53	14
Malaysia							
RENTAS	66	64	1	nap.	0	0	0
New Zealand							
ESAS	13	11	1	1	0	0	0
Philippines							
MIPS	97	87	0	0	0	0	10
Singapore							
MEPS	92	91	1	0	0	0	0
Thailand							
BAHTNET	58	37	6	3	0	1	11

Table 11

Participants in selected securities settlement systems*(end of 2000, unless otherwise noted)*

	Total	Of which: banks	Securities companies	Others
Australia				
RITS	138	51	nav.	87
Austraclear	619	nav.	nav.	nav.
CHESS ¹⁾	160	nav.	nav.	nav.
China				
Government bonds settlement system	705	178	18	509
Hong Kong				
CMU ²⁾	179/203	170/187	0/0	9/16
CCASS	570	58	512	0
Indonesia				
BI-RTGS	nav.	nav.	nav.	nav.
Japan				
BOJ-NET JGB Services ³⁾	371/421	225/262	86/99	60/60
JASDEC ⁴⁾	296	52	222	22
Korea				
KSE Stock	51	0	51	0
KOSDAQ	64	0	64	0
KSE IDM	82	29	52	1
KSE GBM	51	0	51	0
Malaysia				
RENTAS	66	65	nav.	1
SCANS	74	11	61	2
New Zealand				
AustraclearNZ	326	30	nav.	nav.
FASTER ⁵⁾	23	nav.	nav.	nav.
Philippines				
ROSS	346	nav.	nav.	nav.
Singapore				
MEPS-SGS ⁴⁾	140	nav.	nav.	nav.
CDP ⁶⁾	87	nav.	nav.	nav.
DCSS	63	nav.	nav.	nav.
Thailand				
Bond registry system	16,540	nav.	nav.	nav.
Book-entry system ⁷⁾	58/974	nav.	nav.	nav.

¹⁾ Figure for 2001. Figure for 2000 is not available but membership numbers have been stable over time.

²⁾ Number of recognized dealers/CMU members.

³⁾ Number of participants in book-entry/registration systems.

⁴⁾ As of end of March 2001.

⁵⁾ Number of participant broking firms.

⁶⁾ Number of depository agents as of end of June 2000.

⁷⁾ Number of participants in equity/government securities.

ANNEX 2

STATISTICAL METHODOLOGY FOR COUNTRY TABLES¹

General

Exceptions	Data in the tables conform to this methodology unless indicated otherwise in the table concerned. However, it should be noted that varying methods of collecting data can also complicate cross-country comparisons.
Breaks in series	Where these occur they are indicated by a footnote.
Sources of data	These are indicated under the table concerned where it is felt appropriate.
Definitions	Definitions in the tables which are not given in this methodology are based on the Bank for International Settlements, <i>A glossary of terms used in payments and settlement systems</i> , revised version, January 2001 (http://www.bis.org/publ/cps00b.htm). Where necessary, footnotes to individual tables explain the country-specific definitions, eg of "banks". (Note that in general the term "banks" should be broadly construed according to local regulations so as to include all relevant financial institutions.)
Intra-bank items	These are included as appropriate except where indicated.
Foreign currency	Foreign currencies are not included in the figures unless otherwise indicated.
Time period	Each table indicates the period (eg year) or point of time (eg end year) that the data apply to. Where the data apply to a period, the data are the total for that period unless the table explicitly indicates otherwise (eg a daily average).
Estimated data	Where data are broadly estimated and thus only indicative, this is indicated in a footnote (except for population and GDP in Table 1).
Seasonal adjustment	Figures are not seasonally adjusted unless otherwise indicated.
"nav.", "nap.", "neg." and "0"	Where data are not available, this is indicated by "nav.". Where data are not applicable, this is indicated by "nap." Where data are very small (relative to other relevant data in the table concerned), this is indicated by "neg.". Where data mean absolutely zero or none, rather than being a small number rounded to zero, this is indicated by "0".

¹ Based on the methodology for statistical tables in the Bank for International Settlements, *Payment Systems in the Group of Ten Countries*.

Table 1: Basic statistical data

Population	Figures are averages for the year or at a point in the year as indicated.
GDP	Figures are nominal (not real).
GDP per capita	This figure equals the <i>GDP</i> figure divided by the <i>population</i> figure.
Exchange rate (domestic currency vis-à-vis USD) year-end average	The exchange rate of the local currency against the US dollar is provided both as a year-end value and as an average for the year.

Table 2: Settlement media used by non-banks

Banknotes and coins on issue	Banknotes and coins represent the value of cash in circulation in the economy. This excludes the value of banknotes and coins kept in vaults at central banks or at banks (see Table 4) but includes the value held by non-residents.
Transferable deposits	These are transferable deposits which can be used to make cashless payments using one of the instruments mentioned in Tables 7 and 8. They do not include deposits in foreign currencies unless these are included in M1.
Others	Filled in only if Narrow Money Supply (M1) includes items other than banknotes and coins and transferable deposits.
Narrow money supply (M1)	Cash in circulation and transferable deposits held by non-banks including non-residents.
Memorandum items:	
Broad money supply	Included in some cases. Footnotes to individual tables explain the definition of broad money supply used and how it differs from narrow money supply.
Outstanding value on e-money schemes	The difference between the value of cash loaded onto electronic purses (a reloadable multi-purpose prepaid card which may be used for small retail or other payments instead of banknotes and coins) or onto electronic wallets (a computer device used in some electronic money systems which can contain an IC card or in which IC cards can be inserted and which may perform more functions than an IC card) and the value spent.

Table 3: Settlement media used by banks

Transferable balances held at central bank	Deposits held by banks at the central bank which can be used for payment purposes, regardless of the type of account (eg current account, reserve account, settlement account, clearing account).
of which: required reserves	Funds that banks are required to hold at the central bank. If only part of the required reserves can be used for payment purposes, that amount is indicated here.
free reserves	Funds held voluntarily at the central bank that can be used for payment purposes.

Transferable deposits at other banks	Deposits held at other banks in the country (not at the central bank) which can be used for payment purposes.
Others	Included only if assets other than <i>balances held at central bank</i> and <i>transferable deposits at other banks</i> are relevant. In some cases a breakdown is provided. In other cases a footnote indicates what is included in this item.

Memorandum items:

Institutions' borrowing from central bank	Institutions' borrowing (in the forms defined in a footnote by the respective country) from the central bank which can be used for payment purposes.
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Table 4: Institutional framework (end-of-year figures)

Categories	Categories of institutions are based on the individual countries' own financial systems. Particular categories are explained in a footnote where this is felt to be necessary.
Columns 1 and 2	Number of points of entry into the cashless payment system.
Column 1: Number of institutions	Any institution which executes cashless payments is mentioned even if it does not hold deposits for customers (eg because the money transferred is given in cash by the customer to the institution, or debited from a sight account held at another institution).
Column 2: Number of branches	All branches of an institution. As a rule, the head office of the institution is counted as a branch if it offers cashless payment services.
Column 3: Number of accounts	Number of accounts on which cashless payments (see definitions in Tables 7 and 8) can be made. The only accounts mentioned here are those which: are held at central banks, or at other deposit-taking institutions for non-deposit-taking institutions; and can be debited directly using one of the instruments mentioned in Tables 7 and 8.
Column 4: Value of accounts	Aggregate amount of deposits held on accounts mentioned in Column 3. As a rule, the sum of the entries in the last column is identical to transferable deposits in Table 2.

Tables 5 and 6: Volume and value of payment instructions handled by selected interbank settlement systems

With regard to the volume and value of transactions, each payment instruction is counted once (not twice, ie the debit from the payer's account and the credit to the payee's account are not counted separately).

Interbank settlement systems	Interbank clearing and settlement systems in which most (or all) direct participants are financial institutions and which are used primarily to process cashless payments.
-------------------------------------	--

As a rule, all interbank settlement systems are mentioned here, both those managed by central bank and those managed by private operators.

Figures are provided system by system, with categories of various payment instruments (such as cheques, direct debits, credit transfers, etc.) as sub-items.

Tables 7 and 8: Volume and value of indicators of use of various cashless payment instruments

The objective of these tables is to estimate the volume and the value of cashless payment instruments used in the country concerned. Figures concerning only a sample of banks or customers should not be given, but should be extrapolated to provide figures covering the whole volume and value of cashless payment instruments used in the country. The data may include both retail and wholesale, and interbank and customer-initiated payments for cheques and credit transfers, and potentially for other instruments. The same is explained by way of a footnote.

In principle, the term "payment" is defined here to exclude **any** funds transfer in which the originator and the beneficiary are the same. This definition excludes any funds transfers in which the originator and the beneficiary are the same institution or individual. Therefore, any instrument which is used by banks' customers to get cash should not be counted (eg cheques used to obtain cash). Likewise, transfers between accounts in the same name in the same institution are excluded (eg transfers from a cheque account to a savings account, if both accounts are held at the same bank). However, because in practice it is usually impossible to exclude them from the data, transfers between accounts in the same name but where the accounts are held at **different** institutions are included unless indicated otherwise.

Strictly speaking "cashless" means without the involvement of cash. Such a narrow definition would exclude money (postal) orders, which involve cash at one or both ends of the transaction, as well as the majority of travellers' cheques, which are often paid in cash. It is not realistic to use such a narrow definition because it is very doubtful whether available statistics would permit a breakdown of the number of money orders or travellers' cheques according to the way they are paid or settled. Therefore, all payment instruments which involve cashless interbank settlement are included in the statistics.

In the case of cross-border payments, there is a need to avoid double counting (ie in the country of the originator and in the country of the beneficiary). Cross-border cashless payments are accordingly counted in the country of the originator.

The following guidelines are also followed:

No distinction is made between interbank items (bank A to bank B), inter-branch items (bank A branch to another bank A branch), or intra-branch items (bank A customer to another bank A customer at the same branch): all are included in the statistics;

Funds transfers used to settle credit card transactions are included (this is a payment from the user to the issuer);

Cheques Travellers' cheques and bankers' drafts are included under cheques. Commercial bills are included if funds transfers can be made on the basis of these, without using another medium.

Payments by debit and credit cards Also includes delayed debit cards (charge cards).

Credit transfers A payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary. Money orders are included under credit transfers.

Direct debits Pre-authorized debit of the payer's account by the payee.

Total The sum of the above items.

Tables 9 and 10: Volume and value of transfer instructions handled by securities settlement systems

Figures are provided system by system, with categories of various securities (such as government securities, bonds, shares, CDs, futures, options, etc.) as sub-items in some cases.

Transfer instructions comprise all transfer instructions entered into the securities settlement system (including deliveries free of payment). As regards options, all the contracts are included.

As far as CDs are concerned, transactions should be considered regardless of their issuers (banks, central bank, mortgage institutions).

Each transaction is counted once (not twice for sale and purchase). It is the transaction itself that is counted and not the double message notifications.

Securities settlement systems Transfer systems which settle transfer instructions for both securities and funds, and may include trading platforms and clearing houses. SSSs mentioned here include not only those managed by the central banks, but also those managed by private operators.

Table 11: Number of participants in securities settlement systems

Figures are provided separately for each securities settlement system, with categories of various participants (such as banks, securities companies, etc.) as sub-items.

ANNEX 3

CORE PRINCIPLES FOR SYSTEMICALLY IMPORTANT PAYMENT SYSTEMS²

Core Principles for systemically important payment systems

- I. The system should have a wellfounded legal basis under all relevant jurisdictions.
- II. The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.
- III. The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.
- IV.* The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.
- V.* A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.
- VI. Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk.
- VII. The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.
- VIII. The system should provide a means of making payments which is practical for its users and efficient for the economy.
- IX. The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.
- X. The system's governance arrangements should be effective, accountable and transparent.

* Systems should seek to exceed the minima included in these two Core Principles.

Responsibilities of the central bank in applying the Core Principles

- A. The central bank should define clearly its payment system objectives and should disclose publicly its role and major policies with respect to systemically important payment systems.

² Excerpts from the Bank for International Settlements, *Core Principles for Systemically Important Payment Systems*, January 2001.

- B. The central bank should ensure that the systems it operates comply with the Core Principles.
- C. The central bank should oversee compliance with the Core Principles by systems it does not operate and it should have the ability to carry out this oversight.
- D. The central bank, in promoting payment system safety and efficiency through the Core Principles, should cooperate with other central banks and with any other relevant domestic or foreign authorities.

ANNEX 4

RECOMMENDATIONS FOR SECURITIES SETTLEMENT SYSTEMS³

CPSS-IOSCO Technical Committee

Recommendations for Securities Settlement Systems

Legal risk

1. Legal framework

Securities settlement systems should have a well founded, clear and transparent legal basis in the relevant jurisdictions.

Pre-settlement risk

2. Trade confirmation

Confirmation of trades between direct market participants should occur as soon as possible after trade execution, but no later than trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after trade execution, preferably on T+0, but no later than T+1.

3. Settlement cycles

Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be evaluated.

4. Central counterparties (CCPs)

The benefits and costs of a CCP should be evaluated. Where such a mechanism is introduced, the CCP should rigorously control the risks it assumes.

5. Securities lending

Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.

³ Excerpts from the Bank for International Settlements and International Organization of Securities Commissions, *Recommendations for Securities Settlement Systems*, November 2001.

Settlement risk

6. Central securities depositories (CSDs)

Securities should be immobilised or dematerialised and transferred by book entry in CSDs to the greatest extent possible.

7. Delivery versus payment (DVP)

CSDs should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.

8. Timing of settlement finality

Final settlement should occur no later than the end of the settlement day. Intraday or real-time finality should be provided where necessary to reduce risks.

9. CSD risk controls to address participants' failure to settle

CSDs that extend intraday credit to participants, including CSDs that operate net settlement systems, should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligations is unable to settle. The most reliable set of controls is a combination of collateral requirements and limits.

10. Cash settlement assets

Assets used to settle the ultimate payment obligations arising from securities transactions should carry little or no credit or liquidity risk. If central bank money is not used, steps must be taken to protect CSD members from potential losses and liquidity pressures arising from the failure of the cash settlement agent whose assets are used for that purpose.

Operational risk

11. Operational reliability

Sources of operational risk arising in the clearing and settlement process should be identified and minimised through the development of appropriate systems, controls and procedures. Systems should be reliable and secure, and have adequate, scalable capacity. Contingency plans and backup facilities should be established to allow for timely recovery of operations and completion of the settlement process.

Custody risk

12. Protection of customers' securities

Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.

Other issues

13. Governance

Governance arrangements for CSDs and CCPs should be designed to fulfill public interest requirements and to promote the objectives of owners and users.

14. Access

CSDs and CCPs should have objective and publicly disclosed criteria for participation that permit fair and open access.

15. Efficiency

While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.

16. Communication procedures and standards

Securities settlement systems should use or accommodate the relevant international communication procedures and standards in order to facilitate efficient settlement cross-border transactions.

17. Transparency

CSDs and CCPs should provide market participants with sufficient information for them to identify and evaluate accurately the risks and costs associated with using the CSD or CCP services.

18. Regulation and oversight

Securities settlement systems should be subject to transparent and effective regulation and oversight. Central banks and securities regulators should cooperate with each other and with other relevant authorities.

19. Risks in cross-border links

CSDs that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlements.

ANNEX 5

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