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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PAYMENT SYSTEMS IN CHINA

CONTENTS

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 vostros 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.

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.

4.1.3.1 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 majeures.

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’.

(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:					
year end	*8.2982*	*8.2798*	*8.2787*	*8.2793*	*8.2781*
average	*8.3142*	*8.2898*	*8.2791*	*8.2783*	*8.2772*

Table 2

Settlement media used by non-banks

(end of year)

CNY billions

	1996	1997	1998	1999	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
Memorandum items:					
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)

CNY billions

	1996	1997	1998	1999	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)] :					
required reserves	*654.6*	*914.3*	*1,414.6*	*1,430.5*	*1,601.9*
free reserves	*651.7*	*632.8*	*nap.*	*nap.*	*nap.*
Transferable deposits held at other banks	1,901.0	2,133.9	784.8	745.2	847.7
Memorandum item:					
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:				
virtual institutions	*nav.*	*nav.*	*nav.*	*nav.*
Branches of foreign banks	158	6	nav.	nav.

Table 5

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

millions

	1996	1997	1998	1999	2000
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

CNY billions

	1996	1997	1998	1999	2000
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)]

millions

Instruments	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)]

CNY billions

Instruments	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	*nap.*	*nav.*	*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	nap.	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:					
Banks	*nap.*	*nav.*	*130*	*148*	*178*
Securities companies	*nap.*	*nap.*	*nap.*	*12*	*18*
Other types of financial institutions	*nap.*	*nap.*	*359*	*347*	*509*
Stock exchanges	1,066	840	659	628	631
of which:					
Other types of financial institutions	*nav.*	*nav.*	*nav.*	*nav.*	*203*

PAYMENT SYSTEMS IN HONG KONG

CONTENTS

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).

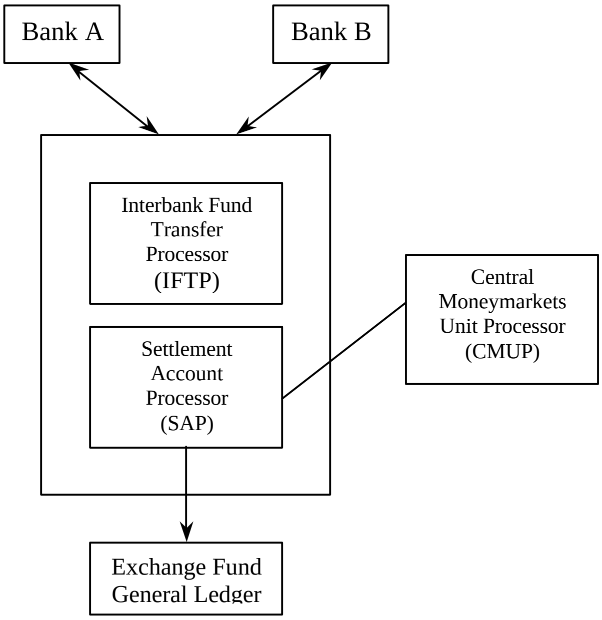
3. Interbank settlement systems

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 –

Clearing Items	Monday to Friday	Saturday
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)

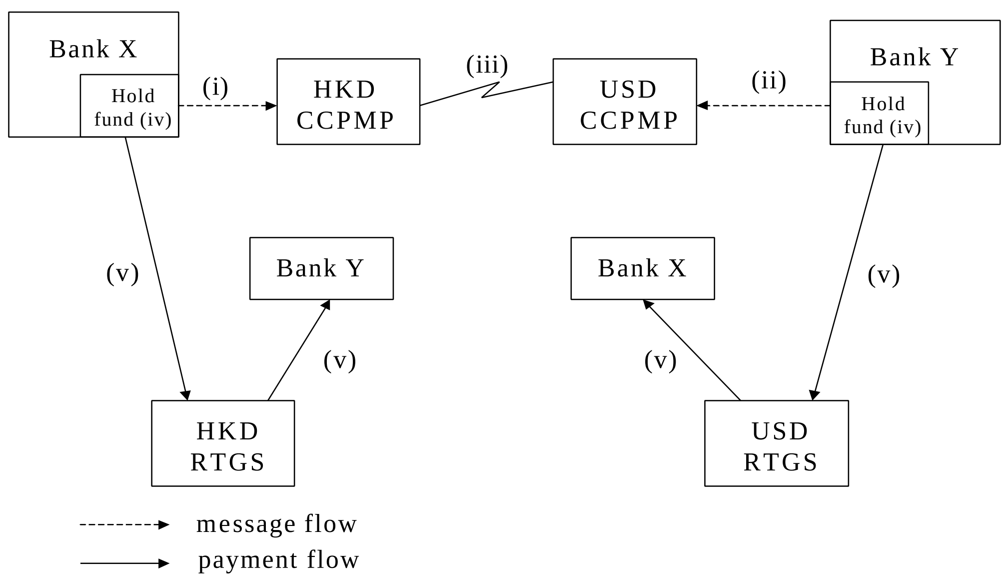
With the establishment of the seamless interface between SAP and CMUP in December 1996, the HKD RTGS system supports the real-time and end-of-day DVP facility for debt securities denominated in HKD that are lodged with the CMU. A similar seamless interface was established in May 1998 with CCASS. Market 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 form 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 –

Clearing Items	Monday to Friday
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 countrparty 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 presentment 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).

<u>Exchange Trades: Continuous Net Settlement (CNS) and Isolated Trades Systems</u>

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.

<u>Risk Management</u>

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.

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:					
year-end	*7.736*	*7.746*	*7.746*	*7.771*	*7.796*
average	*7.734*	*7.742*	*7.745*	*7.758*	*7.791*

Table 2

Settlement media used by non-banks

(end of year)

HKD billions

	1996	1997	1998	1999	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
Memorandum items:					
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:					
on card-based products	*nap.*	*nap.*	*nap.*	*nap.*	*nap.*
on network-based products	*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 certicate 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)

HKD billions

	1996	1997	1998	1999	2000
Transferable balances held at central bank [1]	0.5	0.3	2.5	8.0	0.7
of which:					
required reserves	*nap.*	*nap.*	*nap.*	*nap.*	*nap.*
free reserves	*nap.*	*nap.*	*nap.*	*nap.*	*nap.*
Transferable deposits held at other banks	nap.	nap.	nap.	nap.	nap.
Memorandum item:					
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	nap.	nap.
Deposit-taking companies [4]	61	131	nap.	nap.
Total	**264**	**1,811**	**nav.**	**605,451**
of which:				
virtual institutions	0	0	0	0
Branches of foreign banks				
licensed banks	*123*	*567*	*nav.*	*nav.*
restricted licence banks	*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]	nap.	nap.	nap.	nap.	185
of which USD/HKD PvP [4]	nap.	nap.	nap.	nap.	2
Cheques					
-HKD	140,823	149,850	135,815	134,115	138,571
-USD [5]	nap.	nap.	nap.	nap.	1
ECG [6]					
-HKD	43,358	49,483	50,721	52,589	57,134
-USD	nap.	nap.	nap.	nap.	neg.
Total					
-HKD	**187,108**	**202,655**	**189,692**	**189,855**	**199,114**
-USD	nap.	nap.	nap.	nap.	186

[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 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

HKD billions

	1996	1997	1998	1999	2000
CHATS [1]					
-HKD [2]	61,521	86,318	75,758	75,283	90,983
-USD [3]	nap.	nap.	nap.	nap.	1,888
of which USD/HKD PvP [4]	nap.	nap.	nap.	nap.	667
Cheques					
-HKD	12,563	12,288	5,890	5,348	6,092
-USD [5]	nap.	nap.	nap.	nap.	neg.
ECG [6]					
-HKD	4,673	8,685	6,330	5,528	8,608
-USD	nap.	nap.	nap.	nap.	26
Total					
-HKD	**78,757**	**107,291**	**87,979**	**86,160**	**105,683**
-USD	nap.	nap.	nap.	nap.	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.

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[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

millions

Instruments	1996	1997	1998	1999	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

HKD billions

Instruments	1996	1997	1998	1999	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

thousands

	1996	1997	1998	1999	2000
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

HKD billions

	1996	1997	1998	1999	2000
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:					
Banks [1]	*222*	*222*	*201*	*180*	*170*
Others	*2*	*2*	*3*	*8*	*9*
b)CMU member	259	260	243	217	203
of which:					
Banks [1]	*243*	*242*	*225*	*200*	*187*
Others	*16*	*18*	*18*	*17*	*16*
Number of participants in CCASS	556	568	564	563	570
of which:					
Banks	*63*	*63*	*61*	*60*	*58*
Securities companies [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.