

**Payment systems in  
Hong Kong**



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## List of abbreviations

AI	authorised institution
AMS	Automatic Order Matching and Execution System
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
DTC	deposit-taking company
DTCA	DTC Association
EFBN	Exchange Fund Bill and Note
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
LB	licensed bank
MM	market-maker
MPC	multipurpose stored value card
PPS	Payment by Phone Service
RD	recognised dealer
RLB	restricted licence bank
SAP	Settlement Account Processor
SEHK	Stock Exchange of Hong Kong
SFC	Securities and Futures Commission
SI	settlement instruction



## 1. Institutional aspects

### 1.1 Legal and regulatory framework

There is no specific legislation on payment systems in Hong Kong. However, there are a number of laws that have a 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 authorised 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 a settlement account on such terms and conditions as the Financial Secretary considers appropriate. The Financial Secretary has delegated this power to the HKMA.

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

The legal definition of a cheque is laid down 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 and payable on demand.

A “stored value card” is defined in the Banking Ordinance as a card (or similar) on which data may be stored in electronic, magnetic or optical form and for or in relation to which an individual pays a sum of money to the issuer of the card, directly or indirectly, in exchange for the storage of the value of that money, 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. A 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 value stored on the card is instantaneously deducted at the point of sale (POS).

There are two types of stored value card:

- (a) a “single purpose card”, which is not subject to the regulatory regime under the Banking Ordinance; and
- (b) a “multipurpose card”, with the issuer’s undertaking that, on presentation 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 multipurpose stored value cards with their 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 multipurpose 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 authorised as a deposit-taking company whose principal business is to issue or facilitate the issue of multipurpose 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 multipurpose 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 7 January 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 7 April 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 Securities and Futures Commission Ordinance and nine other securities and futures related ordinances were consolidated into a new Securities and Futures Ordinance, which was passed by the Legislative Council on 13 March 2002 and is expected to come into operation in early 2003.

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 6 March 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 are complying 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 of payment services**

#### **1.2.1.1 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 authorised institutions (AIs) under the Banking Ordinance.

Under the Banking Ordinance, the HKMA is the authority responsible for the authorisation, 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 authorisation 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 of 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 HKD 500,000

(approximately USD 64,103) and above. In May 2000, legal arrangements were finalised 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 the restriction on their 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 specialised activities, including consumer finance and securities business. These companies may take deposits of HKD 100,000 (approximately USD 12,821) 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.

Als 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 Authorisation 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 authorise 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 authorisation 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. Applicants incorporated overseas must come from countries with an established regulatory framework for electronic banking. In addition, they must have total assets of more than USD 16 billion.

#### *1.2.1.2 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 principal 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.

In July 2002, the HKMA appointed Standard Chartered Bank as the settlement institution for the EUR clearing system in Hong Kong. As in the cases of the HKD and USD clearing systems, Standard Chartered Bank also appointed HKICL as its clearing agent.

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 of securities services**

### *1.2.2.1 Licensed dealers*

Broadly speaking, any business entity which carries on or presents 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 customers' 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 in Part VI of the Securities Ordinance. The licensing requirements relating to futures dealers and advisers are established in Part IV of the Commodities Trading Ordinance. The licensing requirements relating to securities margin financiers are established in Part XA of the Securities Ordinance. The licensing requirements relating to leveraged foreign exchange trading are established in the Leveraged Foreign Exchange Trading Ordinance.

#### *1.2.2.2 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.

#### *1.2.2.3 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 providing 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 a DVP facility for shares denominated in HKD in order to reduce settlement risks and improve settlement efficiency. Following the implementation of the USD clearing system in Hong Kong, the DVP facility was extended to shares transactions denominated in USD in August 2000.

#### *1.2.2.4 Central Moneymarkets Unit (CMU)*

The CMU, established in 1990, is operated by the HKMA to provide computerised 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.

In December 1994, the CMU 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. 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 HKD liquidity from the HKMA to facilitate payment flows through intraday and overnight repos 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 with real-time and end-of-day DVP settlement of USD-denominated debt securities. Furthermore, this interface enables automatic intraday repos, which helps to provide intraday USD liquidity to the participants of the USD RTGS system.

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

### **1.2.3 Other service providers**

#### *1.2.3.1 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 standalone 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.

#### *1.2.3.2 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; see Section 2.5.2). EPSCO also offers non-POS debit facilities, including Payment by Phone Service (PPS) and ETC bill 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 payment services because the functions are typically included in the bank automated 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.

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.

Joint Electronic Teller Services Limited (JETCO)

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

Octopus Cards Limited (OCL)

OCL, formerly known as Creative Star Limited, issues Octopus Card, which is a stored value card used primarily for the payment of transport services provided by the five transport operators that jointly own OCL (see Section 2.5.3).

### **1.2.4 Role of other private and public sector bodies**

#### *1.2.4.1 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 be 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 draw up 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.

#### 1.2.4.2 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 media

### 2.1 Cash

Cash is still by far the most common means of retail payment in Hong Kong. At the end of 2001, HKD notes and coins in circulation amounted to HKD 102 billion, representing 7.9% of 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/GDP ratio in Hong Kong remains high, which could be mainly due to the significant amount of HKD notes and coins circulating in mainland China and Macau.

The government, through the HKMA, has given authorisation to three commercial banks, HSBC, Standard Chartered Bank and the Bank of China, to issue currency notes in Hong Kong. Authorisation 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 the specified rate of USD 1 to HKD 7.80 under the linked exchange rate system. The note-issuing banks deposit the USD backing with the Exchange Fund in exchange for certificates of indebtedness, which are redeemed by the Exchange Fund upon redemption of issued banknotes.

Hong Kong Note Printing Limited (HKNPL) prints the 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 HKD 10, HKD 20, HKD 50, HKD 100, HKD 500 and HKD 1,000. The HKD 10 notes are gradually being phased out and replaced by the HKD 10 coin, a process which began in November 1994. The government issues coins of HKD 10, HKD 5, HKD 2, HKD 1, 50 cents, 20 cents and 10 cents. Until 1992 these coins were embossed with the Queen's Head. In 1993, a programme was initiated to replace the Queen's Head series with a new series depicting the Bauhinia flower. The first Bauhinia coins, the HKD 5 and HKD 2 coins, were issued in January 1993. New HKD 1, 50 cent and 20 cent coins were issued in October 1993, and a new 10 cent coin in May 1994. The HKD 10 coin, the last of the Bauhinia series of coins, was issued in November 1994. Since the beginning of the coin replacement programme 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 programme continues.

In early autumn 2002 a new HKD 10 note started to circulate in Hong Kong. The new note is issued by the government in recognition of continuing demand among the public for a HKD 10 note in addition to the HKD 10 coin. The HKD 10 coin and the existing HKD 10 notes will remain in circulation.

Commemorative coins were issued to mark important events such as the establishment of the Hong Kong Special Administrative Region on 1 July 1997 and the grand opening of 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 of retail payment, cheques are also often used in transactions where debit cards or credit cards are not accepted (eg for payment of large-value items such as motor cars or payment of deposit when purchasing property). Cheques are also used for some smaller-value items such as utility bills, but alternative 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 HKD 20 billion. This is about 5% of the daily amount handled by the HKD RTGS interbank payment system

Since January 1998, it has been possible for HKD cheques issued by banks in Hong Kong to be presented at banks in the Shenzhen Special Economic Zone and delivered back to Hong Kong for clearing. Good funds can be made available to the payee in Shenzhen on the afternoon of the next business day after presentation of the cheque. A similar service was extended to 19 cities in Guangdong province in 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 transfer.

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 2001 was nearly 18 billion for a value of HKD 443 billion.

## **2.4 Direct debit transfers**

Standing direct debit instructions are commonly used by households for executing such regular payments as utility bills and charges. In debit transfers, the payee instructs his bank to collect payment from the paying party, often on a recurring basis. Direct debit payments are preauthorised 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 2001 was over 37 billion for a value of HKD 55 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 HKD 62 billion in outstanding receivables as at the end of 2001. The 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. (See also Section 1.2.3.2.)

### **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. 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, giving rise to the question of float management, which is of prudential concern to the HKMA and the public alike. This is one of the considerations that led to the authorisation of OCL as a DTC (see below) to bring it under the regulatory regime of the HKMA.

Octopus Card is a "contactless" stored value card issued by OCL (see Section 1.2.3.2). The card scheme was launched in the third quarter of 1997, when it was exempted from the definition of multipurpose 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, OCL, formerly known as Creative Star Limited, was authorised as a special purpose DTC under the Banking Ordinance. The authorisation of the company allows Octopus Card to be put to a wider range of uses, including non-transport-related, thus enhancing the convenience for cardholders. Its application now includes car parks, fast food outlets, bakeries, convenience stores, supermarkets, personal care stores, vending machines, photo booths, pay phones, photocopiers, cinemas and schools. Any extension of the multipurpose use of Octopus to non-transport service providers is subject to the conditions set down by the HKMA when it authorised the company as a DTC.

By the end of June 2002, the number of Octopus Cards in circulation had reached 8.6 million, with daily transactions at over 7.2 million. There were over 130 service providers.

## **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 bill 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 over the phone and on the internet, and ETC bill 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 bill payment).

## **3. Interbank settlement systems**

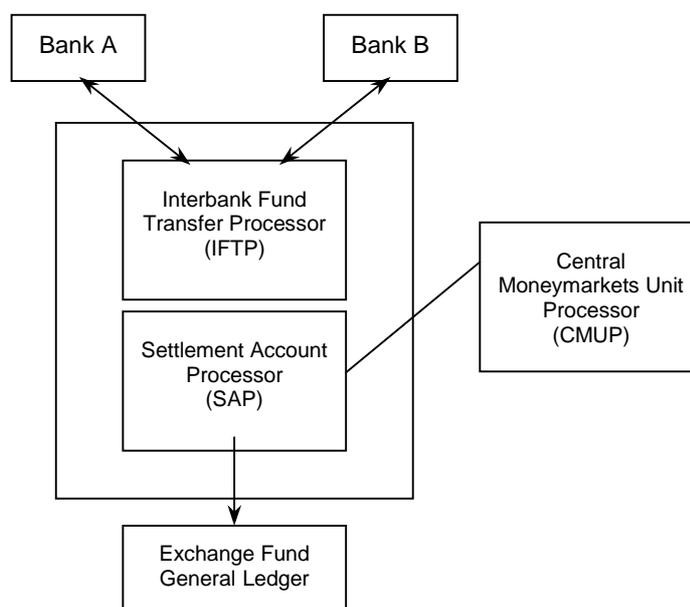
### **3.1 The real-time gross settlement (RTGS) system for HKD**

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

The design of the RTGS system is simple and robust. It uses a Y-shaped topology 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 a 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 intraday repo transactions to obtain interest-free intraday liquidity from the HKMA.

Diagram 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

#### 3.1.3.1 RTGS transactions

The name of the RTGS system for interbank transactions 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.

#### 3.1.3.2 Clearing and settlement of paper cheques (CLG)

CLG 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 day 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 check for sufficient funds in the drawees' accounts and return all dishonoured cheques to HKICL on the next business day (Day D+1). Only cheques presented on Day D that are not returned are settled on day D+1.

#### 3.1.3.3 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;
- funds 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 for the RTGS system is HKICL. The system operates from 09:00 to 17:30 from Monday to Friday and from 09:00 to 12:00 on Saturday. During the above operating hours, banks can settle their interbank transactions. Customer-related transactions have to be handled before 17:00 from Monday to Friday and 11:30 on Saturday.

### 3.1.5 Settlement

#### 3.1.5.1 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.

#### 3.1.5.2 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 (ie stock market transactions)	09:30	09:30
EPSCO (EPS + autocredit items)	10:00	10:00
JETCO (Joint Electronic Teller Services)	11:30	09:00
Paper cheques + autodebit items	15:00 (09:00 on Monday for Friday items)	nil

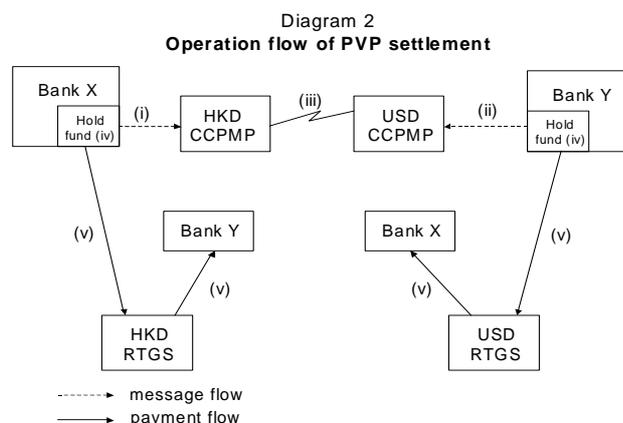
### 3.1.5.3 Delivery versus payment (DVP)

With the establishment of the seamless interface between the 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 a real-time and an end-of-day DVP facility for HKD-denominated shares which are listed on SEHK.

### 3.1.5.4 Payment versus payment (PVP)

The HKD CHATS was linked with the USD CHATS (see Section 3.2 for information on the 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 to 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.

Diagram 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 via the HKD RTGS system (i). Bank Y also initiates a mirror PVP payment transaction via the USD RTGS system (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).



### 3.1.6 Risks and risk management measures

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

- (a) Management of liquidity: under the RTGS environment, the availability of intraday liquidity is a crucial element in order to reduce the chance of payment gridlock in the system. In this regard, the HKD CHATS has various built-in 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 a 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. Intraday repos that cannot be repurchased before the close of business will be rolled into overnight borrowing under the discount window, in which interest is charged by the HKMA. Apart from the above facility, banks can also arrange overnight repos with the HKMA through the discount window facility if required.
- (c) Queuing mechanism: the HKD RTGS system is a credit transfer system. If a bank does not have a sufficient balance in its settlement account to effect payment, the transaction is queued in the system. Banks can make use of a resequencing function to move the selected transaction to either the top or the bottom of their queued payments. The queuing mechanism allows the banks to manage their own queues of payment instructions through cancellation, resequencing and amendments.
- (d) Monitoring: to ensure smooth processing in 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 orderly manner throughout the day. Each bank is required to release and settle its interbank payments whose aggregate value is not less than 35% and 65% (by 12:00 and 14:30 respectively) 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 have underperformed.
- (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, into the IFTP, the instructions will be stripped so that only the settlement instruction - ie 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 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 of 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 21 August 2000.

The purpose of the USD clearing system is to provide efficient settlement of USD transactions during Asian business hours. The 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 centre, and the fact that the 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 be a commercial bank, and such a private sector solution is consistent with the recommendation by the Bank for International Settlements. Such practice is also 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 (see Section 3.2.1).

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

- The settlement institution 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 settlement institution and all transactions are settled across the books of the USD settlement institution.
- The USD CHATS has adopted a two-tier membership structure in which banks can join the system as either direct 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 settlement institution.
- Unlike the HKD CHATS, the USD settlement institution provides a clean intraday overdraft facility to the direct participants in the system. Direct participants can enjoy an interest-free overdraft facility and interest-free intraday repos if they can repay HSBC's New York correspondent before the close of the New York CHIPS on that value day (ie 05:30 in summer, or 04:30 in winter, Hong Kong time, on Day D+1).

### **3.2.1 Ownership**

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

### **3.2.2 Participation**

Participation in the 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 settlement institution.

### **3.2.3 Types of transactions**

#### *3.2.3.1 RTGS transactions*

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

#### *3.2.3.2 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.

### 3.2.3.3 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 09:00 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

#### 3.2.5.1 RTGS

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

#### 3.2.5.2 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 a bulk clearing basis at the following times.

Clearing items	Monday to Friday
CCASS (ie stock market transactions)	09:30
Paper cheques	15:00 (09:00 on Monday for Friday items)

#### 3.2.5.3 Delivery versus payment (DVP)

In December 2000, the USD CHATS system linked up with the CMUP (ie the book-entry debt securities clearing system operated by the HKMA) to support the 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 a real-time and an end-of-day DVP facility for USD-denominated shares which are traded on SEHK.

#### 3.2.5.4 Payment versus 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 Herstatt risk. With PVP settlement and the consequent elimination of Herstatt risk, the application of bilateral counterparty trading limits may assume less importance, and interbank liquidity may therefore improve as the traded currencies are put to immediate use in the respective clearing systems.

### 3.2.6 Risks and risk management measures

Various risk management measures have been instituted:

- (a) Management of liquidity: similar to the HKD CHATS, the USD CHATS has various built-in system features to facilitate liquidity management for the participating 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 will need to pay (or receive) for

each of the two 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, which allows the banks to assess precisely whether they have surplus (or insufficient) funds for meeting their payment obligations.

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

- (b) **Queuing mechanism:** if a bank does not have a 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 resequencing function to move the selected transaction to either the top or the bottom. The queuing mechanism allows the banks to manage their own queues of payment instructions through cancellation, resequencing and amendments.
- (c) **Monitoring:** the USD settlement institution as well as the HKMA closely monitor the payment condition of each direct participant on a real-time basis. Through the USD SAP, the USD settlement institution and the HKMA can access the position of each bank as well as the details of each transaction. The HKMA also closely oversees the performance of the USD settlement institution. The HKMA meets regularly with the USD settlement institution to discuss 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 under which each direct participant is required to release and settle interbank payments whose aggregate value is not less than 35% and 65% (by 12:00 and 14:30 respectively) 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 settlement institution on a regular basis to keep abreast of the operation of the system.
- (f) **Confidentiality:** while a direct participant inputs the full details of its payment instructions, including customer information, into the USD IFTP, the instructions will be stripped so that only the settlement instruction - ie 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 has adopted 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 of the USD settlement institution 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 settlement institution and HKICL.

## **3.3 Major projects and policies being implemented**

### **3.3.1 Cross-border joint cheque clearing facility with cities in mainland China**

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 1 October 2000, it has been possible to reduce the clearing and settling of HKD cheques issued by banks in Hong Kong and presented in Guangdong province 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 January 1998 in Shenzhen, and 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 arrangement with mainland China, the HKMA and the Guangzhou branch 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 province and presented in Hong Kong. Starting from 22 June 2002, the time required for clearing those cheques has been reduced to two working days. The joint clearing facility has streamlined the collection of the cheques and their delivery to the clearing houses in Guangdong and Shenzhen for processing.

### **3.3.2 Review of retail payment services in Hong Kong**

In late 2001, the HKMA completed a comprehensive review of retail payment services in Hong Kong, which was conducted by an internal task force 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 concluded that Hong Kong's retail payment systems generally function well. They are considered to be efficient and effective, and there is 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 the smaller banks), which will not have this in-house hardware/software (as it is not likely 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, which will check balances and other technical details and verify signatures. For cheques which are to be returned on account of insufficient funds, technical errors or incorrect signatures, both Group A and Group B banks will generate outward return data files, using either their own in-house facilities or HKICL's image viewing software as the case may be, and submit the files to HKICL for return processing. HKICL will then pass these 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) the collecting bank, having examined a cheque, suspects it to be counterfeit or forged. In these situations, physical presentation of the cheque itself will still be required for security and crime prevention reasons.

For risk management purposes, a system will be instituted for sample checking of the cheques which are proposed to be truncated. To assist paying banks with signature verification from the cheque

images, appropriate consideration will be given in the selection of processing equipment and elsewhere to ensuring high-quality images. A programme will also be devised with a view to ensuring that the cheque imaging process and the cheque images are reliable and secure. The programme will be applicable to both Group A banks and HKICL. HKICL will appoint a consultancy firm to design the programme. Both HKICL and Group A banks will appoint either internal or external auditors to certify their imaging systems in accordance with the programme. Certification will be carried out every three years or sooner on an "as needed" basis.

The banking industry as represented by the HKAB is in favour of cheque imaging and truncation because cheque processing costs and storage costs (currently incurred 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 clearing system in Hong Kong**

On 3 July 2002, the HKMA announced that Standard Chartered Bank had been appointed as the settlement institution for the EUR clearing system in Hong Kong for a franchise period of five years from 1 March 2003.

The purpose of this EUR clearing system is to facilitate the efficient settlement of EUR transactions on a real-time basis within the Hong Kong time zone. With EUR being one of the leading international currencies, the holding of EUR and the trading of EUR-denominated assets may become increasingly prevalent in Hong Kong and the rest of the Asia-Pacific region. An efficient and reliable EUR clearing system will be an important addition to Hong Kong's financial infrastructure.

In line with international practice and learning from the successful experience of Hong Kong's USD clearing system, a private sector solution has been devised for the EUR clearing system. A commercial bank - Standard Chartered - will act as the settlement institution. It in turn has appointed HKICL, the current operator of the HKD and USD clearing systems, as its clearing agent.

The key functions of the EUR clearing system will include an interbank EUR RTGS system, PVP settlement for EUR/USD and EUR/HKD foreign exchange transactions and DVP settlement for EUR-denominated debt securities through a linkage with the CMU. It is expected that the system will be ready for launch in the second quarter of 2003.

## **4. Securities settlement systems**

The securities traded in Hong Kong consist mainly of EFBNs, private debt securities and equity securities. Transactions involving these instruments are cleared and settled through two distinct clearing systems:

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

##### *4.1.1.1 Market overview*

The amount of HKD debt issuance in 2001 was HKD 386 billion, 15% lower than in 2000. However, the total of HKD debt outstanding rose by 5% to reach HKD 494 billion at the end of 2001. The decline in issuance was mainly attributable to the economic downturn and a poor external environment. Other than statutory bodies and government-owned corporations, all classes of issuer registered a reduction in issuance. Nevertheless, the market saw an increase in product variety and strong retail interest in debt securities.

#### 4.1.1.2 Trading systems

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

Exchange market: EFBNs were listed on SEHK in August 1999. Retail investors can trade EFBNs through SEHK. Currently, SEHK is using a trading system called the Automatic Order Matching and Execution System (AMS). Similar to equity 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 on 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

#### 4.1.2.1 Trade matching and confirmation

The CMU provides two types of trade matching services for CMU participants. Participants who have installed a CMU user terminal (CMT) can use the “single input and confirmation” method to match their transfer instructions with their counterparties. Another matching service - “matching at centre” - is also available to all CMU participants.

“Single input and confirmation” is performed in sequence as follows:

- Sellers input trade details into 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 transactions.

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

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

If instructions do not match, with the “single input and confirmation” method new transactions can be initiated by the sellers. 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.

#### 4.1.2.2 Clearing house

The CMU is not a central counterparty for securities transactions and does not guarantee settlement.

### 4.1.3 Settlement

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

The CMU service offers two types of settlement mode: (i) delivery versus payment (DVP), and (ii) free of payment (FOP). Through the seamless interface with the HKD and USD RTGS systems, the CMU provides real-time DVP settlement for its members. Members which are direct participants of the HKD or USD RTGS system can settle a transaction directly through their cash clearing account with the settlement institution. Those not directly participating in the RTGS system have to appoint a settlement bank to effect the payment arising from their securities transaction.

Real-time settlement is on a gross basis. The real-time window extends from 09:00 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 is completed before 16:00.

#### 4.1.3.1 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.

#### 4.1.3.2 Central securities depository (CSD)

The CMU acts as the CSD for EFBNs and provides members with 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 programme;
- 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) Recognised 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 degrees of commitment, the development of the EFBN market. RDs are to participate actively in the primary market and to promote EFBNs in the retail market. MMs, appointed from the pool of RDs, have the added responsibility of maintaining secondary market liquidity. Only RDs and MMs are eligible to settle EFBNs through the CMU.
- (b) CMU members: the following are eligible to join the CMU as CMU members to settle and clear private sector debt securities:
  - Als in Hong Kong;
  - members of the Hong Kong Capital Markets Association.

At the end of December 2001, there were 188 CMU members and 166 RDs/MMs. The rights and obligations of RDs/MMs and CMU members using the CMU service are set out in the Appointment Letter of Recognised Dealer/Market-Maker and CMU Membership Agreement respectively.

CMU participants are required to maintain separate accounts for their own holdings and customers' holdings. A customer with substantial holdings may request the CMU member to open a specific custody account under his name.

#### 4.1.3.3 Risk management

The CMU is not a central counterparty for securities transactions and does not guarantee settlement. Settlement of transactions will be failed either if buyers have insufficient funds or if sellers have insufficient securities. 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 securities transactions. Bank members can obtain the necessary intraday liquidity through automatic intraday repo transactions entered into with the settlement institutions of the payment systems. Therefore, the CMU is not exposed to any credit risk to its members.

In addition, there is no credit exposure between CMU members arising from the settling of securities transactions through the CMU because the CMU provides both real-time and end-of-day DVP facilities to its members. However, since 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 a real-time DVP basis.

With regard to disaster arrangements, the CMU has a hot backup site that is located outside the central business district. Production data are copied to the site on a real-time basis. When a major operational disruption occurs 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 failure of a participant's CMT.

The CMU maintains a comprehensive system of internal controls and procedures. This aims to minimise the operational risk. These internal controls and procedures are subject to examination by both internal and external auditors. The internal audit is conducted on a 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 high-quality audit services to the Legislative Council and public sector organisations 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 entrusted with the primary objective of assisting the management of the HKMA in the effective discharge of its responsibilities and functions. This is achieved through comprehensive audit coverage sufficient to ensure that the 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.

#### *4.1.3.4 Payment*

Payments for transactions are executed 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.

Those not directly participating in the interbank payment system have to appoint a settlement bank to effect the payments arising from their securities transactions.

## **4.2 Equities**

### **4.2.1 Trading**

The demutualisation 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 27 June 2000. To avoid potential conflicts of interest, arrangements were made for the HKEx to be regulated as a listed issuer directly by the SFC.

#### *4.2.1.1 Market overview*

##### **Main Board**

As at the end of December 2001, there were 756 companies listed on the Main Board with a total market capitalisation of HKD 3,885.3 billion.

In May 2000, SEHK introduced the Pilot Programme for trading US securities. Accordingly, Nasdaq and SEHK signed an agreement on the 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. Pilot Programme shares are traded and settled in HKD, via the Hong Kong trading and clearing system, following the standard Hong Kong T+2 settlement period.

### Growth Enterprise Market (GEM)

The GEM commenced operations on 15 November 1999 to provide capital formation facilities for growth companies that are not qualified to list on the Main Board. Fifty seven companies were newly listed in 2001. In total, they raised HKD 4.1 billion of new capital. GEM's average daily turnover value in 2001 was HKD 162 million. As of the end of 2001, 111 companies were listed on the GEM with a total market value of HKD 61.0 billion.

### Warrants (Main Board)

The total number of warrants listed on the exchange was 96 as at the end of 2001, compared to 291 in 2000. The turnover of warrants for 2001 was HKD 108.2 billion, representing a decrease of 35% compared with 2000's HKD 167.4 billion.

### Debt securities (Main Board)

Twenty one new debt securities were listed in Hong Kong in 2001, compared with 20 in 2000. The total number of debt securities decreased to 195 at the end of December 2001. Trading remained inactive with a year total of HKD 38 million.

### Unit trusts and mutual funds (Main Board)

There were 22 unit trusts listed on the exchange as at the end of December 2001, compared to 21 and 23 in 2000 and 1999 respectively. The total trading turnover of unit trusts listed on the exchange increased to HKD 20.7 billion in 2001 compared to HKD 20 billion in 2000 and HKD 12.5 million in 1999.

### Derivatives market

The total number of contracts traded in the HKEx derivatives market increased by 13.9% to 10,549,552 in 2001. The average daily volume was 37,872 contracts. The growth was primarily due to a volatile market.

#### 4.2.1.2 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 auto-matching based upon a price-time priority algorithm. Currently, AMS/3 runs two sessions daily, 10:00 to 12:30 and 14:30 to 16:00, Monday to Friday. Orders are placed by brokers with 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 currently traded currency denominations are HKD and USD.

#### 4.2.1.3 Governance

The governance of SEHK, including its trading systems, is performed by the holding company - the HKEx. The HKEx board comprises 15 directors, six of whom are shareholders, eight directors appointed by the government to represent the public interest and one an ex officio member, the chief executive of the HKEx, who is appointed by the HKEx board with the approval of the SFC.

#### 4.2.1.4 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 of Hong Kong for five years preceding the application. As to a corporate exchange participant, the applicant must be a holder of a stock exchange trading right, a registered

dealer under the Securities Ordinance and a corporation limited by shares incorporated in Hong Kong. Detailed qualifications are stipulated in the SEHK rules.

#### **4.2.2 Pre-settlement**

##### *4.2.2.1 Trade confirmation*

The direct interface between AMS/3 and CCASS provides automated transmission of executed trade information for clearing and settlement processing (see Section 4.2.2.2, “Exchange trades”, for details).

##### *4.2.2.2 Clearing house*

CCASS clearing services determine the stock and money obligations of participants in a securities transaction to deliver or receive either cash or securities. CCASS also provides settlement services under which securities are credited to or debited from 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 instructions, clearing agency transactions and investor settlement instructions).

##### *Exchange trades: continuous net settlement (CNS) and isolated trades system*

Details of all exchange trades, including trade data and trade amendments, are electronically and automatically transmitted to CCASS by SEHK on each trading (T) day. There is no need for broker participants 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 shortly after 18:00 on each T day for reconciliation. Final clearing statements are available to broker participants shortly after 14:00 on T+1 for confirmation purposes.

##### **CNS system**

Exchange trades are settled under the 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 the CNS system, HKSCC becomes the central counterparty to both the buying and the selling broker through novation. Acting as the central 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. (For details of the HKEx board, see Section 4.2.1.3.)

## Participation

There are six categories of CCASS participant:

1. Broker participant (must be an exchange participant of SEHK and registered dealer under the Securities Ordinance).
2. Custodian participant (must be an AI under the Banking Ordinance, or a trust company registered under the Trustee Ordinance, or a registered dealer under the Securities Ordinance but not an exchange participant of SEHK).
3. Investor participant (must be an individual aged 18 or above, hold a Hong Kong identity card and not be an undischarged bankrupt or subject to any legal incapacity).
4. Stock lender participant (must have an established stock lending business in Hong Kong in securities listed on SEHK or 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 participant (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 participant (must be a body recognised and regulated in Hong Kong by the SFC or other similar regulatory organisation or, in an overseas jurisdiction, by a governmental body or securities regulatory agency or an equivalent authority in respect of its business of 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 SEHK rules.

## Risk management

HKSCC takes the following measures to manage its risk exposures:

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

All exchange trades are due for settlement on the second trading day following the transaction (ie 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 system. Money ledgers of participants are also updated simultaneously. Money settlement by broker participants through their designated banks is generally confirmed on the morning of 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 central counterparty to the CNS trades, HKSCC is exposed to market risk as a result of unfavourable fluctuations in 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 reflect 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 unfavourable marks in cash or by using stock as collateral to HKSCC. The marking to market and collection of net unfavourable marks help to confine HKSCC's market risk to a single day's market fluctuations.

In addition, an intraday marking to market on all open positions is performed at 11:00 daily. Broker participants are required to pay the intraday marks if they are in excess of a 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 broker participants are 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 the two entities 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 clearing house'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, transfers 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 HKD 50,000 in cash for every trading right held in SEHK, with the balance in cash or bank guarantees. The amounts of contributions are 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 the 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 a settlement guarantee for the novated contracts.

*4.2.2.3 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**

#### *4.2.3.1 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 online 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 online by initiating DIs. Each DI takes immediate effect upon input, if there is a sufficient stock balance available in the delivering participant's stock clearing account.

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

#### *4.2.3.2 Central securities depository (CSD)*

See Section 4.1.3.2.

#### *4.2.3.3 Central counterparty*

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

#### *4.2.3.4 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 the CNS system are always on a DVP basis. For isolated trades and SI and ISI transactions, participants can choose to settle on a DVP or FOP basis. For transactions settled on an 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 the RDP system, shares are delivered to the stock account of paying participants upon receipt of payment confirmation from HKICL.

Each participant establishes an account at a designated bank and authorises 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 participants can make enquiries about such information via the CCASS phone system or the internet.

The money positions arising from a broker participant's trades settled under the 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 and 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 modernisation 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 modernised 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.

To further enhance the debt clearing and settlement infrastructure of Hong Kong, the CMU is preparing to provide efficient and cost-effective clearing, settlement and custodian facilities for US Treasuries to its members. The new facilities will enable CMU members to clear and settle US Treasuries on a real-time delivery versus payment basis during Hong Kong hours. This will not only improve settlement efficiency but also reduce settlement risk for US Treasuries in the Asian time zone. In addition, the new service could expand the universe of eligible collateral for the USD clearing system and other foreign currency clearing systems in Hong Kong. This arrangement should help to create an important pool of liquidity in this region and to attract US Treasuries trading to Hong Kong. The HKMA has appointed Citibank as its custodian for custody of US Treasuries on behalf of the CMU. This new service will commence in the fourth quarter of 2002.

#### **4.3.2 Implementation of CCASS/3**

To keep pace with future developments, HKEx is in the process of upgrading CCASS to a new-generation system, 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 include structural improvement in system functions. The system will support multimarket 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 stage 1 system of CCASS/3 was launched successfully in May 2002. Following stabilisation of the system, HKEx plans to introduce the stage 2 system of CCASS/3 in the second half of 2002.

## **5. Role of the HKMA**

The HKMA was established on 1 April 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: the Hongkong and Shanghai Banking Corporation Limited, 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 banker to the government, a function which has been carried out historically by commercial banks.

#### **5.1 Provision of settlement accounts**

See Section 3.1.2.

#### **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 specialising in the clearing and settlement of debt securities. The HKMA assumes no role in the settlement of 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 minimising, and even eliminating, settlement risk.

